

# UC SAN DIEGO

# SAT WORKBOOK

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## PROJECT OF

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# SIGNAL & RESPONSE | INTRODUCTION

On every section of the SAT, when you encounter any question, the goal is to look for the SIGNAL and apply the appropriate RESPONSE.

This book will introduce and define all content tested on the SAT in Reading, Writing, and Math on the basis of the SIGNAL and the RESPONSE to the signal.

The SIGNAL(S) are the clues from the answer choices, question, and passage/math problem that will identify the subject matter of and/or appropriate strategy for a question type. The ability to recognize signals provides the primary compass direction for the solution.

The RESPONSE is defined as how to apply the appropriate foundational knowledge and/or strategies after identifying what kind of question is being asked. What are the tools to use to solve the question? What are the steps or rules that are indicated with each different question type?

This book will define each question type accordingly through the SIGNAL and RESPONSE lens, providing a solid method to answer all of the question types that is proven to achieve significant score improvement.

## SIGNAL & RESPONSE | IN THIS BOOK

Below is a general version of how a question is presented using the Signal & Response approach, with brief descriptions of the type of content seen under the **SIGNAL** and the **RESPONSE** column.

Underneath the question on the left, Signals indicative of the question type are provided, and rules are emphasized. Under the Answer Choices, the Response path is fully detailed step by step.

EXAMPLE 1:

QUESTION	ANSWER CHOICES
A sentence might be [ 1 ] given with an underlined portion, and multiple answer choices will be provided for you to select the right answer from.	<p>[ 1 ]</p> <p>A) No Change</p> <p>B) given; with</p> <p>C) give with</p> <p>D) give, with</p>
SIGNAL	RESPONSE
<b>USE</b> the answer choices, keywords from the question, and other clues from the passage or math problem to <b>IDENTIFY</b> the signal(s) for each question.	Apply the proper response based on the signal(s) in order to eliminate wrong answers and figure out the correct answer.

# SIGNAL & RESPONSE | **MAXIMIZE YOUR SUCCESS**

## Learning + the Two-Step Approach

All content in this workbook is presented in relation to the Signal & Response strategy. The workbook not only gives important Signal & Response skills but also covers fundamental knowledge required on the SAT.

All Signals and their Responses are organized under specific subject headings such as Grammar|Lists or Math|Linear Equations.

New material, such as grammar rules, will be introduced along with new strategies, such as active reading.

You must integrate the new and familiar foundational knowledge with the SIGNAL & RESPONSE approach into your SAT practice in order to maximize your success.

## PRACTICE & NEW SKILLS

Practicing the Signal & Response skills will make them become second nature and increase your ability to score well. To achieve maximum score improvement, use the **SIGNAL & RESPONSE** strategy on every SAT question. This strategy has consistently helped both lower and higher scoring students achieve significant score improvement.

Effective practice includes careful review. Do not limit your review to missed questions. Instead, plan on reviewing questions that were difficult or time-consuming, or that required you to guess.

Did you correctly recognize all of the signals? Did you apply the proper response? Did you use the Signal & Response strategy to solve the question in a time efficient way that also avoids mistakes?

Failing to correctly identify a signal in the math or writing questions indicates that review of the subject information as well as the Signal & Response strategy for that subject matter is needed.

If you are missing questions even though you are correctly identifying the signals, then plan on reviewing the appropriate subject material and the proper response strategy. Consider using outside resources, such as the recommended Khan Academy practice, to strengthen your understanding of that subject.

With the introduction of each new subject, this book provides recommended Khan Academy SAT practice sections that correspond with the subject.

## PRACTICE TIME

We recommend planning on devoting at least 45 minutes 5 days a week to practicing (and reviewing) SAT practice test questions and/or Khan Academy SAT practice questions.

Make sure to include SAT practice test sections and full Writing passages on Khan Academy in order to practice recognizing signals and timing.

## SKILL DEVELOPMENT | **OUTSIDE SOURCES**

### Official SAT Resources

#### **College Board 8 Official SAT Tests w/ Explanations & Scoring Scales**

<https://collegereadiness.collegeboard.org/sat/practice/full-length-practice-tests>

#### **College Board 2 Official PSAT Tests w/ Explanations & Scoring Scales**

<https://collegereadiness.collegeboard.org/psat-nmsqt-psat-10/practice/full-length-practice-tests>

### Khan Academy Official SAT Practice

#### **Math**

<https://www.khanacademy.org/mission/sat/practice/math>

#### **Reading & Writing**

<https://www.khanacademy.org/mission/sat/practice/reading-and-writing>

#### **Essay**

<https://www.khanacademy.org/mission/sat/practice/essay>

#### **Tips & Strategies**

<https://www.khanacademy.org/mission/sat/tips-and-planning>

#### **Full Tests (same as the 8 College Board Tests)**

<https://www.khanacademy.org/mission/sat/exams>

### Additional Resources

#### **Khan Academy Grammar**

<https://www.khanacademy.org/humanities/grammar>

#### **Khan Academy Algebra**

<https://www.khanacademy.org/math/algebra>

# WRITING

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# WRITING

## On the SAT

The second section of the SAT is Writing and Language (Writing). You will be given 44 questions in the form of 4 passages with 11 questions each. Half of the questions are grammar/punctuation questions and half are rhetoric questions. There will be 35 minutes to complete this section, which averages to 8:45 minutes per passage.

After completing the classes and homework for this section, you will be able to categorize ALMOST all the SAT questions from the Writing and Language section, apply the correct response for each question type, and answer most of the questions correctly.

Remaining questions can be solved by a process of elimination, which will be demonstrated.

### **44 Questions TOTAL in writing**

#### **22 questions on grammar**

#### **22 questions on rhetoric**

You will have 8:45 minutes per passage. Aim to finish each passage in about 8:30 minutes. Use the 15 seconds remaining to bubble in the answer choices at the end of each passage.

# WRITING | SIGNAL & RESPONSE

The 14 Subjects covered in the Writing section are listed below. They are divided between Grammar and Rhetoric. Foundational English Rules are included to support the Signal & Response demonstrations in these sections.

GRAMMAR SUBJECTS		RHETORIC SUBJECTS
Verbs		
Pronouns	Lists	Redundancy and Concision
Apostrophes	Parallel Structures	Transition Words/Phrases
Clauses	Introductory Modifiers	Vocabulary
Comma Phrases	Punctuation	

Below is a sample Writing question with a general description of the Signal & Response solution process.

**EXAMPLE 2:**

QUESTION	ANSWER CHOICES
A sentence might be [ 1 ] given with an underlined portion, and multiple answer choices will be provided for you to select the right answer from.	[ 2 ] A) No Change B) are given with C) were given with D) give with
SIGNAL	RESPONSE
<p><b>USE</b> look at the differences among the answer choices to identify one or more of the Signals for the subjects listed above for each question.</p> <p>Sometimes you will also use the information from the overall meaning of the sentence to help properly identify Signals for subjects such as Lists, Parallel Structures, or Redundancy and Concision, etc.</p> <p><b>FINALLY</b>, the Signals that will indicate Rhetoric Subjects that have Questions With Prompts will be clear from the specific prompt preceding the answer choices.</p>	<p><b>DECIDE</b> For example, the differences in the answer choices provided above are based on which verbs will be used in the sentence. This indicates that verbs are being tested.</p> <p>Once you have identified the Signal(s) for a question, you should apply the strategic Response for each Signal (and its corresponding Subject), which will be taught in this course, in order to both eliminate incorrect answer choices and select the correct answer choice.</p> <p>The proper response to Verb questions will be explained in the Verb Grammar section.</p>

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# GRAMMAR KEY | **ABBREVIATIONS** | **DEFINITIONS** | **RULES**

The Grammar Key is a reference for the Writing and Reading Sections. This includes sentence markup abbreviations, preposition and pronoun rules, and grammar tips.

## Sentence

### DEFINITIONS & ABBREVIATIONS

**IC = Independent Clause** | An Independent Clause (IC):

- Has a [Subject] and a [Verb].
- Is a complete thought that makes sense.
- Can stand alone as a complete sentence.

**DC = Dependent Clause** | The Dependent Clause (DC):

- Has a [**Subject**] and a [**Verb**], but it begins with a [*Subordinating*] term.
- Is not a complete thought, so it can never be an IC by itself.
- Must be combined with an IC to make a complete sentence.

**FANBOYS** = For, And, Nor, Bt, Or, Yet, So

### **cp = Comma Phrase**

A Comma Phrase adds explanation, description, an intervening thought, or other information that is NOT necessary for the sentence to be complete and make sense.

### **IM = Introductory Modifier**

A Modifier describes a person, place, or thing in a sentence. An Introductory Modifier (IM) is a phrase that comes at the beginning of the sentence and is always followed by a comma. The person, place, or thing described by the IM must IMMEDIATELY FOLLOW the comma after the IM.

### **which/who cp =**

A Relative Clause starting with "WHICH" or "WHO" is treated like a comma phrase, meaning it must be set off from the IC with commas.

### **TW = Transition Words and Phrases**

Transition words and phrases can show up in the beginning, middle, or end of a sentence.

# GRAMMAR KEY | **ABBREVIATIONS** | **DEFINITIONS** | **RULES**

The Grammar Key is a reference for the Writing and Reading Sections. This includes sentence markup abbreviations, preposition and pronoun rules, and grammar tips.

## Sentence | Punctuation

### RULES & ABBREVIATIONS

**IC, FANBOYS IC**

A comma followed by one of the FANBOYS almost ALWAYS separates two (IC) independent clauses.

**IC, IC**

A Comma Splice (two ICs separated by a comma) is ALWAYS WRONG.

**IC; IC**

A semicolon must separate two ICs.

**IC + DC**

(Usually no comma is used to separate clauses when a DC comes AFTER an IC.)

**DC, IC**

A sentence that begins with a DC must have a comma after the DC (before the IC).

**CP**

A Comma Phrase must always be set off with commas, parentheses, or dashes.

**IC, cp**

**IC, which/who cp**

**IC—cp**

Comma phrases can be added at the end of a complete sentence (IC), set off with a comma.

**I, cp, C**

**I—cp—C**

A comma phrase breaks up an IC when the phrase is surrounded by commas, dashes, or parentheses.

**I (cp) C**

The SAT will NOT test on the decision of which type of punctuation to use to set off a comma phrase.

**cp, IC**

**IM, IC**

**DC, IC**

A comma MUST follow introductory comma phrases, introductory modifiers (IM), and dependent clauses (DC).

**I, which cp, C**

**I—which cp—C**

**I(who cp)C**

A relative clause that begins with “WHICH” or “who” is treated like a comma phrase.

SOME COMMON	TERMS THAT INTRODUCE DEPENDENT CLAUSES (DC) ARE:		
<b>IF</b>	<b>WHEN</b>	<b>SO THAT</b>	<b>BEFORE</b>
<b>AS</b>	<b>WHENEVER</b>	<b>UNLESS</b>	<b>SINCE</b>
<b>AS IF</b>	<b>WHENEVER</b>	<b>ALTHOUGH</b>	<b>AFTER</b>
	<b>WHILE</b>	<b>BECAUSE</b>	<b>ONCE</b>
	<b>WHETHER</b>	<b>EVEN THOUGH</b>	<b>UNTIL</b>

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# GRAMMAR KEY | ABBREVIATIONS | DEFINITIONS | RULES

## Prepositions & Prepositional Phrases

### DEFINITIONS

**PREPOSITIONS** are words such as in, at, of, to, on, about, between, by, under, toward, and with.

**PREPOSITIONAL PHRASES** include the preposition as well as the terms that follow it, which are being referred to by the preposition, such as:

- "at the height of her career"
- "with his friends and family"
- "on the brown desk"

## Pronouns (antecedents)

### SUBJECT, OBJECT, POSSESSIVE, PLURAL

**PRONOUNS** are words used to take the place of previously mentioned nouns/noun phrases (antecedents).

#### PRONOUNS [*Antecedents*]

<b>SUBJECT</b>	<b>HE</b>	<b>SHE</b>	<b>IT</b>	<b>THEY</b>	<b>WHO</b>
<b>OBJECT</b>	<b>HIM</b>	<b>HER</b>	<b>ITS</b>	<b>THEM</b>	<b>WHOM</b>

<b>POSSESSIVE</b>	<b>HIS</b>	<b>HER</b>	<b>ITS</b>	<b>WHOSE</b>	<b>THEIR</b>
<b>RELATIVE</b>	<b>WHO</b>	<b>WHOM</b>	<b>THAT</b>	<b>WHICH</b>	

### SINGULAR POSSESSIVE PRONOUNS

- His / Her / Its
- Its = the possessive pronoun for a singular thing (nonperson)
- Its vs. It's [It's (Contraction) = It is]
- Its vs. Its' [Its' (NOT a real word); Always wrong]

### PLURAL POSSESSIVE PRONOUNS

- Their = the possessive pronoun for a plural thing
- Their vs. They're [They're (Contraction) = They are]
- Their vs. There [There = A location]

### PLURAL AND/OR SINGULAR POSSESSIVE PRONOUNS

- Whose vs. Who's [Who's (Contraction) = Who is]
- Your vs. You're [You're (Contraction) = You are]

## GRAMMAR KEY | **ANSWER CHOICE TIPS**

### SAT Answer Choice Tips

#### **"BEING"**

In grammar and punctuation questions, ANSWER CHOICES that include the word "BEING" are almost always WRONG.

WHEN BEGINNING TO BUBBLE IN ANSWERS for a new passage, always check to make sure the question number matches on your answer sheet.

# WRITING | GRAMMAR

*For any language, grammar is a "system of rules that defines the grammatical structure of a language."*

—Webster

- GRAMMAR . . . . . #**
- Verbs | Introduction . . . . . #
- Verbs | Signal & Response . . . . . #
- Verbs | Tricky Subjects . . . . . #
- Verbs | Tense Exceptions . . . . . #
- Verbs . . . . . #
  
- Pronouns | Introduction . . . . . #
- Pronouns | Signal & Response . . . . . #
- Pronouns . . . . . #
  
- Apostrophes | Introduction . . . . . #
- Apostrophes | Rules . . . . . #
  
- Lists | Introduction . . . . . #
- Lists | Signal & Response . . . . . #
- Lists . . . . . #
  
- Other Parallel Structures | Introduction . . . . . #
- Other Parallel Structures | Comparisons . . . . . #
  
- Clauses | Introduction . . . . . #
- Clauses . . . . . #
  
- Comma Phrase | Introduction . . . . . #
- Comma Phrase | Definition/Rule . . . . . #
- Comma Phrase | Signal & Response . . . . . #
- Comma Phrases . . . . . #
  
- Introductory Modifiers | Introduction . . . . . #
- Introductory Modifiers | Signal & Response . . . . . #
- Introductory Modifiers . . . . . #
  
- Punctuation | Introduction . . . . . #
- Punctuation | Signal & Response . . . . . #
- Punctuation | Rule/Response/Examples . . . . . #
  
- Writing | Grammar: Answers . . . . . #

# VERBS | RULES

***"I am incomplete! Can't go anywhere without my verb! Must have dropped it on my way here!"***

*—Diary of the Misplaced Sentence*

Verbs are the glue that holds a sentence together. The SAT makes verbs a question type.

- **SAT WILL TEST** subject verb agreement and/or verb tense.
- **SINGULAR SUBJECTS** require singular verbs.
- **PLURAL SUBJECTS** require plural verbs.
- **VERB TENSE** will almost always match the tense of the surrounding verbs.

## **COMMON VERBS**

	<b>present</b>	<b>past</b>	<b>future</b>
<b>singular</b>	is	was	will be
<b>plural</b>	are	were	will be
<b>singular</b>	has	had	will have
<b>plural</b>	have	had	will have
<b>singular</b>	walks	walked	will walk
<b>plural</b>	walk	walked	will walk

## **HE/SHE VS. THEY TEST**

<b>for use</b>	<b>singular</b>	<b>plural</b>
	he/she	they
	walks	walk
	plays	play
	has	have
	is	are
	wants	want
	runs	run

### **Khan Academy Practice:**

- (1) Grammar: Shifts in verb, tense, and mood;
- (2) Grammar: Subject verb agreement

# VERB | SIGNAL & RESPONSE

Once you identify the Signal as a Verb Question, first test **SUBJECT VERB AGREEMENT**. If answer choices still remain, then move on to **VERB TENSE**.

EXAMPLE 3:

QUESTION	ANSWER CHOICES
<p>New research indicates that mosquitoes [ 3 ] initially senses the smell of a food source before its warmth.</p>	<p>[ 3 ] A) No Change B) is initially sensing C) initially sense D) has initially sensed</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> feature the same verb in multiple forms, such as in Singular, in Plural, and in different tenses.</p>	<p><b>DECIDE</b> this is a verb question.</p> <p><b>START WITH</b> subject verb agreement.</p> <p><b>IDENTIFY</b> the proper subject of the underlined verb as Singular or Plural</p> <ul style="list-style-type: none"> <li>• This may require crossing out phrases that separate the subject from the verb.</li> <li>• If there are multiple clauses, you may need to figure out the correct subject for the verb.</li> <li>• Watch out for Tricky Subjects.</li> </ul> <p><b>DETERMINE</b> which answer choices <b>MATCH</b></p> <p>Singular subject = Singular verb Plural subject = Plural verb</p> <ul style="list-style-type: none"> <li>• Use the He/She vs. They Test as needed to test which answer choices are Singular or Plural.</li> </ul> <p><b>ELIMINATE</b> Answer Choices that do not match the subject.</p>
<p><b>ANSWER CHOICES</b> with different <b>VERB TENSES</b> remain.</p>	<p><b>IDENTIFY</b> the verb tense used in surrounding verbs (either in the same sentence or in the sentences immediately before or after).</p> <p><b>ALMOST ALWAYS MATCH</b> the verb tense to the tense used in the surrounding verbs.</p> <p><i>(Rare Exception) There is a compelling reason to change the verb tense in the context of the sentence.</i></p>

# VERBS | TRICKY SUBJECTS

Determining whether a subject is Singular or Plural can be confusing. Here is a list of the common SAT tricks for you to look out for.

	Example
<p><b>Singular</b></p> <p><b>Proper name</b> of a book, movie, show, band</p>	The <i>Eagles</i> <b>was</b> my father's favorite band.
<p>Every (one/body/thing), Any (one/body/thing), No (body/thing), Each (of the students)</p>	Everyone <b>loves</b> Ray.
<p><b>A gerund (-ing word)</b> can be a subject</p>	Building model cars <b>was</b> my favorite hobby growing up.
<p><b>Collective nouns:</b> group, team, family—usually singular because referring to a singular unit</p>	The team <b>is</b> winning the game.
<p><b>Plural</b></p> <p><b>Multiple singular</b> subjects combined with "and"</p>	The dog and the cat <b>hate</b> each other.
<p><b>Never Verbs by Themselves</b></p> <p><b>A gerund "-ing"</b> word is NEVER a true verb by itself. The real verb is the helping verb before the "-ing" word.</p>	He <b>is</b> running
<p><b>An infinitive</b> (to + base verb) like "to fly" is NEVER a verb by itself. A real verb must introduce an infinitive.</p>	She <b>wants</b> to run.

# VERBS | TENSE EXCEPTIONS

There are a few compelling exceptions to the default rule of keeping Verb Tense consistent. The reasons to change verb tense will always be clear in the meaning of the sentence. They are:

Tense Exceptions	
Keeping Verb Tense Consistent	<b>Circle the correct verb in each sentence:</b>
<p><b>Context</b></p> <p><b>Context of the sentence</b> clearly changes verb tense.</p>	<p>Yesterday I <b>was</b> sad, but <b>today</b> I [ feel/felt ] better.</p>
<p><b>Past Perfect</b></p> <p><b>Had happened</b>—two actions occurred in the past, but one action was fully completed before the other action took place.</p>	<p>By the time <b>Bast found</b> the message in the bottle, the paper inside [ was/had been ] long since destroyed.</p>
<p><b>Conditional/Hypothetical</b></p> <p><b>Must use would, could, or might</b>—when uncertain whether something will happen; almost always preceded by “if” clause.</p>	<p>If I <b>get</b> a cat, it [ might eat/ate ] my favorite goldfish, Fred.</p>
<p><b>Subjunctive</b></p> <p>An “if” statement <b>that is not likely to happen or is impossible</b> uses past tense in the “if” clause AND would/ could/might + base verb in the next clause.</p>	<p>If I [ were/is ] a billionaire, I <b>would</b> buy a castle in Scotland.</p>
<p>“To be” ALWAYS becomes WERE in the Subjunctive “if” clause.</p>	<p>My <b>brother claims</b> that if Benjamin Franklin [ were/ was ] alive today, he would sport a man bun.</p>
<p>Answers to these questions are given at the end of the writing section.</p>	

# VERBS | PREPOSITIONAL PHRASE

*Prepositions* are words such as **in, at, of, to,** and **on.** A Prepositional Phrase is a phrase that starts with a preposition, such as “**in** the house.” *Prepositional Phrase Question Types* are sentences with a prepositional phrase **BETWEEN** the **SUBJECT** and the underlined **VERB** that are testing **SUBJECT VERB AGREEMENT.**

To solve, **CROSS OUT** the prepositional phrase to help **IDENTIFY THE SUBJECT** of the sentence.

EXAMPLE 4:

QUESTION	ANSWER CHOICES
The teacher’s insistence on high standards for his students [ 4 ] <u>is</u> not intended to make students drop out of his course.	[ 4 ] A) No Change B) are C) being D) have been
SIGNAL	RESPONSE
<b>ANSWER CHOICES</b> include the same verb in different forms. .	<b>DECIDE</b> this is a verb question.
<b>BEING SAT TIP</b> In Grammar/Punctuation Question types, answer choices that include the term being are almost always wrong.	<b>ELIMINATE</b> the answer choice <u>being</u> . [ 4 ] A) No Change B) are C) <u>being</u> D) have been.
<b>ALWAYS FIRST</b> test subject verb agreement.	<b>CROSS OUT</b> this is a verb question.
<b>A PREPOSITIONAL PHRASE</b> is between the subject and the verb.	<b>START WITH</b> the prepositional phrase starting with the preposition and stop at the verb.  The teacher’s insistence <u>on high standards for his students</u> [ 4 ] is not intended to make students drop out of his course...
<b>THE SUBJECT</b> is “teacher’s insistence,” which is Singular. If needed, use he/she vs. they before any verb to test if it is singular or plural, i.e. (singular) She is; <del>she have been</del> (plural) They are; They have been	<b>ELIMINATE</b> answer choices that are Plural. [ 4 ] A) No Change B) <u>are</u> C) <u>being</u> D) have <u>been</u>
There is only one answer choice remaining, so you do not need to test verb tense for this question.	<b>ANSWER A</b> No Change provides the only Singular verb.

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# VERBS | COMMA PHRASE

Sentences that have a *Comma Phrase* **BETWEEN** the **SUBJECT** and the underlined **VERB** are *Comma Phrase Question Types* that are testing **SUBJECT VERB AGREEMENT**.

To solve, **CROSS OUT** the comma phrase and/or prepositional phrases to help **IDENTIFY THE SUBJECT** of the sentence.

EXAMPLE 5:

QUESTION	ANSWER CHOICES
The largest predators on our planet, according to experts in paleontology, [ 5 ] <u>was</u> dinosaurs of the genus Spinosaurus, which ranged up to 59 feet and weighed up to 20 tons.	[ 5 ] A) No Change B) has been C) are D) were
SIGNAL	RESPONSE
<b>ANSWER CHOICES</b> include the same verb in multiple forms.	<b>DECIDE</b> this is a verb question.
<b>ALWAYS FIRST</b> test subject verb agreement.	<b>CROSS OUT</b> the comma phrase.
<b>A COMMA PHRASE</b> is between the subject and the verb.	The largest predators on our planet, <del>according to experts in paleontology,</del> [5] was dinosaurs of the
<b>A PREPOSITIONAL PHRASE</b> "on our planet" is between the subject and the verb.	<b>CROSS OUT</b> CROSS OUT the prepositional phrase starting with the preposition and stop at the verb. The largest predators on our planet, according to experts in paleontology, [ 5 ] was dinosaurs of the ...
<b>THE SUBJECT</b> is "predators," which is _____	<b>ELIMINATE</b> answer choices that are _____ [ 5 ] A) No Change B) has been C) are D) were
<b>CLOSEST VERB</b> "ranged" is in the past tense. There is no clear and compelling reason to change verb tense in this sentence.	<b>ELIMINATE</b> answer choices that are NOT in the past tense. [ 5 ] A) No Change B) has been C) are D) were
Answers to these questions are given at the end of this section.	<b>ANSWER</b> _____

# VERBS | MULTIPLE CLAUSES

Sentences that have a *Relative Clause* (clauses beginning with that, which, who, whom) often contain multiple **SUBJECTS** and/or **VERBS**. When testing verbs, *Multiple Clause Question Types* often test **SUBJECT VERB AGREEMENT**.

**IDENTIFY THE SUBJECT** of the underlined **VERB** by asking “who” or “what” is doing the underlined verb. **CROSS OUT** any comma phrases and/or prepositional phrases to help **IDENTIFY THE SUBJECT**.

EXAMPLE 6:

QUESTION	ANSWER CHOICES
Anyone who has spent time living in developing nations with limited medical care [ 6 ] know the importance of receiving vaccinations.	[ 6 ] A) No Change B) have known C) knows D) are knowing
SIGNAL	RESPONSE
<b>ANSWER CHOICES</b> include the same verb in different forms.	<b>DECIDE</b> that it is a verb question.
<b>ALWAYS FIRST</b> test subject verb agreement.	<b>IDENTIFY</b> the subject of the verb to know:
<b>MULTIPLE CLAUSES</b> are in the sentence because it has the term “who” and has multiple verbs and subjects.	Ask who or what know(s) the importance...in the meaning of this sentence. Time? Developing nations? Anyone? Medical care?
<b>THE SUBJECT</b> is “anyone”—the only subject that can know the importance...	<b>ELIMINATE</b> answer choices that are Plural.
Thus, “anyone” is the subject and is Singular.	[ 6 ] A) No Change B) have known C) knows D) are knowing
There is only one answer choice remaining, the correct one, so you do not need to test verb tense.	If needed, use he/she vs. they test to figure out which verbs are singular and which are plural. <b>ANSWER</b> C) knows

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# VERBS | MULTIPLE CLAUSES

EXAMPLE 7:

QUESTION	ANSWER CHOICES
<p>New research indicates that mosquitoes [ 7 ] <u>initially senses</u> the smell of a food source before its warmth.</p>	<p>[ 7 ] A) No Change B) is initially sensing C) initially sense D) has initially sensed</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> include the same verb in multiple forms.</p>	<p><b>DECIDE</b> that it is a verb question.</p>
<p><b>ALWAYS FIRST</b> test subject verb agreement.</p>	<p><b>IDENTIFY</b> the subject of the verb that sense(s):</p>
<p><b>MULTIPLE CLAUSES</b> are in the sentence because it has the term "that" and has multiple verbs and subjects.</p>	<p>Ask who or what initially sense(s) the smell... in the meaning of this sentence. New research? Or mosquitoes?</p>
<p><b>THE SUBJECT</b> is " _____ " since " _____ " cannot sense smells.  The subject " _____ " is _____.</p>	<p><b>ELIMINATE</b> answer choices that are _____.  If needed, use he/she vs. they test to figure out which verbs are singular and which are plural.  [ 7 ] A) No Change B) is initially sensing C) initially sense D) has initially sensed</p>
<p>There is only one answer choice remaining, so you do not need to test _____</p>	<p><b>ANSWER</b> _____</p>
<p>Answers to these questions are given at the end of this section.</p>	

# VERBS | MULTIPLE CLAUSES

## EXAMPLE 8:

QUESTION	ANSWER CHOICES
Everyone in my meditation classes agrees that engaging in mindfulness practices [ 8 ] <u>reduce</u> stress and supports health.	[ 8 ] A) No Change B) reduces C) reduced D) are reducing
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> include the same verb in different forms.</p>	<p><b>DECIDE</b> that it is _____.</p>
<p><b>ALWAYS FIRST</b> test subject verb agreement.</p> <p>MULTIPLE CLAUSES are in the sentence because it has the term "that" and has multiple verbs and subjects.</p>	<p><b>IDENTIFY</b> the subject of the verb reduces:</p> <p>Ask who or what reduce(s) stress... in the meaning of this sentence. "Everyone in my meditation classes" or "engaging in mindfulness practices"?</p>
<p><b>THE INITIAL SUBJECT</b> is _____, because _____.</p>	
<p><b>A PREPOSITIONAL PHRASE</b></p> <p>" _____ " is between the subject and the verb.</p>	<p><b>CROSS OUT</b> the prepositional phrase.</p> <p>Everyone in my meditation classes agrees that engaging in mindfulness practices [ 8 ] reduce stress and supports health.</p>
<p><b>THE SUBJECT</b> is "engaging," which is _____.</p>	
<p>NOTE Check Tricky Subjects if unsure.</p>	<p><b>ELIMINATE</b> answer choices that are _____</p> <p>[ 8 ] A) No Change B) reduces C) reduced D) are reducing</p>
<p><b>ANSWER CHOICES</b> still include different verb tenses.</p>	<p><b>READ FOR MEANING.</b> Check the tense of the surrounding verbs. Underline surrounding verbs (past, present, future).</p>
<p><b>SECOND</b> test verb tense. The surrounding verbs, _____, are in the _____ tense.</p>	<p>Everyone in my meditation classes agrees that engaging in mindfulness practices [ 8 ] reduce stress and supports health.</p>
<p>There is no compelling reason to change verb tense in this sentence.</p>	<p><b>ELIMINATE</b> answer choices NOT in the _____ tense.</p> <p>[ 8 ] A) No Change B) reduces C) reduced D) are reducing</p>
<p><b>MATCH</b> the verb tense.</p>	<p><b>ANSWER</b> _____</p>
<p>Answers to these questions are given at the end of this section.</p>	

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# VERBS | VERB TENSE

Some sentences will have multiple **ANSWER CHOICES** that still **INCLUDE THE SAME VERB IN DIFFERENT TENSES** after you have ensured the subject and verb agree (singular: singular or plural: plural). This question type is testing *Verb Tense*.

EXAMPLE 9:

QUESTION	ANSWER CHOICES
The scarecrow placed last in the contest because the judges decided he [ 9 ] <u>is</u> entirely out of his field.	[ 9 ] A) No Change B) will be C) have been D) was
SIGNAL	RESPONSE
<b>ANSWER CHOICES</b> include the same verb in different forms.	<b>DECIDE</b> that it is a verb question.
<b>ALWAYS FIRST</b> test subject verb agreement.	<b>ELIMINATE</b> all the answer choices that are Plural.
<b>THE SUBJECT</b> is "the scarecrow," which is Singular.	[ 9 ] A) No Change [is] B) will be C) <del>have been</del> D) was
<b>ANSWER CHOICES</b> still include different verb tenses.	<b>READ FOR MEANING</b>
<b>SECOND</b> test verb tense. The surrounding verbs, _____, are in the _____ tense.	Check the tense of the surrounding verbs (past, present, future). Look out for any compelling reason to change the verb tense.
There is no compelling reason to change verb tense in this sentence.	The scarecrow <b>placed</b> last in the contest because the judges <b>decided</b> he [ 9 ] <u>is</u> entirely out of his field.
<b>MATCH</b> the verb tenses.	<b>ELIMINATE</b> answer choices NOT in the _____
Answers to these questions are given at the end of this section..	tense. [ 9 ] A) No Change [is] B) will be C) <del>have been</del> D) was
	<b>ANSWER</b> _____

# PRONOUNS | RULES

*“Who is in the first race and I-Don’t-Know is in the second. Anybody is the jockey for His. The odds are 20-1 in favor of Anybody’s-Bet in the first race and 5-1 in favor of I-Don’t-Know in the second. If His ended up in the winner’s circle, which race was he in?”*

–Do Bookies Ever Win? Article from Better’s Monday Gazette

**PRONOUNS ARE** words used to take the place of or are a reference to previously mentioned nouns/noun phrases, which are called **ANTECEDENTS**.

**PRONOUN EXAMPLES A PRONOUN MUST** clearly and correctly refer to a specific **ANTECEDENT**: person vs. thing; masculine vs. feminine; singular vs. plural; and subject vs. object vs. possessive.

The final (second) table on this page offers examples that highlight the differences noted in the first table below.

PRONOUNS [ <i>Antecedents</i> ]					
<b>SUBJECT</b>	<b>HE</b>	<b>SHE</b>	<b>IT</b>	<b>THEY</b>	<b>WHO</b>
<b>OBJECT</b>	<b>HIM</b>	<b>HER</b>	<b>ITS</b>	<b>THEM</b>	<b>WHOM</b>

<b>POSSESSIVE</b>	<b>HIS</b>	<b>HER</b>	<b>ITS</b>	<b>WHOSE</b>	<b>THEIR</b>
<b>RELATIVE</b>	<b>WHO</b>	<b>WHOM</b>	<b>THAT</b>	<b>WHICH</b>	

PRONOUN EXAMPLES		
<p><b>Subject Object</b>  <u>Jen</u> stole my <b>car</b>.</p> <p><b>Subject:</b> Singular/person/feminine  <b>Object:</b> Singular/thing</p> <p><u>She</u> stole <b>it</b>.  <u>Who</u> stole <b>it</b>?</p>	<p><b>Subject Object</b>                      Zeke and Jen stole my <b>cars</b>.</p> <p><b>Subject:</b> Plural/people  <b>Object:</b> Plural/thing</p> <p><u>They</u> stole <b>them</b>.  <u>Who</u> stole <b>them</b>?</p>	<p><b>Subject Object</b>                      My car was stolen by Zeke.</p> <p><b>Subject:</b> Singular/thing  <b>Object:</b> Singular/person/masculine</p> <p><u>It</u> was stolen by <b>him</b>.  <u>It</u> was stolen by <b>whom</b>?</p>

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# PRONOUNS | SIGNAL & RESPONSE

Whenever a Pronoun is used, it must be 100% clear **WHICH NOUN(S)** that pronoun is standing in for (called the **ANTECEDENT**). If it is not 100% clear which noun(s) the pronoun is standing in for, then the sentence is incorrectly ambiguous. The **PRONOUN** must be replaced with the **CLARIFYING NOUN(S)**.

EXAMPLE 10:

QUESTION	ANSWER CHOICES
Leah and her sister appeared very similar at first glance, but [ 10 ] <u>she</u> had a much larger chin.	[ 10 ] A) No Change B) this girl C) Leah D) a sister
SIGNAL	RESPONSE
<b>ANSWER CHOICES</b> include pronouns and nouns as options.	<b>CHOOSE</b> the noun answer that absolutely clarifies who/ what is being referenced.
<b>PRONOUN CLARITY</b> is being tested because it is not 100% clear whom the pronoun is standing in for.	A) "She" is incorrect because it is not 100% clear whether "she" refers to Leah or her sister.
Answers to these questions are given at the end of this section..	B) _____ because _____
	C) _____ because _____
	D) _____ because _____

### Khan Academy Practice:

- (1) Grammar: Pronoun clarity
- (2) Grammar: Pronoun agreement
- (3) Grammar: Possessive Pronouns
- (4) Grammar: Possessive determiner

# PRONOUNS | SINGULAR VS. PLURAL

If the **ANTECEDENT** is **SINGULAR**, the **PRONOUN** must be **SINGULAR**.

If the **ANTECEDENT** is **PLURAL**, the **PRONOUN** must be **PLURAL**.

The same rules apply when the antecedent is a person or a thing and when the antecedent is a male or a female.

EXAMPLE 11:

QUESTION	ANSWER CHOICES
As soon as the relief [ 11 ] <u>packages</u> of medical supplies arrived on location in the flooded city, we delivered it to the appropriate hospital.	[ 11 ] A) No Change B) shipment C) parcels D) freights
SIGNAL	RESPONSE
<p><b>THERE ARE NO ANSWER CHOICES</b> with pronouns, which would usually be the signal.</p> <p><b>INSTEAD, THE ANSWER CHOICES</b> are singular and plural nouns that are synonyms. While this may look like a vocabulary question at first, the context provides no clear basis for choosing between the answer choices.</p> <p>However, <b>THE SENTENCE CONTAINS THE PRONOUN "IT"</b> to help you select the correct noun as an antecedent.</p>	<p><b>DECIDE</b> which noun to use (not based on meaning) based on whether the noun matches the pronoun "it."</p> <p>Since "it" is singular, the antecedent must also be singular. Eliminate plural nouns.</p> <p>A) packages B) shipment C) parcels D) freights</p> <p><b>ANSWER B</b></p>

# PRONOUNS | POSSESSIVE

**POSSESSIVE PRONOUNS** never use an apostrophe.

**POSSESSIVE PRONOUNS** stand in for a possessive noun(s).

SINGULAR POSSESSIVE PRONOUNS	PLURAL POSSESSIVE PRONOUNS	PLURAL AND/OR SINGULAR POSSESSIVE PRONOUNS
<p><b>His / Her / Its</b></p> <p><b>Its</b> = the possessive pronoun for a singular thing (nonperson)</p> <p><b>Its vs. It's</b> [It's (Contraction) = It is]</p> <p><b>Its vs. Its'</b> [Its' (NOT a real word); Always wrong]</p>	<p><b>Their = the possessive pronoun for a plural thing</b></p> <p><b>Their vs. They're</b> [They're (Contraction) = They are]</p> <p><b>Their vs. There</b> [There = A location]</p>	<p><b>Whose vs. Who's</b> [Who's (Contraction) = Who is]</p> <p><b>Your vs. You're</b> [You're (Contraction) = You are]</p>

EXAMPLE 12:

QUESTION	ANSWER CHOICES
My parrot lost [12] <u>they're</u> mind.	[12] A) No Change B) <del>their</del> C) its D) <del>it's</del>
SIGNAL	RESPONSE
<b>ANSWER CHOICES</b> with singular and plural possessive pronouns, and contractions indicate pronouns are being tested.	<b>DECIDE</b> whether this is a pronoun question. <b>READ</b> both words from any contraction into the sentence before choosing it as an answer choice. <b>ELIMINATE</b> answer choices that are contractions. [12] A) <del>No Change</del> B) <del>their</del> C) its D) <del>it's</del>
The antecedent is "my parrot," which is singular.	<b>DETERMINE</b> whether the antecedent is singular or plural. <b>ELIMINATE</b> answer choice B, which is a plural pronoun. [12] A) <del>No Change</del> B) <del>their</del> C) its D) <del>it's</del>
"Its" is singular possessive, which matches the antecedent and the meaning of the sentence.	<b>ANSWER C</b>

# PRONOUNS | POSSESSIVE

EXAMPLE 13:

QUESTION	ANSWER CHOICES
<p>N. Chen of the United States achieved fame for [ 13 ] its five quadruple jumps, the first ever accomplished in the Olympics for men's figure skating.</p>	<p>[12] A) No Change B) their C) its D) it's</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> have pronouns, contraction, singular vs. plural, person vs. thing.</p>	<p><b>DECIDE</b> pronouns are being tested.  <b>TEST</b> answer choices that are contractions by reading both words from the contraction into the sentence to see whether they make sense. If they do not, <b>ELIMINATE</b> them.</p>
<p>The antecedent must be _____ since only a _____ can do jumps.</p>	<p>[13] A) No Change B) his C) it's D) her  <b>DETERMINE</b> whether N. Chen is male or female. Look for context clues in the sentence to make your determination.  <b>ELIMINATE</b> _____ from the answer choices</p>
<p>Since jumps were done in _____ figure skating, Chen must be _____</p>	<p>[13] A) <del>No Change</del> B) his C) <del>it's</del> D) her  <b>ANSWER B</b></p>

# PRONOUNS | WHO VS. WHOM | THE TWO-PART TEST

If you are deciding whether to use **WHO** or **WHOM** in a sentence, there is a two-part test to follow.

Start by **ASKING IF THERE IS A PREPOSITION** such as **of, to, by, in, on, at, around, above, near, underneath, alongside, of, from,** etc. immediately before the word **WHO** or **WHOM** in the sentence.

PRONOUNS					
<b>SUBJECT</b>	<b>HE</b>	<b>SHE</b>	<b>IT</b>	<b>THEY</b>	<b>WHO</b>
<b>OBJECT</b>	<b>HIM</b>	<b>HER</b>	<b>ITS</b>	<b>THEM</b>	<b>WHOM</b>

<b>IF YES</b>	<b>THERE IS A PREPOSITION</b> then always use <b>WHOM</b> : <b>of WHOM; to WHOM; by WHOM; in WHOM</b>
<b>IF NO</b>	<b>THERE IS NO PREPOSITION</b> figure out whether the...  <b>Subject WHO</b> OR <b>Object WHOM</b> is taking the place of a  <b>Subject HE/SHE/THEY</b> OR an <b>Object HIM/HER/THEM</b>
<b>EXAMPLE</b>	I love someone [ <b>WHO</b> (?) or <b>WHOM</b> (?)] I cannot have.  [ <b>Subject</b> ] I love [ <b>Object</b> ] someone [ <b>Subject</b> ] <b>WHO</b> or [ <b>Object</b> ] <b>WHOM</b> ] I cannot have.
<b>ASK</b>	[ <b>Subject</b> ] I cannot have [ <b>Subject</b> ] <b>HE SHE WHO</b>
<b>OR</b>	[ <b>Subject</b> ] I cannot have [ <b>Object</b> ] <b>HIM HER WHOM</b>
<b>ANALYSIS</b>	<b>HIM</b> is the <b>Object</b> and correct here, so [ <b>Object</b> ] <b>WHOM</b> is the correct word to substitute.
<b>ANSWER</b>	I love someone <b>WHOM</b> I cannot have.
<b>TEST</b>	If you can replace <b>WHO/WHOM</b> with [ <b>Subject</b> ] <b>HE/SHE/THEY</b> , then use <b>WHO</b> .  If you can replace <b>WHO/WHOM</b> with [ <b>Object</b> ] <b>HIM/HER/THEM</b> , then use <b>WHOM</b> .

# APOSTROPHES | **INTRODUCTION**

*If you need to prove you own something, you may need your ID, a bill of sale, and definitely an apostrophe! And it better be in the right place!*

Apostrophes are the signals that clarify...

**Its' mine!!!**

**No, it's mine!!!... and it can't be**

**yours ANY POSSIBLE way**

**because an "its' " is not even**

**a real thing!**

**Khan Academy Practice:**

**(1) Grammar: Possessive Pronouns**

# APOSTROPHES | **RULES**

Apostrophes are used on nouns to show possession of the following noun (i.e., that one noun belongs to another). They are also used in some words to form a contraction. Apostrophes are **NEVER** used to make something plural without showing possession.

See *Pronouns, Its vs. It's*, for info about possessive pronouns (NO apostrophes) and contractions (WITH apostrophes).

The rules for how apostrophes are used to show possession, Singular vs. Plural, are shown below. Practice with some of your own examples.

**SHOW SOME OF YOUR OWN EXAMPLES:**

## Singular

's means there is only one boy (singular). It has no bearing on the number of books.

**EXAMPLE** Boy's books

\_\_\_\_\_ 's

\_\_\_\_\_ 's

\_\_\_\_\_ 's

## Plural

s' means there is more than one boy (plural). Again, it has no bearing on the number of books. **EXAMPLE** Boys' books

\_\_\_\_\_ s'

\_\_\_\_\_ s'

\_\_\_\_\_ s'

# LISTS | INTRODUCTION

*The Toad, who had hopped lightly out of bed as soon*

*as he heard the key turned in the lock, watched him*

*eagerly from the window till he disappeared down*

*the carriage-drive. Then, laughing heartily, he dressed*  
[LIST ITEM 1] [PAST TENSE VERB]

*as quickly as possible in the smartest suit he could*

*lay hands on at the moment, filled his pockets with*  
[COMMA] [LIST ITEM 2] [PAST TENSE VERB]

*cash which he took from a small drawer in the*

*dressing-table, scrambled out of the handsome Tudor*  
[COMMA] [LIST ITEM 3] [PAST TENSE VERB]

*window which formed such a feature of his bedroom,*  
[COMMA]

*slid lightly to the ground, and, taking the opposite*  
[LIST ITEM 4] [PAST TENSE VERB] [FINAL LIST COMMA]

*direction to the Rat, marched off lightheartedly,*  
[LIST ITEM 5] [PAST TENSE VERB]

*whistling a merry tune.*

— Adapted from *The Wind in the Willows*, by Kenneth Grahame

# LISTS | SIGNAL & RESPONSE

List Questions can be tricky to spot, especially if you look only at the answer choices before reading the sentences. The **KEY SIGNAL** for spotting a list question is noticing that the **SENTENCE CONTAINS A LIST** when you first read it and noting that the question involves that list.

EXAMPLES 14 & 15:

QUESTION	ANSWER CHOICES
<p>The seagulls were very annoying: they scavenged along the [ 14 ] <u>beach</u> pecked at people’s fingers, and dropped their waste above beach goers.</p> <p>A person needs spirit, luck, and [ 15 ] <u>being resilient</u> to successfully travel across Central Asia.</p>	<p>[ 14 ] A) No Change B) beach; C) beach: D) beach,</p> <p>[ 15 ] A) No Change B) resilience C) resilient D) more resilient</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> contain various punctuation options, including a comma, and are part of a list.</p>	<p><b>DECIDE</b> it is a list punctuation question.</p> <p><b>CHECK</b> to see if the comma is separating items in the list. If so, it is the right answer.</p>
<p><b>ANSWER CHOICES</b> contain various punctuation options, including either a colon or a single dash, and introduce a list.</p>	<p><b>DECIDE</b> it is a list punctuation question.</p> <p><b>CHECK</b> if the colon or the dash follows an IC that is introducing the list. (Rare) A list can also come between two dashes.</p>
<p><b>ANSWER CHOICES</b> include the same term or terms in different forms and are part of a list. It may look like a verb question or a vocabulary question, possibly with some answers including prepositions.</p>	<p><b>DECIDE</b> it is a list parallelism question.</p> <p><b>CHECK</b> if the term(s) in the answer choices introduce an item on the list. Make sure to choose the term(s) that is parallel with the other items in the list.</p>

### Khan Academy Practice:

- (1) Grammar: Parallel Structure
- (2) Grammar: Items in a series

# LISTS | PUNCTUATION

All items separated with a comma: ,

RULE / ANALYSIS	EXAMPLE
<p><b>RULE</b> When a sentence lists three or more items, a comma is used between every item on the list. There should be no comma before the first item on the list.</p>	
<p><b>ON THE SAT</b>, a comma is required between the last two items on the list (often called the Oxford comma).</p>	<p>Rachita is a wonderful attorney, mother, and activist.</p>
<p><b>WARNING</b> It is <b>ALWAYS WRONG</b> to mix and match the punctuation used to separate items in a list. No punctuation other than a comma can be used to separate items in a list.</p>	<p>Comment: There is no comma before “attorney,” the first item in the list. However, there is a comma between “mother” and “and activist,” the last two items on the list. This is the <b>ONE EXCEPTION</b> to the <b>RULE</b> that comma <b>FANBOYS</b> separate two ICs.</p>

Introducing items in a list: : —

RULE / ANALYSIS	EXAMPLE
<p><b>RULE</b> An IC followed by a colon (or a dash) can introduce a list. The IC that introduces the list cannot contain any of the items in the list.</p> <p>(Rare) A list can come inside of an IC when it is surrounded by two dashes.</p>	<p><b>IC: list</b></p> <p>Sunny added three items to her bucket list: earn a graduate degree, sail across the Pacific Ocean, and live forever.</p> <p><b>I—list—C</b></p> <p>The things that annoy me—yappy dogs, bad breath, and silly arguments—are always present during my family vacations.</p>
<p><b>WARNING</b> Items in a list can <b>NEVER</b> be introduced with a <b>SEMICOLON</b>. It is <b>ALWAYS WRONG</b> to use a semicolon or a comma after “such as,” “including,” or “like” when they are used to introduce lists.</p>	<p>After the colon or dash, each of the listed items should be separated with a comma and be parallel (<i>see example above</i>).</p>

# LISTS | PARALLELISM

RULE	EXAMPLE
<p><b>RULE</b> The items in a list must be grammatically parallel, meaning each item must begin with the same type of word (noun, adjective, preposition, “-ing” word, verb, etc). If verbs introduce each item, the verbs must all have the same tense and singular/plural agreement.</p>	<p><b>FAILED PARALLEL LIST EXAMPLE:</b> Chris likes to teach, cooking, and baseball.</p>
<p>None of the items in the first example list are parallel. The first is an infinitive verb, the second is a word ending in “-ing,” and the last item is a noun. How could we make this list parallel?</p>	<p>One way to make this list parallel would be to start each item with a gerund, “-ing” word: Chris likes teaching, cooking, and watching baseball.</p>
<p>The following list about geckos is NOT parallel. Why? How could this list be made parallel?</p> <p>This list is not parallel because</p> <p>_____</p> <p>_____</p>	<p><b>FAILED PARALLEL LIST EXAMPLE:</b> Geckos communicate by barking, chirping, and by squeaking.</p> <p>Try to make the list parallel below</p> <p>_____</p> <p>_____</p>
<p>To make this list perfectly parallel, it must either (1) have “by” before only the first item in the list (after which the “by” is implied before the other items on the list) or (2) have the preposition “by” before each item in the list.</p> <p>Both of these options are correct. However, a sentence that uses a <b>PREPOSITION TO INTRODUCE SOME ITEMS BUT NOT OTHERS</b>—like the first example sentence about geckos—is always <b>WRONG</b>.</p>	<p>In this example, the first item in the list has “by” in front of it.</p> <p>(1) Geckos communicate by barking, chirping, and squeaking. In this example, every item in the list has “by” in front of it.</p> <p>(2) Geckos communicate by barking, by chirping, and by squeaking.</p>

# LISTS

EXAMPLE 16:

QUESTION	ANSWER CHOICES
<p>The seagulls were very annoying: they scavenged along the [16 ] beach pecked at people’s fingers, and dropped their waste above beach goers.</p>	<p>[ 16 ] A) No Change B) beach; C) beach: D) beach</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> feature multiple types of punctuation. The sentence contains a list introduced by an “IC-colon.” A comma is used to separate the last two items in the list.</p>	<p><b>DECIDE</b> it is a list punctuation question. <b>READ</b> the list carefully. <b>AID</b> if the term “beach” ends the first item in the list and the term “pecked” starts the second item in the list. They do.</p>
<p>A comma must always be used to separate items in a list.</p>	<p>A comma must separate “beach” and “pecked,” as a comma must come between the first and second items in the list.</p>
	<p><b>ANSWER D.</b></p>

# LISTS

EXAMPLE 17:

QUESTION	ANSWER CHOICES
<p>A person needs spirit, luck, and [ 17 ] being resilient to successfully travel across Central Asia.</p>	<p>[ 17 ] A) No Change B) resilience C) resilient D) more resilient</p>
SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICE</b> are part of a list featuring the same term in different forms. If the question is not testing punctuation, it will test parallelism.</p> <p><b>BEING</b> is in one of the answer choices.</p>	<p><b>DECIDE</b> this is a list parallelism question.</p> <p>Immediately <b>ELIMINATE</b> being resilient because <b>BEING</b> is almost never correct on the SAT grammar and punctuation questions.</p> <p>A) <del>No Change</del> B) resilience C) resilient D) more resilient</p>
	<p><b>IDENTIFY</b> whether the other items in the list are parallel to the terms (by type of grammar) offered in the answer choices by looking at the context of the sentence.</p>
<p>The sentence is listing items that are needed. Is it correct to say a person needs resilient or needs more resilient?</p>	<p>No, so <b>ELIMINATE</b> C and D as answer choices.</p> <p>A) <del>No Change</del> B) resilience C) <b>resilient</b> D) <del>more resilient</del></p>
<p><b>FURTHER EXPLANATION</b> Resilient describes someone or something, so it is an adjective. Resilience is an attribute that a person or thing can possess, making it a noun. Since spirit and luck are also attributes that people can possess, meaning they are also nouns, resilience is the proper parallel term in this list.</p>	<p>Is it possible that a person needs resilience?</p> <p>Yes, so B) resilience is the correct answer choice.</p>
	<p><b>ANSWER B</b></p>

## OTHER PARALLEL STRUCTURES | **RULES**

*My bookcase is taller than beautiful. My cat has longer hair than jumping. Stella is happy and yawned.*

### Parallel Comparisons

#### **RULE**

When two items are being compared, they need to be parallel enough to ensure that it makes logical sense to compare those two things.

For example, you would not say that your bookcase is taller than beautiful; it makes no sense to compare the height of a bookcase with an adjective like beautiful or a noun like bench.

A logical comparison would compare the height of the bookcase to the height of another noun.

### Parallel

WORDS/PHRASES CONNECTED BY FANBOYS WITHOUT A COMMA

#### **RULE**

When only two words/phrases (not three or more, which would make a list) apply to the same subject or verb, and they are connected with one of the FANBOYS WITHOUT A COMMA (especially "and" or "but,") then those words/phrases should be parallel.

### **Khan Academy Practice:**

(1) Logical comparisons

# PARALLEL STRUCTURES | **COMPARISONS**

Consider the following FAILED Comparisons and the ways they can be corrected by ensuring that parallel items are being compared.

## Comparison

RULE / ANALYSIS	EXAMPLE
<p><b>THIS EXAMPLE</b> does not make logical sense because it compares reading John Steinbeck’s books to the person Mark Twain. To correct this error, we need to compare reading Steinbeck’s BOOKS to reading Mark Twain’s BOOKS. There are three ways to make this correction:</p>	<p><b>FAILED PARALLEL COMPARISON EXAMPLE</b> I enjoy reading John Steinbeck’s books more than Mark Twain.</p>
<p><b>THE FIRST</b> correction ensures that the comparison is being made between the books of two authors.</p>	<p>I enjoy reading John Steinbeck’s books more than Mark Twain’s books.</p>
<p><b>THE SECOND</b> correction makes the comparison logical by leaving out the term books at the end of the sentence and adding an “s” to Twain to show inferred possession of books.</p>	<p>I enjoy reading John Steinbeck’s books more than Mark Twain’s.</p>
<p><b>THE THIRD</b> correction uses a pronoun [that/those] for books and “of” to imply possession. Use “that” for singular nouns and “those” for plural nouns.</p>	<p>I enjoy reading John Steinbeck’s books more than those of Mark Twain.</p>
<p><b>SAT NOTE</b> Each of these sentences is correct and makes a parallel comparison, but the SAT would only ever offer ONE as the correct answer.</p>	

## Words/Phrases Connected by Fanboys Without a Comma

RULE / ANALYSIS	EXAMPLE
<p><b>THIS EXAMPLE</b> FAILS to be parallel. Her fame and beautiful are both things that apply to Kim, and they are connected with and; however, they are not parallel. How could we make this sentence parallel?</p>	<p><b>FAILED PARALLEL WORDS/PHRASES EXAMPLE</b> Kim is known for her fame and beautiful.</p>
<p>The first item consisted of a possessive pronoun + a noun. The possessive pronoun can be inferred for the second items. The sentence can become parallel by using the same grammatical structure for the second item: beautiful (an adjective) becomes beauty (a noun).</p>	<p>Kim is known for her fame and her beauty.  Kim is known for her fame and beauty.</p>

# PARALLEL STRUCTURES | **COMPARISONS**

EXAMPLE 18:

QUESTION	ANSWER CHOICES
<p>Dentists disagree over whether high-fructose corn syrup or [ 18 ] <u>ingesting artificial sweetener</u> is worse for one's teeth.</p>	<p>[ 18 ] A) No Change B) artificial sweetener C) the ingestion of artificial sweetener D) consuming artificial sweetener</p>
SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>THE CONTEXT</b> whether high-fructose corn syrup or ... is worse makes this A COMPARISON.</p> <p><b>ANSWER CHOICES</b> contain references to artificial sweetener using different parts of grammar, so it's testing parallelism.</p>	<p><b>DECIDE</b> this is a parallel comparison question.</p> <p>First Step—figure out the item being compared in the fixed part of the sentence.</p> <p>It is “high-fructose corn syrup,” a noun without any term to introduce it.</p> <p><b>ELIMINATE</b> all of the answer choices that use terms to introduce artificial sweetener, such as ingesting, consuming, and the ingestion of.</p> <p>[18 ] A) <del>No Change</del> B) artificial sweetener C) <del>the ingestion of artificial sweetener</del> D) <del>consuming artificial sweetener</del></p> <p>The remaining answer choice, “artificial sweetener,” makes a logical comparison to high-fructose corn syrup.</p> <p><b>ANSWER B</b></p>

# PARALLEL STRUCTURES | **COMPARISONS**

EXAMPLE 19:

QUESTION	ANSWER CHOICES
<p>Sunbathing at the beach and [ 19 ] sipped on ginger ale are Jiro's favorite ways to pass a Sunday afternoon.</p>	<p>[ 19 ] A) No Change B) sipping C) to sip D) sip</p>
SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICES</b> feature the same verb in multiple tenses and different forms. The underlined verb is connected to another phrase by "and" without a comma, so consider parallelism.</p>	<p>Two phrases are connected by the word "and" without a comma, so they should be parallel.</p> <p>The first phrase begins with an "-ing" word, sunbathing, so the second phrase following "and" should also begin with an _____.</p> <p>Thus, sipping is the correct answer.</p> <p>[ 19 ] A) <del>No Change</del> B) sipping C) <del>to sip</del> D) sip</p>
	<p><b>ANSWER</b> _____</p>

# CLAUSES | RULES: INDEPENDENT VS. DEPENDENT

***When I was very young and the urge to be***

[DC] [SUBJECT] [VERB]

***someplace else was on me, I was assured by***

[COMMA] [IC] [SUBJECT] [VERB]

***mature people that maturity would cure this itch.***

***When years described me as mature, the remedy***

[DC] [SUBJECT] [VERB] [COMMA] [IC] [SUBJECT]

***described was middle age. In middle age***

[VERB] [IC]

***I was assured that greater age would calm***

[SUBJECT] [VERB]

***my fever and now that I am fifty-eight perhaps***

***senility will do the job. Nothing has worked.***

[IC] [SUBJECT] [VERB]

– Adapted from *Travels With Charlie*, by John Steinbeck

## Khan Academy Practice:

- (1) Grammar: Within-sentence punctuation
- (2) Grammar: Sentence boundaries
- (3) Grammar: Subordination and coordination

# CLAUSES | **INDEPENDENT CLAUSE IC**

## A Failed IC:

- Has a *Subject* and a *Verb*.
- Is a complete thought that makes sense.
- Can always stand alone as a complete sentence.
- Any *Clause* that fails to meet all these conditions cannot be an IC and is therefore not a complete sentence.

### EXAMPLE / ANALYSIS

**EXAMPLE**

Americans are exploring their national identity.

[Subject] Americans [Verb] are exploring their national identity.

**ANALYSIS**

Complete thought that makes sense as a sentence (IC).

# CLAUSES | **FAILED INDEPENDENT CLAUSES**

## A Failed IC:

- Lacks a [Subject] or a [Verb] or both OR
- Doesn't make sense as a complete thought, so it can never be an IC (or a complete sentence) by itself.
- Something that fails to be a complete sentence is called a sentence fragment.

### EXAMPLE / ANALYSIS

**EXAMPLE**

Which can change a country.

*[Relative Pronoun]* Which *[Verb]* can change a country.

**ANALYSIS**

This is a relative clause starting with the *[Relative Pronoun]* **WHICH/WHO**.

**TIP**

Think "clauses and comma phrases" when you see *[Relative Pronouns]* **WHICH/WHO**, especially following a comma, in the answer choices.

### EXAMPLE / ANALYSIS / TIP

**EXAMPLE**

Students protesting gun violence

*[Subject]* Students protesting gun violence

**ANALYSIS**

This example fails to be an IC because it is lacking a true *[Verb]*.

**RULE**

Words ending in "-ing" by themselves are not true *[Verbs]*.

Neither are infinitives—"to" + a base verb (e.g., to protest).

# CLAUSES

## HOW TO COMBINE INDEPENDENT CLAUSES CORRECTLY

You must be able to spot incorrectly combined ICs to eliminate them as answer choices. Here are some rules of the road on what is correct and what isn't.

### Wrong ways to combine ICs

RULE	EXAMPLES OF WRONG WAYS
<p><b>WRONG</b> IC, IC Comma Splice</p> <p>It is ALWAYS WRONG to combine two ICs with ONLY a comma (called a COMMA SPLICE).</p>	Basil is annoying, he is a bad dog.
<p><b>WRONG</b> ICIC No punctuation at all</p>	Basil is annoying he is a bad dog.

### Right ways to combine ICs

RULE	EXAMPLES OF RIGHT WAYS
<p><b>RULE 1</b> IC; IC</p> <p>Separate two independent clauses with a <u>period</u>.</p>	<p>IC; IC</p> <p>Basil is annoying. He is a bad dog.</p>
<p><b>RULE 2</b> IC, FANBOYS IC</p> <p>Separate two independent clauses with a <u>comma and one of the "FANBOYS."</u> [ For, And, Nor, But, Or, Yet, So ]</p>	<p>IC, FANBOYS IC</p> <p>Basil is annoying, <u>for</u> he is a bad dog.</p>
<p><b>RULE 3</b> IC; IC</p> <p>Separate two independent clauses with a <u>semicolon</u>.</p>	<p>IC; IC</p> <p>Basil is annoying; he is a bad dog.</p>
<p><b>RULE 4</b> If using methods 1–3 above is not provided as an option for separating two independent clauses on the SAT, then one of the independent clauses (IC) must change into a dependent clause (DC) OR Comma Phrase (cp).</p>	<p>DC , IC</p> <p><u>Because</u> Basil is annoying, he is a bad dog.</p> <p>IC, cp</p> <p>Change second IC into a comma phrase (cp) starting with "which" or "who" :</p> <p>Basil is bad dog, <u>which</u> is annoying.</p> <p>Change the second IC into a comma phrase (cp), often starting with an -ing word:</p> <p>Basil is a bad dog, <u>barking</u> at everything in sight.</p>

# CLAUSES

## DEPENDENT CLAUSE DC | SUBORDINATING TERMS

### The Dependent Clause (DC)

- Has a [Subject] and a [Verb], but it begins with a [Subordinating] term.
- Is not a complete thought, so it can never be a complete sentence by itself.
- Must be combined with an IC to make a complete sentence.

EXAMPLE / ANALYSIS	
<b>EXAMPLE</b>	Although Americans are exploring their national identity  <i>[Subordinating]</i> Although [Subject] Americans [Verb] are exploring their national identity
<b>ANALYSIS</b>	This is a <i>Dependent Clause</i> (DC) and can never be a complete sentence by itself. It must be combined with an IC to make a complete sentence.

### SUBORDINATING TERMS

RULE	EXAMPLE
<b>DO NOT</b> use a COMMA after a [Subordinating] term.	<i>[Subordinating]</i> Because LeBron is coaching me in basketball

**Some common [Subordinating] terms that introduce Dependent Clauses are:**

if	when	so that	before
as	whereas	unless	since
as if	whenever	although	after
	while	because	once
	whether	even though	until

### TRANSITION TERMS

RULE	EXAMPLE
<b>TRANSITION TERMS</b> are DIFFERENT than <b>SUBORDINATING TERMS.</b>	Here are some examples of Transition Words: However, Therefore, and Additionally
<b>USE</b> a COMMA after a transition word.	<i>[Transition]</i> However, LeBron is coaching me in basketball.

# CLAUSES | **QUIZ: INDEPENDENT IC/DC/FAILED ICs**

## DIRECTIONS

Please read the items below and identify whether each is an IC, a DC, or a Failed IC.

Then label each item accordingly: IC, DC, or Failed.

For items labeled ICs and DCs, circle the Subject and underline the Verb.\*

- \_\_\_\_\_ 1. Our teacher is working us to death.
- \_\_\_\_\_ 2. Ken making Edgar angry.
- \_\_\_\_\_ 3. She left him.
- \_\_\_\_\_ 4. Because Justin loves lollipops.
- \_\_\_\_\_ 5. Birds fly.
- \_\_\_\_\_ 6. After Alexis crashed into the pole.
- \_\_\_\_\_ 7. Which Haydee has preferred.
- \_\_\_\_\_ 8. Students to walk out of class.
- \_\_\_\_\_ 9. If Roberto is locked out, he should call my phone.
- \_\_\_\_\_ 10. It is hard.

\*Answers and explanations are provided on the next page.



# CLAUSES | PUNCTUATION

EXAMPLE 20:

QUESTION	ANSWER CHOICES
<p>Although scientists have discovered more than 10,000 types of flies in the [ 20 ] <u>world</u>. <u>The</u> most widely known in North America is the fruit fly.</p>	<p>[ 20 ] A) No Change B) world, and the C) world; the D) world, the</p>
SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICES INCLUDE</b> multiple types of punctuation between "world" and "the."</p>	<p><b>DECIDE</b> it is a punctuation question type.</p>
<p><b>USE PUNCTUATION RULES</b> to eliminate wrong answer and select the right answer. See <i>punctuation rules</i>.</p>	<p>Start by testing the types of punctuation with the fewest rules. Look for ICs as you test punctuation. <b>REMEMBER</b> to apply the rules regarding ICs, DCs, and cps as needed.</p>
<p>The first half of the sentence starting with "Although" is a DC. It is followed by an IC, starting with "the most widely..."</p>	<p><b>ELIMINATE</b> "world. The" because the sentence lacks an IC before the period. A) No Change B) world, and the C) world; the D) world, the</p>
<p><b>PERIOD</b> A period must be surround by two ICs (IC.IC).</p>	<p><b>ELIMINATE</b> "world; the" because there is a DC before the semicolon.</p>
<p><b>SEMICOLON</b> A semicolon also must be surrounded by two ICs (IC;IC).</p>	<p>A) <del>No Change</del> B) world, and the C) <del>world;</del> the D) world, the</p>
<p>Now there are two answer choices that use a comma alone. See if they fit one of the listed purposes for using a single comma.</p>	<p>Although scientists have discovered more than 10,000 types of flies in the [15] world, and the most widely known in North America is the fruit fly.</p>
<p><b>A COMMA</b> followed by one of the FANBOYS almost always separates two ICs.</p>	<p><b>ELIMINATE</b> "world, and the" because there is not an IC before ", and". A) <del>No Change</del> B) <del>world, and the</del> C) <del>world;</del> the D) world, the</p>
<p><b>A SENTENCE THAT STARTS WITH A DC</b> must have a comma after the DC and before the IC.</p>	<p>Although scientists have discovered more than 10,000 types of flies in the [15] <u>world, the</u> most widely known in North America is the fruit fly.</p>
<p>Thus, the correct answer is "<u>world, the</u>" because it correctly use a comma to separate a DC from an IC.</p>	
	<p><b>ANSWER B</b></p>

## COMMA PHRASE (CP) | INTRODUCTION

and relative clauses that start with “which” or “who”

***In a few days Mr. Bingley returned Mr. Bennet’s***  
 [IC] [SUBJECT] [VERB]

***visit, and they sat about ten minutes together in***  
 [COMMA] [FANBOY] [IC] [SUBJECT] [VERB]

***his library. He had entertained hopes of being***  
 [END IC] [SUBJECT] [VERB]

***admitted to a sight of the young ladies, whose***  
 [COMMA] [BEGIN cp]

***beauty he had heard about; however, he saw only***  
 [END cp] [IC] [SUBJECT] [VERB]

***the father. The ladies were somewhat more***  
 [END IC] [IC] [SUBJECT] [VERB]

***fortunate, having the advantage of ascertaining***  
 [COMMA] [BEGIN cp]

***from an upper window that he wore a blue coat***

***and rode a black horse.***  
 [END cp]

– Adapted from *Pride and Prejudice*, by Jane Austen

Comma Phrases (cp) can be at the end, in the middle, or at the beginning of a sentence (IC). This section discusses all three, including relative clauses that act as comma phrases, as well as some frequently tested phrases that are NOT comma phrases.

# COMMA PHRASE (CP) | DEFINITION/RULE

## Comma Phrase

### DEFINITION

A *Comma Phrase* adds explanation, description, an intervening thought, or other information that is NOT necessary for the sentence to be complete and make sense. A comma phrase can never be an IC.

### RULE

A Comma Phrase must always be set off with **commas, parentheses, or dashes**:

IC, cp (*Comma Phrase*).  
 I, cp (*Comma Phrase*), C  
 I—cp (*Comma Phrase*)—C  
 I (cp (*Comma Phrase*)) C  
 cp (*Comma Phrase*), IC.

## Relative Clauses that Start with “Which” or “Who”

### DEFINITION

A *Relative Clause* that begins with “WHICH” or “WHO” is almost always treated like a *Comma Phrase*, meaning it must be set off from the IC with the proper cp punctuation. We will refer to these clauses as *Comma Phrases* in this section.

### RULE

A *Comma Phrase* that begins with “WHICH” or “WHO” will come in the Middle or at the End of an IC and should be set off with the proper comma phrase punctuation.

IC, WHICH/WHO cp  
 I, WHICH/WHO cp, C  
 I—WHICH/WHO cp—C  
 I (WHICH/WHO cp) C

# COMMA PHRASE | SIGNAL & RESPONSE

SAT Questions dealing with *Comma Phrases* fall under the same Signal | Response category as *Punctuation Questions*. However, when one or more **commas**, **dashes**, or **parentheses** are provided in the answer choices, or sometimes in the sentence, **USE THE RULES** regarding comma phrases in this section and clauses from the last section to get to the correct answer.

EXAMPLES 21 and 22

QUESTION	ANSWER CHOICES
<p>[ 21 ] Psycho the title of a famous horror movie, is a description of a person with a genuine psychiatric condition.</p> <p>Siri is teaching me grammar, [ 22 ] which is my favorite subject.</p>	<p>[ 21 ] A) No Change B) Psycho— C) Psycho, D) Psycho:</p> <p>[ 22 ] A) No Change B) it is my favorite subject C) that is my favorite subject D) which it is my favorite subject</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> in [ 21 ] include options that set off one or more phrases with different punctuation, including one or more commas, parentheses, or dashes. Other punctuation options may be offered in the answer choices.</p> <p><b>THE CROSS OUT TEST</b>—use as needed.</p> <p><b>PUNCTUATION</b> rules are covered in detail later this section</p>	<p><b>DECIDE</b> it is a punctuation question. Since commas are included, consider comma phrases.</p> <p><b>IDENTIFY</b> the IC in the sentence.</p> <p><b>CROSS OUT</b> the potential comma phrase(s) from the sentence to see if the sentence is complete, makes sense, and does not lose its meaning.</p> <p>If so, then the phrase should be set off from the sentence with the proper punctuation.</p> <p>If the sentence fails after you cross out a potential comma phrase, then no punctuation should be used to set off the phrase.</p>
<p><b>ANSWER CHOICES</b> in [ 22 ] change the words that follow a comma, but the comma itself is fixed. Answer choices often include “which,” “who,” or an –ing word.</p>	<p><b>DECIDE</b> this is a comma phrase question.</p> <p><b>IDENTIFY</b> the IC(s) in the sentence and look for ICs in the answer choices. If the sentence has an IC before the comma, eliminate any answer choices that are ICs.</p> <p>Make sure the comma does NOT separate TWO ICs. There must be a DC or a comma phrase on one side of the comma.</p>

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# COMMA PHRASE AT THE END OF A COMPLETE SENTENCE (IC)

Comma Phrases can be added at the **END OF A COMPLETE SENTENCE (IC)**, and they **MUST BE SET OFF WITH A COMMA**.

## IC, cp

SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICES</b> change words that follow a comma, but the comma itself is fixed.</p>	<p><b>IC, cp</b> <b>EXAMPLE</b> I am studying for the <b>GMAT, a very difficult test.</b></p> <p><b>RESPONSE</b> Read the sentence to find whether there is an IC on either side of the comma.</p>
<p>There is an IC followed by a comma. Use the cross out test on the phrase that follows the comma.</p>	<p><b>USE THE CROSS OUT TEST</b> on the phrase "a very difficult test".</p> <p>I am studying for the GMAT, a <del>very difficult test</del>.</p> <p>The sentence is still complete and makes sense after you cross out "a very difficult test," so it is a comma phrase that properly follows a comma at the end of a sentence.</p>

## Failed IC, cp

SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICES</b> change words that follow a comma, but the comma itself is fixed.</p>	<p><b>FAILED COMMA PHRASE EXAMPLE</b></p> <p>The GMAT is, <del>a very difficult test</del>.</p> <p><b>RESPONSE</b> There is NO IC before or after the comma, so there is no comma phrase. Thus, there should not be a comma in this sentence.</p>
<p><b>WHEN THERE IS ONLY ONE COMMA AND IT IS FIXED IN THE SENTENCE</b>, the cross out test is rarely needed. Instead, the cross out test is useful when deciding if a comma should be used to set off a potential comma phrase.</p>	<p>"The GMAT is" is not an IC; "a very difficult test" is not an IC. So, we cannot cross out the phrases on either side of the comma without ruining the sentence.</p>

# COMMA PHRASE | STARTING WITH “WHICH” OR “WHO” AT THE END OF AN IC

Comma phrases starting with “WHICH or “WHO” (or rarely “WHOM”) can be added at the end of a complete sentence (IC), and they **MUST BE SET OFF WITH A COMMA.**

**RULE** IC, WHICH cp | IC, WHO cp

SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICES</b> include “which” or “who” (or rarely “whom”) at the beginning of the terms that follow a fixed comma in a sentence. There is an IC before the comma and the “which” or “who” phrase.</p>	<p><b>IC, WHICH cp   IC, WHO cp EXAMPLE</b></p> <p>Siri is teaching me grammar, [41] <u>which is my favorite subject.</u></p> <p>A) No Change B) it is my favorite subject C) that is my favorite subject D) which it is my favorite subject</p> <p><b>DECIDE</b> this is a comma phrase question. <b>READ</b> the sentence to identify any ICs.</p>
<p>Since there is an IC before the fixed comma, there cannot be an IC after the comma (without one of the FANBOYS). Two ICs separated by a comma is always wrong.</p>	<p><b>ELIMINATE</b> any answer choices that offer an IC after the comma.</p> <p>A) No Change B) <del>it is my favorite subject</del> C) <del>that is my favorite subject</del> D) which it is my favorite subject</p>
<p>Questions involving “which” or “who” rarely test whether a comma should be used. However, if they do, then use the cross out test to decide if the “which” or “who” phrase should be set off with the proper comma phrase punctuation (a comma or commas, dashes, or parentheses).</p>	<p>Between the two remaining answer choices A and D, only A is grammatically correct. Answer choice D, “which it is my favorite subject,” does not make sense because it uses two pronouns in a row, “which” and “it.” On the other hand, “which is my favorite subject” makes sense as a comma phrase to add at the end of the sentence.</p> <p><b>ELIMINATE</b> answer choice D. A) No Change B) <del>it is my favorite subject</del> C) <del>that is my favorite subject</del> D) which it is my favorite subject</p>
	<p><b>ANSWER</b> A</p>

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# COMMA PHRASE IN THE MIDDLE OF A COMPLETE SENTENCE (IC)

*Comma Phrases* can be added in the middle of a complete sentence (IC), by placing commas, dashes, or parentheses before and after the entire comma phrase. The **PUNCTUATION MUST MATCH ON BOTH SIDES.**

**USE THE CROSS OUT TEST** by thinking of two commas, two dashes, and two parentheses as SLICERS; you can cut out what is between, and the rest of the sentence will still make sense and remain complete.

**RULE** I, cp, C | I—cp—C | I (cp) C

I, cp, C

SIGNAL / RULE	RESPONSE EXAMPLE / ANALYSIS
<p><b><u>ANSWER CHOICES</u></b> have different punctuation, including one or more commas, parentheses, or dashes in various places in the sentence.</p>	<p>J.R. Smith is tutoring me in math, <u>especially algebra</u>, this summer.</p>
	<p><b><u>TEST</u></b> if the phrase set between two commas, parentheses, or dashes is truly a comma phrase by crossing it out.</p> <p>After crossing it out, check whether the rest of the sentence is an IC, still makes sense, and is complete.</p> <p>J.R. Smith is tutoring me in math, <u>especially algebra</u>— this summer.</p> <p>A) No Change B) especially algebra C) especially algebra, D) especially algebra)</p>
<p><b><u>THE SENTENCE MAKES SENSE</u></b> without the phrase, so “especially algebra” is a comma phrase in the middle of a sentence requiring matching commas, parentheses, or dashes to set it off on both sides.</p>	<p><b><u>ELIMINATE</u></b> answer choices that don’t have matching punctuation. Since the comma phrase has a comma before it, a comma must also follow it. Also eliminate answer choices that lack punctuation on BOTH sides of the comma phrase.</p> <p><b><u>ANSWER C</u></b></p>

# COMMA PHRASE IN THE MIDDLE OF A COMPLETE SENTENCE (IC)

**RULE** I, cp, C | I—cp—C | I (cp) C

I, cp, C

SIGNAL / RULE	RESPONSE EXAMPLE / ANALYSIS
<p><b>ANSWER CHOICES</b> have different punctuation, including one or more commas, parentheses, or dashes, in various places in the sentence. Punctuation might be mixed in the answer choices, but it is always wrong to mix punctuation that surrounds a comma phrase in the middle of an IC.</p>	<p>Liberia— <u>according to historians</u>—began as a settlement for freed African American slaves who believed they would have a better life in Africa than in the United States.</p> <p><b>TEST</b> if the phrase set between the two dashes is truly a comma phrase by crossing it out.</p> <p>After crossing it out, check whether the rest of the sentence still makes sense and is complete.</p> <p>Liberia—<del>according to historians</del>—began as a settlement for freed African American slaves who believed they would have a better life in Africa than in the United States.</p>
	<p><b>THE SENTENCE MAKES SENSE</b> without the phrase, so “according to historians” is a comma phrase in the middle of a sentence requiring matching commas, parentheses, or dashes to set it off on both sides.</p> <p><b>ELIMINATE</b> answer choices that don’t have matching punctuation. Also eliminate answer choices that lack punctuation on BOTH sides of the comma phrase.</p>

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# COMMA PHRASE IN THE MIDDLE OF A COMPLETE SENTENCE (IC)

**RULE** I, cp, C | I—cp—C | I (cp) C

I, cp, C

SIGNAL / RULE	RESPONSE EXAMPLE / ANALYSIS
<p><b>ANSWER CHOICES</b> have different punctuation, including one or more commas, parentheses, or dashes, in various places in the sentence. Punctuation might be mixed in the answer choices, but it is always wrong to mix punctuation that surrounds a comma phrase in the middle of an IC.</p>	<p>Star Lord (the self-proclaimed name of the superhero from Guardians of the Galaxy) struggled with his jealousy of the more beautiful superhero Thor.</p> <p><b>TEST</b> if the phrase set between the two parentheses is truly a comma phrase by crossing it out. After crossing it out, check whether the rest of the sentence still makes sense and is complete.</p> <p>Star Lord (<del>the self-proclaimed name of the superhero from Guardians of the Galaxy</del>) struggled with his jealousy of the more beautiful superhero Thor.</p> <p><b>THE SENTENCE MAKES SENSE</b> without the phrase, so “<del>the self-proclaimed name of the superhero from Guardians of the Galaxy</del>” is a comma phrase in the middle of sentence, requiring matching commas, parentheses, or dashes to set it off on both sides.</p>
<p><b>GRAMMAR ALERT NOTE</b> If a comma phrase is set within parentheses, the phrase must immediately follow the person or thing it describes or explains, as it does above.</p>	<p><b>ELIMINATE</b> answer choices that don't have matching punctuation. Also eliminate answer choices that lack punctuation on BOTH sides of the comma phrase.</p> <p><b>FAILED I(CP)C EXAMPLE</b></p> <p>Star Lord struggled with his jealousy (the superhero from Guardians of the Galaxy) of the more beautiful Thor.</p> <p>“The superhero from Guardians of the Galaxy” does not explain or describe Star Lord’s <u>jealousy</u>.</p>

# COMMA PHRASE STARTING WITH “WHICH” IN THE MIDDLE OF AN IC

Comma Phrases starting with “WHICH” can be **ADDED AT THE MIDDLE OF A COMPLETE SENTENCE** (IC), by placing commas, dashes, or parentheses before and after the entire comma phrase. The **PUNCTUATION MUST MATCH ON BOTH SIDES**.

**USE THE CROSS OUT TEST** by thinking of two commas, two dashes, and two parentheses as **SLICERS**; you can cut out what is between and the rest of the sentence will still make sense, plus remain complete.

**RULE:** I, WHICH cp, C | I—WHICH cp—C | I (WHICH cp) C

## I, WHICH cp, C

SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICES</b> have different punctuation, including one or more commas, parentheses, or dashes, in various places in the sentence. Punctuation might be mixed. The underlined phrase might include the terms “which” or “who.”</p>	<p>The SAT, which is a very difficult test, will be administered in June.</p> <p>The SAT — which is a very difficult test — will be administered in June.</p> <p>The SAT ( which is a very difficult test ) will be administered in June.</p>
<p>Remember that a comma phrase can never be an IC.</p>	<p><b>TEST</b> if the phrase set between the two commas is truly a comma phrase by crossing it out.</p> <p>After crossing it out, check whether the rest of the sentence still makes sense and is complete.</p> <p>The SAT, <del>which is a very difficult test</del>, will be administered in June.</p>
	<p><b>ANALYSIS</b> The sentence makes sense without the phrase, so “which is a very difficult test” is a comma phrase in the middle of a sentence requiring matching commas, parentheses, or dashes to set it off on both sides.</p>
	<p><b>ELIMINATE</b> answer choices that don’t have matching punctuation. Also eliminate answer choices that lack punctuation on BOTH sides of the comma phrase.</p>

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# COMMA PHRASE STARTING WITH “WHO” IN THE MIDDLE OF AN IC

A *Relative Clause/Comma Phrase* that adds information about a person instead of a thing can start with “WHO” or “WHOM” instead of “WHICH.”

NOT ALL *Relative Clauses* starting with “WHO” or “WHOM” are Comma Phrases. **USE THE CROSS OUT TEST** to decide when commas are needed.

**RULE:** I, WHO cp, C | I—WHO cp—C | I (WHO cp) C

I, WHO cp, C

SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>ANSWER CHOICES</b> have different punctuation, including one or more commas, parentheses, or dashes, in various places in the sentence. Punctuation might be mixed.</p>	<p>Mike Trout (<u>who is a professional ball player</u>) doesn't like to fish.</p> <p><b>THE SENTENCE MAKES SENSE</b> without the phrase “who is a professional ball player,” so it is a comma phrase in the middle of a sentence requiring matching commas, parentheses, or dashes to set it off on both sides.</p>
<p>Remember if different subjects are provided before a comma phrase in the middle of an IC or within parentheses, the subject being described by the comma phrase must immediately precede the cp.</p>	<p><b>FAILED I—cp—C EXAMPLE</b></p> <p>Mike Trout—<u>who is a professional ball player doesn't</u>— like to fish.</p> <p>Mike Trout (<u>who is a professional ball player doesn't</u>) like to fish.</p> <p><b>TEST</b> if the phrase set between the two parentheses or dashes is truly a comma phrase by crossing it out. Afterwards check whether the rest of the sentence still makes sense and is complete.</p> <p>Mike Trout—<del>who is a professional ball player doesn't</del>—like to fish.</p> <p>Mike Trout (<del>who is a professional ball player doesn't</del>) like to fish.</p> <p>“Mike Trout like to fish” doesn't make sense, so the crossed out phase is not a cp and should not be set off by punctuation.</p>

## COMMA PHRASE | **AT THE BEGINNING OF AN (IC)**

Most Comma Phrases at the **BEGINNING OF A SENTENCE** are transition words/phrases, introductory words/phrases/modifiers, or **dependent** clauses. A comma **MUST SEPARATE** these introductory comma phrases and dependent clauses from the independent clause that follows.

**RULE:** cp, IC | DC, IC

SIGNAL / RULE	RESPONSE / ANALYSIS
<p><b>AT THE BEGINNING OF A COMPLETE SENTENCE</b>                      have different punctuation, including one or more commas, parentheses, or dashes, in various places in the sentence. Punctuation might be mixed.</p>	<p><b>EXAMPLES</b>                      However, Marshall stole my car.                      Regardless of what you think, Marshall stole my car.                      In the summer of 2017, Marshall stole my car.                      When I wasn't looking [DC], Marshall stole my car. [IC]</p>

## RELATIVE CLAUSE | **STARTING WITH “THAT”**

A *Relative Clause* beginning with “THAT” is almost **NEVER** set off with commas or any other punctuation because it provides information that is necessary to the meaning of the sentence.

### EXAMPLE 23

QUESTION	ANSWER CHOICES
<p>[ 23 ] Effort, that is easily observed, is rewarded by management, while less obvious effort often gets ignored.</p>	<p>[ 23 ]</p> <p>A) No Change</p> <p>B) Effort that is easily observed is rewarded by management,</p> <p>C) Effort that is easily seen, and observed is rewarded by management</p> <p>D) Effort—that is easily observed—is rewarded by management</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> include phrases set off between commas and dashes. Other ACs have commas in different places. The question is testing comma phrases in the middle of a sentence</p>	<p><b>CROSS OUT</b> the “that” clause between the commas in A or the dashes in D, “Effort, that is easily observed, is rewarded by management, while less obvious effort often gets ignored.” The result is, “Effort is rewarded by management, while less obvious effort often gets ignored.”</p>
<p><b>ANSWER CHOICES</b> does not make sense unless we add in the information provided from the “that” clause, “Effort <i>that is easily observed</i> is rewarded by management, while less obvious effort often gets ignored.”</p> <p>Thus, the “that” clause is essential to this sentence and cannot be set off with commas or dashes.</p> <p>NOTE IC, DC is sometimes ok. The comma following rewarded is allowed because sometimes a comma comes after an IC and before a DC for clarity.</p>	<p><b>ELIMINATE</b> answer choices A and D because the “that” clause is NOT a comma phrase and cannot be removed without ruining the sentence.</p> <p><b>ELIMINATE</b> answer choice C because the comma FANBOYS (seen, and) does not separate two ICs.</p> <p>Answer choice B is correct, since the “that” clause is appropriately NOT set off with any punctuation.</p>
	<p><b>ANSWER B</b></p>

# PREPOSITIONAL PHRASES

Notice how the *Prepositional Phrases* in the next three examples provide information directly tied to the **term/phrase** they follow.

SIGNAL / RULE	RESPONSE / EXAMPLE / ANALYSIS
<p><b><u>RULE</u></b>                      Phrases that begin with a preposition almost never have punctuation before them.</p> <p>A prepositional phrase that provides important information tied to the term/phrase it immediately follows should have NO punctuation before the prepositional phrase.</p>	<p>Agents at the Federal Bureau of Investigation found the Zodiac Killer to be one of the most elusive criminals of all time.</p> <p><b><u>ANALYSIS</u></b>                      "At the Federal Bureau of Investigation" provides direct information about the agents, so no comma should be used. Even though a lot of information is provided in this sentence, it acts as one IC with no comma phrases.</p>
<p><b><u>RULE EXCEPTIONS</u></b>                      A comma usually follows Introductory/Transitional phrases starting with a preposition when the phrase comes before an IC.</p> <p><i>"in addition," "in 1492," "on the other hand," "to the contrary,"</i> etc.</p>	<p>Ani is difficult; on the other hand, you must agree she is brilliant.</p> <p><b><u>ANALYSIS</u></b>                      "On the other hand" does not provide direct information about Ani. Instead it provides a transition between the two ICs.</p>
<p>A prepositional phrase is set between two commas, two dashes, or two parentheses if it intervenes in the middle of a sentence.</p> <p><i>"in addition," "in conclusion," "on the other hand," "to the contrary," "from this to that," "to my relief,"</i> etc.</p>	<p>My grades, <i>to my relief</i>, have improved over the past year.</p> <p><b><u>ANALYSIS</u></b>                      "To my relief" does not provide direct information about "my grades." Instead, it gives general commentary interjected by the speaker about his or her feelings.</p>

# COMMA PHRASE | PUNCTUATION

## EXAMPLE 24

QUESTION	ANSWER CHOICES
<p>[ 24 ] Psycho the title of a famous horror movie, is a description of a person with a genuine psychiatric condition.</p>	<p>[ 24 ] A) No Change B) Psycho— C) Psycho, D) Pscyho</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> feature different types of punctuation, including a comma and a dash.</p>	<p><b>USE PUNCTUATION RULES</b> to eliminate the wrong answers and select the right answer. Start by testing the types of punctuation with the fewest rules. Look for ICs as you test punctuation rules.</p>
<p><b>A COLON</b> must be preceded by an IC. "Psycho" is not an IC.</p>	<p><b>CROSS OUT</b> Psycho: A) No Change B) Psycho— C) Psycho, D) Pscyho:</p>
<p><b>A SINGLE DASH</b> must be preceded by an IC. "Psycho" is not an IC. It is always wrong to mix punctuation surrounding a comma phrase.</p>	<p><b>CROSS OUT</b> Psycho— A) No Change B) Psycho— C) Psycho, D) Pscyho:</p>
<p><b>THE COMMA</b> could be working together with the second comma in the sentence to set off a comma phrase.</p>	<p><b>TEST THIS</b> by crossing out the comma phrase "the title of a famous horror movie."  Psycho the title of a famous horror movie, is a description of a person with a genuine psychiatric condition.  Without that phrase, the sentence reads, "Psycho is a description of a person with a genuine psychiatric condition."  <b>ANALYSIS</b> After crossing out the cp, the remaining sentence is complete and makes sense, meaning the comma phrase belongs between commas.</p>
<p>You are left with the correct answer.</p>	<p><b>ELIMINATE</b> Psycho with no punctuation because it fails to place a comma on both sides of the comma phrase. A) No Change B) Psycho— C) Psycho, D) Pscyho:</p>
	<p><b>ANSWER C</b></p>

# INTRODUCTORY MODIFIERS (IM) | **INTRODUCTION**

***Spell-bound and quivering with excitement,***  
[BEGIN IM] [END IM] [COMMA]

***the Water Rat followed the Adventurer league by***  
[THING BEING DESCRIBED]

***league, over stormy bays, through crowded roadsteads,***

***across harbour bars on a racing tide,***

***up winding rivers that hid their busy little towns***

***round a sudden turn.***

— The Wind in the Willows, by *Kenneth Grahame*

## **Khan Academy Practice:**

(1) Grammar: Modifier Placement;

(2) Grammar: Subordination and coordination

# INTRODUCTORY MODIFIERS | **SIGNAL & RESPONSE**

A *Modifier* describes a **person, place, or thing** in a sentence.

An **Introductory Modifier (IM)** describes a person, place, or thing and is a Phrase that comes at the **BEGINNING OF THE SENTENCE**.

The **PERSON, PLACE, OR THING** described by the IM **MUST IMMEDIATELY FOLLOW A COMMA** after the IM.

## EXAMPLE 25

QUESTION	ANSWER CHOICES
<p>Preoccupied by the sun glaring directly in his eyes, [ 25 ] <u>the player allowed the football to slip through his fingers.</u></p>	<p>[ 25 ]</p> <p>A) No Change</p> <p>B) the player’s fingers slipped on the football.</p> <p>C) the football slipped through the player’s fingers.</p> <p>D) everyone saw the player’s fingers slip on the football.</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> will be very similar in meaning and will be long, sometimes even appearing as full ICs. The major difference between the answer choices will be that the order of the words is changed around.</p> <p><b>AFTER IDENTIFYING AN IM</b> at the beginning of the sentence, then make sure that the <b>PERSON, PLACE, OR THING</b> being described by the IM <b>IMMEDIATELY FOLLOWS</b> it.</p>	<p>After seeing this signal, immediately <b>CHECK</b> to see if there is an IM at the beginning of the sentence.</p> <p><b>LOOK FOR</b> a descriptive phrase followed by a comma at the beginning of the sentence.</p> <p>If you find one, <b>DECIDE</b> it is an IM question.</p> <p><b>ASK</b> who or what is being described by the Introductory Modifier.</p>

# INTRODUCTORY MODIFIER(IM) AT THE BEGINNING OF AN (IC)

## RULE IM, IC

SIGNAL / RULE	RESPONSE EXAMPLE / ANALYSIS
<p><b>RULE</b> The person, place, or thing being described by the IM must immediately follow the introductory modifier (IM), and the IM must be set off with a comma.</p>	<p><b><u>FAILED IM EXAMPLE</u></b> Driving down the street, <u>the houses looked lovely to the family.</u></p>
<p><b>ANSWER CHOICES</b> are very similar in meaning, are often long, and might be either full ICs or nearly ICs. The major difference between the answer choices will be that the order of the words is changed around.</p>	<p><b><u>EXAMPLE</u></b> Driving down the street, <u>the family thought that the houses looked lovely.</u></p>
<p>The SAT will test whether the person or thing being modified is placed immediately after the IM.</p>	<p><b><u>CHECK</u></b> to see if there is an introductory modifier at the beginning of the sentence (set off with a comma).  <b><u>ASK</u></b> who or what the introductory modifier is describing. <b>CHOOSE THE ANSWER THAT</b> places the person or thing being described by the IM immediately after the introductory modifier.  <b><u>ANALYSIS</u></b> Who or what is the IM "driving down the street" describing?  Does it describe "the houses"? NO! It would not make sense for houses to drive down the street, since houses cannot drive. So "the houses" should not immediately follow the IM.  Could "driving down the street" describe "the family"? YES. A family can drive down a street. So "the family" must come as close as possible to the introductory modifier.</p>

# INTRODUCTORY MODIFIER(IM) AT THE BEGINNING OF AN (IC)

## RULE IM, IC

### EXAMPLE 26

QUESTION	ANSWER CHOICES
<p>Preoccupied by the sun glaring directly in his eyes, [ 26 ] <u>the player allowed the football to slip through his fingers</u></p>	<p>[ 26 ]</p> <p>A) No Change</p> <p>B) the player’s fingers slipped on the football.</p> <p>C) the football slipped through the player’s fingers.</p> <p>D) everyone saw the player’s fingers slip on the football.</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> will be very similar in meaning and will often be long, sometimes even appearing as full ICs. The major difference between the answer choices will be that the word order is changed (as shown in the example above).</p>	<p>After identifying this signal, immediately <b>CHECK</b> to see if there is an IM at the beginning of the sentence.</p> <p><b>LOOK FOR</b> a descriptive phrase followed by a comma at the beginning of the sentence.</p>
<p><b>AN IM, FOLLOWED BY A COMMA</b> starts the sentence, and the answer choices all immediately follow the IM.</p>	<p><b>DECIDE</b> it is an IM question type.</p> <p><b>SELECT THE ANSWER CHOICE</b> that places the person/thing described by the modifier immediately after the comma.</p> <p><b>ASK</b> could “preoccupied by the sun glaring directly in his eyes” describe “the football” or “everyone” or “the player’s fingers”? No, so <b>ELIMINATE</b> answer choices B, C, and D.</p> <p><b>ASK</b> could “preoccupied by the sun glaring directly in his eyes” describe “the player”? Yes</p>
	<p><b>ANSWER A</b></p>

# PUNCTUATION | INTRODUCTION

*After a time she heard a little pattering of feet in the distance,*  
[COMMA]

*and she hastily dried her eyes to see what was coming.*  
[PERIOD]

*It was the White Rabbit returning, splendidly dressed,*  
[COMMA] [COMMA]

*with a pair of white kid-gloves in one hand and a large fan*  
[HYPHEN]

*in the other: he came trotting along in a great hurry,*  
[COLON] [COMMA]

*muttering to himself as he came, "Oh! the Duchess, the Duchess,*  
[COMMA] [QUOTE][EXCLAMATION] [COMMA] [COMMA]

*the Duchess! Oh! Won't she be savage if I've kept her waiting!"*  
[EXCLAMATION] [EXCLAMATION] [APOSTROPHE] [APOSTROPHE] [EXCLAMATION] [QUOTE]

*Alice felt so desperate that she was ready to ask help of anyone,*  
[COMMA]

*so when the Rabbit came near her, she began in a low,*  
[COMMA] [COMMA]

*timid voice, "If you please, Sir—" The rabbit started violently,*  
[COMMA] [QUOTE] [COMMA] [DASH] [QUOTE] [COMMA]

*dropped the white kid-gloves and the fan, and scurried away*  
[HYPHEN] [COMMA]

*into the darkness as hard as he could go.*  
[PERIOD]

—Adapted from *Alice's Adventures in Wonderland*, by Lewis Carroll

# PUNCTUATION | **SIGNAL & RESPONSE**

*Punctuation* marks are the signals that clarify the difference between one thought and another explained in sentence form. The SAT will use Punctuation Questions to test rules regarding Clauses, Comma Phrases, and Punctuation.

## EXAMPLES 27 & 28

QUESTIONS	ANSWER CHOICES
Gardening successfully is more akin to science than to art [ 27 ] , it entails knowledge, time-tested experience, and much patience.	[ 27 ] A) No Change B) ; and it entails C) ; it entails D) it entails
As a practicing Jainist, Gutama had one [ 28 ] goal, and hoped to alleviate karma in the world.	[ 28 ] A) No Change B) goal: C) goal; D) goal, he—hoped
SIGNAL	RESPONSE
<b>ANSWER CHOICES</b> feature different types of punctuation and/or the answers feature the same punctuation used in different places.	<b>USE THE PUNCTUATION RULES</b> provided in this section (alongside the rules governing Clauses and Comma Phrases) to eliminate wrong answers and select the correct answer.  <b>START BY</b> testing answer choices that use punctuation with fewer rules, such as periods, semicolons, colons, and then dashes. Move on to commas last.

## PUNCTUATION EXAMPLES

- The cow jumped over the moon.
- ; Peanuts are not truly nuts; they are legumes.
- : There is only one letter that doesn't appear in the name of any U.S. state: Q.
- The qualities required for success—motivation and hard work—can be learned by anyone.
- , McDonalds invented bubblegum-flavored broccoli, which kids, unsurprisingly, did not like.
- ( ) Blue whales (the largest mammals on earth) eat close to half a million calories per mouthful.
- ? Why do people usually burn more calories while sleeping than while watching TV?

### Khan Academy Practice:

- (1) Grammar: Within-sentence punctuation
- (2) Grammar: Sentence boundaries
- (3) Grammar: Nonrestrictive and parenthetical elements
- (4) Grammar: End-of-sentence punctuation
- (5) See Clauses & Modifiers practice as well

# PUNCTUATION | **RULE/RESPONSE**

## PERIOD .

## IC. IC

SIGNAL / RULE	RESPONSE / EXAMPLE
<p><b>PERIODS</b> can only be used to end sentences that are ICs.</p> <p>A <b>PERIOD</b> cannot be used after a failed IC, a DC, or a cp.</p>	<p><b>IC. IC. EXAMPLE</b></p> <p>Every city in Italy has its own dialect of Italian. Italy chose the dialect used in Florence as its national language.</p> <p><b>WHAT NOT TO DO IC.</b> cp. example:                      Many Italians believed that Rome’s dialect should have been chosen due to its history and the presence of the Vatican in Rome. <u>Which is the seat of the Catholic Church.</u></p> <p>Which is the seat of the <i>Catholic Church</i> is NOT an IC, so it cannot be surrounded by periods.</p>

## SEMICOLON ;

## IC; IC

SIGNAL / RULE	RESPONSE / EXAMPLE
<p><b>PERIODS</b> can only be used to end sentences that are ICs.</p> <p>A <b>PERIOD</b> cannot be used after a failed IC, a DC, or a cp.</p>	<p>If there is NOT an IC on BOTH sides of a semicolon, then eliminate the semicolon as an answer choice.</p> <p><b>IC; IC. EXAMPLE</b></p> <p>The U.S. invaded Panama on December 20, 1989; the intended result was to overthrow and arrest the de facto dictator Manuel Noriega.</p>
<p><b>NEVER</b> use one of the FANBOYS after a semicolon.</p>	<p><b>FAILED IC; FANBOYS IC. EXAMPLE</b></p> <p>Noriega had no intention of allowing the U.S. troops to arrest him; <u>so</u> he attempted to escape to a place where the U.S. soldiers could not follow him.</p>
<p>However, a semicolon can be followed by a transition word/phrase.</p>	<p><b>IC; TRANSITION WORD IC. EXAMPLE</b></p> <p>Noriega plead, threatened, and cajoled to obtain refuge at the Vatican embassy in Panama City; <u>eventually, the embassy</u> granted him refuge by allowing him entrance to their building.</p>
<p><b>NEVER</b> use a semicolon to introduce items in a list.</p>	<p><b>FAILED IC; LIST. EXAMPLE</b></p> <p>There are many places the U.S. military cannot legally invade, such as; foreign consulates, <u>foreign embassies, and U.N. facilities.</u></p>

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# PUNCTUATION | **RULE/RESPONSE**

## COLON :

## IC:

SIGNAL / RULE	RESPONSE / EXAMPLE
A <b>COLON</b> must ALWAYS be preceded by an IC. A list, phrase, word, quote, or even another IC can follow a colon.	If there is NOT an IC before the colon, then eliminate it as an answer choice.
Colons are used (after an IC) to introduce things like a list.	<b>IC: LIST. EXAMPLE</b> There are four colors of paint to use: red, green, blue, and yellow.
They can also be used to direct attention to (highlight/emphasize) the information that follows the colon.	<b>IC: WORD. EXAMPLE</b> The U.S. was forbidden from using violence against the Vatican embassy to remove the man they wanted: Noriega.
If a colon is used to separate two ICs, then the second IC explains the first IC.	<b>IC: IC. EXAMPLE</b> After deciding that leaving Panama without Noriega was not an option, the U.S. military was forced to get creative: the military had to figure out a way to capture Noriega from the Vatican embassy without the use of invasion, force, or violence of any kind.

## DASH —

## IC—

SIGNAL / RULE	RESPONSE / EXAMPLE
<b>ONE DASH—</b>	<b>CHECK</b> the answer choices and the rest of the sentence to see if the sentence contains ONE or TWO dashes.
<b>IC—LIST, PHRASE, OR WORD</b> If ONE DASH is an option, then apply the following rule: A Single Dash, like a colon, must always be <b>PRECEDED BY AN IC</b> . A Single Dash can be followed by a list, phrase, word or other IC.	<b>IC—PHRASE. EXAMPLE</b> There is only one person who can tell me what to do—my mother.
<b>TWO DASHES —...—</b>	<b>CHECK</b> the answer choices and the rest of the sentence to see if the sentence contains ONE or TWO dashes.
<b>I—cp—C</b> If TWO DASHES are an option, then apply the following rule: Two Dashes must be used in the middle of a sentence to <b>SURROUND A COMMA PHRASE</b> . Use the cross-out test to see if the phrase inside the dashes is a comma phrase.	<b>I—cp—C. EXAMPLE</b> The U.S. military’s strategy to remove Noriega from the Vatican embassy centered on the fact that Noriega—who was well known for his passion for classical music—detested rock music.

# PUNCTUATION | **RULE/RESPONSE**

## COMMA ,

SIGNAL / RULE	RESPONSE / EXAMPLE
<b>WHEN TESTING COMMA USE</b> in a sentence:	<b>FIRST DETERMINE</b> whether the comma is working together with other commas OR whether the comma is working alone in a sentence.
Commas can work together in a list OR can surround a comma phrase in the middle of a sentence.	<b>CHECK</b> to see if the sentence contains additional commas. Watch for lists.
If a comma is not working together with another comma, then the comma must have a valid purpose for working alone.	<b>ALWAYS PAY ATTENTION TO</b> the meaning of the sentence, looking for ICs, DCs, and possible comma phrases.

## COMMAS WORKING TOGETHER , . . . ,

cp or list

SIGNAL / RULE	RESPONSE / EXAMPLE
<b>CHECK</b> the sentence for a list with three or more items that are separated by at least one comma and combined with AND or OR.	<b>READ FOR MEANING</b> to see if the sentence contains a list. If so, commas <b>MUST</b> separate each item in the list.
<b>CHECK</b> to see if two commas are being used to surround a comma phrase in the middle of a sentence.	<b>USE THE CROSS OUT TEST</b> on as many phrases as needed to see whether they are true comma phrases.
<b>REMEMBER</b> that comma phrases include relative clauses that begin with "which," "who," or "whom."	<b>IF THE CROSS OUT TEST</b> results in an IC that makes sense, then two commas <b>MUST</b> set off the comma phrase. However, if crossing out a phrase ruins an IC or results in a nonsensical sentence, it is <b>NOT</b> a comma phrase and should <b>NOT</b> be placed between commas.
<b>REMEMBER</b> that commas must set off Transition Words and Interrupting phrases that come in the middle of a sentence, such as "to my regret," "however," "therefore," etc	

# PUNCTUATION | **RULE/RESPONSE**

## COMMAS WORKING ALONE ,

SIGNAL / RULE	RESPONSE / EXAMPLE
<p><b>IF A COMMA IS WORKING ALONE</b>, then identify a valid purpose for using that comma from the list below:</p>	<p><b>READ THE SENTENCE FOR MEANING</b> Always try to identify the IC and watch for DCs and comma phrases.</p>
<p><b>1 IC, FANBOYS IC.</b> When a comma is followed by one of the FANBOYS, (if it is not in a list) it must be surrounded by two ICs.</p>	<p><b>1 IC, FANBOYS IC. EXAMPLE</b> The U.S. troops surrounded the Vatican embassy with powerful speakers, and they began blasting American rock music at the embassy nonstop.</p>
<p><b>2 cp, IC / IM, IC.</b> A comma should follow a comma phrase, prepositional phrase, or introductory modifier (IM) at the beginning of an IC.</p>	<p><b>2 cp, IC. EXAMPLE</b> Within 10 days of musical bombardment, a half-crazed Noriega left (or was made to leave) the embassy and surrendered to U.S. troops on January 3, 1990.</p>
<p><b>3 DC, IC.</b> A sentence that starts with a DC must have a comma after the DC and before the IC.</p>	<p><b>3 DC, IC. EXAMPLE</b> While the strategy to capture Noriega was unconventional, it succeeded. After his surrender, Noriega was arrested, tried, and convicted in the state of Florida.</p>
<p><b>4 IC, cp.</b> A comma should be used after an IC to set off a comma phrase that adds additional but unnecessary information to the end of a sentence. Use the cross out test if uncertain whether to use a comma.</p>	<p><b>4 IC, cp. EXAMPLE</b> Distances in space are measured in light years, the distance traveled at the speed of light in one year. If crossing out a phrase ruins the sentence, then it <b>MUST NOT</b> be set off with a comma.</p>
<p><b>5 IC, WHICH/WHO/ [Rare WHOM]</b> A comma must be used after an IC to set off a comma phrase that starts with "which" or "who" (and rarely "whom").</p>	<p><b>5 IC, WHICH/WHO/ [Rare WHOM]. EXAMPLE</b> The mean distance between the earth and the sun is seven light minutes, which translates to 93,000,000 miles.</p>
<p><b>6 COMMA BEFORE A QUOTE</b> A comma is used to introduce a quotation that starts with a capital letter. If a quotation immediately follows a speaking or reporting verb (such as said, commented, wrote) and the quotation breaks the flow of the sentence, then a comma should come before the quote.</p>	<p><b>6 – 7 COMMA BEFORE A QUOTE EXAMPLES</b> The New York Times commented, "The play was a huge success." <i>This quote starts with a capital letter, and if the quotation marks and comma were removed, the sentence would not be grammatically correct.</i></p>
<p><b>7 NO COMMA BEFORE A QUOTE</b> No comma is used when THAT comes before the quotation OR when the quotation does not start with a capital letter and there is no reporting verb immediately before the quote</p>	<p>The New York Times reported that the play "was a huge success." <i>If the quotation marks were removed from this example, it would still be a grammatically correct sentence.</i></p>

# PUNCTUATION | **RULE/RESPONSE**

## PARENTHESES ( )

SIGNAL / RULE	RESPONSE / EXAMPLE
<b>PARENTHESES MUST</b> contain a comma phrase that explains or describes whatever comes IMMEDIATELY before the parentheses.	<b>WHAT NOT TO DO</b> The lion (a more humane place for animals than many zoos) at the Wild Animal park roared as we walked by it.
<b>YOU CANNOT MIX</b> and match punctuation; if a comma phrase starts with one parenthesis, it must end with a second parenthesis.	<b>CORRECT</b> The lion at the Wild Animal Park (a more humane place for animals than many zoos) roared as we walked by it.

## QUESTION MARKS ?

SIGNAL / RULE	RESPONSE / EXAMPLE
<b>A SENTENCE THAT IS A QUESTION</b> from start to finish ends with a question mark. Often questions begin with terms like "who," "what," "when," "where," "why," "how."	Did Lila ask you about the math test?
<b>A SENTENCE THAT</b> reports, mentions, or otherwise references a question DOES NOT end with a question mark. It ends with a period.	Jerome wanted to know why it didn't rain yesterday. I asked if you lost your cell phone.

## WHEN NOT TO USE PUNCTUATION

SIGNAL / RULE	RESPONSE / EXAMPLE
Do NOT use any punctuation after the following words: such as, including, and like.	<b>WHAT NOT TO DO</b> I have been investing in many things including, real estate, stocks, and space expeditions.
ALWAYS eliminate answer choices that offer punctuation after such as, including, or like.	<b>CORRECT</b> I have been investing in many things including real estate, stocks, and space expeditions.
ALMOST NEVER use punctuation before a preposition.	<b>WHAT NOT TO DO</b> My father encouraged me—in the study of martial arts—at a young age. <b>CORRECT</b> My father encouraged me to study martial arts at a young age.

# PUNCTUATION

## EXAMPLE 29

QUESTION	ANSWER CHOICES
<p>As a practicing Jainist, Gutama had one [ 29 ] goal, and hoped to alleviate karma in the world.</p>	<p>[ 29 ] A) No Change B) goal: C) goal; D) goal, he—hoped</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> feature different types of punctuation. The semicolon in answer choice C is a good place to start since the rule is easy to test.</p>	<p><b>USE PUNCTUATION RULES</b> to eliminate wrong answers and select the right answer. Start by testing the types of punctuation with the fewest rules. <b>LOOK FOR</b> ICs while testing punctuation rules.</p>
<p>A <b>SEMICOLON</b> must separate two ICs. In answer choice C, what follows the semicolon, “to alleviate karma in the world,” is not an IC. So eliminate “C) goal;” because there is no IC after the semicolon.</p>	<p><b>ELIMINATE</b> the answer choice with a semicolon, C. A) No Change B) goal: C) goal; D) goal, he—hoped</p> <p><b>ANSWER</b> B goal:</p>
<p>The colon in answer B is also easy to test. A <b>COLON</b> must be preceded by an IC. Considering answer B, “As a practicing Jainist, Gutama had one goal:” is an IC while “and hoped to alleviate karma in the world.” is NOT an IC. So the colon is being used correctly in “B) goal:”</p>	<p><b>ADVICE</b> Continue eliminating the remaining answer choices to ensure you did not make a mistake.</p>
<p>A <b>SINGLE DASH</b> must be preceded by an IC. “As a practicing Jainist, Gutama had one goal, he—” is not an IC because the hanging he does not make sense.</p>	<p><b>ELIMINATE</b> the answer choice with the dash, D. A) No Change B) goal: C) goal; D) goal, he—hoped</p>
<p><b>COMMAS WORKING TOGETHER</b></p> <p>The comma may be working with the comma after “Jainist” to create a comma phrase out of “Gutama had one goal.” Test by crossing out the potential comma phrase.</p> <p><b>COMMA WORKING ALONE</b></p> <p>The comma may be working alone as a comma + FANBOYS to separate two ICs. However, “hoped to alleviate karma in the world” is not an IC, so the comma cannot be working alone. Thus, the comma answer choice A can be eliminated. The comma is neither working alone nor working together with another comma.</p>	<p>As a practicing Jainist, Gutama had one goal, and hoped to alleviate karma in the world.</p> <p>“As a practicing Jainist and hoped to alleviate karma in the world,” does not make sense as a complete sentence, so the comma is not working together to set off a comma phrase.</p> <p><b>ELIMINATE</b> the answer choice with a comma, A. A) No Change B) goal: C) goal; D) goal, he—hoped</p>
	<p><b>ANSWER CHOICE CONFIRMED B</b></p>

# PUNCTUATION

## EXAMPLE 30

QUESTION	ANSWER CHOICES
<p>Gardening successfully is more akin to science than to art [ 30 ], it entails knowledge, time-tested experience, and much patience.</p>	<p>[ 30 ] A) No Change B) ; and it entails C) ; it entails D) it entails</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> all include different types of punctuation between “art” and “it entails.”</p>	<p><b>USE PUNCTUATION RULES</b> to eliminate wrong answers and select the right answer. Start by testing the types of punctuation with the fewest rules. LOOK FOR ICs as you test punctuation.</p> <p>REMEMBER to apply the rules regarding clauses and comma phrases as needed.</p>
<p>“Gardening is more akin to science than to art” is an IC. “It entails knowledge, time-tested experience, and much patience” is an IC.</p> <p>A <b>SEMICOLON</b> is the only piece of punctuation offered that is used to separate two ICs. A SEMICOLON cannot be followed by one of the FANBOYS</p> <p>A <b>SEMICOLON</b> cannot be followed by one of the FANBOYS.</p>	<p><b>CROSS OUT</b> the answer choices that include punctuation that is not a semicolon.</p> <p>A) <del>No Change</del> B) ; and it entails C) ; it entails D) <del>it entails</del></p>
<p><b>REMINDER</b></p> <p>A <b>COMMA SPLICE</b> is always wrong with two ICs.</p> <p><b>NO PUNCTUATION BETWEEN TWO ICs</b> is always wrong</p>	<p><b>CROSS OUT</b> the answer choice with a FANBOY after the semicolon “; and it entails”.</p> <p>Thus, “; it entails” is the correct answer.</p> <p>A) <del>No Change</del> B) ; and it entails C) ; it entails D) <del>it entails</del></p> <p><b>ANSWER C</b></p>

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# WRITING | GRAMMAR: ANSWERS

## Verbs

### Page 13 | Verbs | Tense Exceptions

Examples: Answers

*Context:*

Yesterday I was sad, but today I feel better.

*Past Perfect:*

By the time Bast found the message in the bottle, the paper inside had been long since destroyed.

*Conditional/Hypothetical:*

If I get a cat, it might eat my favorite goldfish, Fred.

*Subjunctive:*

If I were a billionaire, I would buy a castle in Scotland. My brother claims that if Benjamin Franklin were alive today, he would sport a man bun.

### Page 15 | Example 5 : Answers

**THE SUBJECT** is "predators," which is Plural.

**ELIMINATE** answer choices that are Singular.  
[ 5 ] A) No Change B) has been C) are D) were

**ANSWER D**

### Page 17 | Example 7 : Answers

**THE SUBJECT** is "mosquitoes," which is Plural.

**ELIMINATE** answer choices that are Singular.

There is only one answer choice remaining, so you do not need to test Verb Tense.

**ANSWER C**

### Page 18 | Example 8 : Answers

**DECIDE** that it is a verb question.

**THE INITIAL SUBJECT** is "engaging in mindfulness practices" because it is the subject that makes sense for reducing stress in this sentence.

**A PREPOSITIONAL PHRASE** "in mindfulness practices" is between the subject and the verb.

**CROSS OUT** the prepositional phrase. Everyone in my meditation classes agrees that engaging in mindfulness practices [8] reduces stress and supports health.

**THE SUBJECT** is "engaging," which is Singular.

**ELIMINATE** answer choices that are Plural.  
[ 8 ] A) No Change B) reduces C) reduced D) are reducing

The surrounding verbs, "agrees" and "supports," are in the present tense.

**ELIMINATE** answer choices that are NOT in present tense.  
[ 8 ] A) No Change B) reduces C) reduced D) are reducing

**ANSWER B**

### Page 19 | Example 9 : Answers

The surrounding verbs, "placed" and "decided," are in the past tense.

**ELIMINATE** answer choices NOT in the past tense.  
[ 9 ] A) No Change [is] B) will be C) have been D) was

**ANSWER D**

# WRITING | GRAMMAR: ANSWERS

## Pronouns

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### Page 21 | Example 10 : Answers

B) incorrect because “this girl” does not 100% clarify whether the referent is Leah or her sister.

C) correct because “Leah” absolutely clarifies the antecedent being referenced—Leah, not her sister.

D) “a sister” is incorrect because it could refer to either Leah or her sister.

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### Page 24 | Example 13 : Answers

The antecedent must be N. Chen (a person) since only a person can do jumps.

**ELIMINATE** “its” [No Change] because N. Chen is not a thing.

Since jumps were done in men’s figure skating, Chen must be male.

**ELIMINATE**

[ 13 ] A) ~~No Change~~ B) his C) ~~it’s~~ D) her

**ANSWER B**

# WRITING | Rhetoric

*Rhetoric is the study of writing or speaking as a means of communication or persuasion.*

—Webster

- RHETORIC..... #**
- Introduction..... #
- Questions With No Prompts..... #
- Redundancy & Concision..... #
- Frequently Confused Words..... #
- Transition Words and Phrases..... #
- Commonly Tested Words and Phrases..... #
- Transition Word/Phrase Questions..... #
- Vocabulary..... #
- Questions With Prompts..... #
- Effectively Combines..... #
- Support a Claim..... #
- Introduce..... #
- Transitions | Three Types..... #
- Graph..... #
- Miscellaneous..... #
- Relevancy..... #
- Logical Flow..... #

## EXPLAIN *MOTIVATE!* **CLARIFY**

*Otherwise he might have been a great general,*

*blowing up all sorts of towns, or he might have been*

*a great politician, dealing in all sorts of parliamentary*

*rhetoric; however, as it was, he and the Court of Chancery*

*had fallen upon each other in the pleasantest way, and nobody was much*

*the worse ...*

*—Adapted from Bleak House, by Charles Dickens*

The most important strategy for all rhetorical questions is to **ACTIVELY READ** and comprehend the passages as you go.

**DO NOT SKIP** paragraphs or sentences because they do not contain any questions.

Instead, **FOCUS ON** understanding the main point of the passage as well as the main purpose of each paragraph.

# RHETORIC | **QUESTIONS WITH NO PROMPTS**

A *Rhetoric Question* **WITH NO PROMPTS** will have a list of four answer choices that relate to underlined content in a paragraph. You will need to **DETERMINE THE QUESTION TYPE BY IDENTIFYING THE SIGNALS**.

EXAMPLE 31

QUESTION	ANSWER CHOICES
When trying to improve on the SAT, students must find ways to learn and [ 31 ] <u>figure out a way that will allow them to address their shortcomings.</u>	[ 31 ] A) No Change B) deal with their flaws and weaknesses C) address their deficiencies D) come up with a plan to address their deficiencies
SIGNAL	RESPONSE
<b>USE THE SIGNALS</b> provided in this section to properly identify which type of Rhetoric question you are facing.	<b>AFTER IDENTIFYING</b> the Signal and identifying the type of Rhetoric question, apply the appropriate Responses provided in this section to choose your answer.

**Khan Academy Practice:**

- (1) Grammar: Conventional Expression
- (2) Effective language use: Precision and concision
- (3) Effective Language Use: Style and Tone
- (4) Effective language use: Syntax
- (5) Grammar: Subordination and coordination
- (6) Writing: Argument, Informative, Narrative (full passages)
- (7) Grammar: Noun agreement (sing v. plural)
- (8) Grammar: Frequently confused words

# RHETORIC | **REDUNDANCY** | *Questions With No Prompts*

*Redundancy Questions* require recognizing unnecessarily repeated information that should be deleted. **SOME ANSWER CHOICES** feature redundant concepts within the answer choice itself; others may include a concept that has already been referenced in the same or previous sentence. **THE CORRECT ANSWER** is almost always the term(s) by itself (usually the shortest) or, when appropriate, "DELETE the underlined portion." **ELIMINATE ALL ANSWER CHOICES THAT REPEAT CONCEPTS.**

SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> all contain the same word/phrase and some include other words/phrases with similar meanings. However, only one answer choice provides the word/phrase by itself.</p> <p>This sentence is redundant. WHY?</p>	<p><b>Example 1</b></p> <p>I am repeating myself over and over again. To correct this sentence, eliminate all redundancy.</p> <p><b>Answer:</b> I am repeating myself.</p>
<p><b>ANSWER CHOICES</b> all contain "extensive" and some include other words with similar meanings. However, only one answer choice provides "extensive" by itself.</p>	<p><b>Example 2</b></p> <p>Preliminary results have been promising, showing that intervening with thoughtfulness can be feasible on an <u>extensive and large</u> scale.</p> <p>A) NO CHANGE                      B) extensive                      C) extensive and also great                      D) extensive and grand</p>
<p><b>ANSWER CHOICE</b> provides the option to delete the underlined portion.</p> <p>When reading sentence and answer choices for meaning, notice that concepts are being repeated.</p> <p>When you see the option to "DELETE the underlined portion" on the SAT, consider whether redundancy is being tested. (Redundancy is often not being tested when you see this answer choice, but you must always check to see if it is being tested.)</p>	<p><b>Example 3</b></p> <p>Because the animals were still audible under the various conditions and situations, the campers remained wary of the safety of the camp.</p> <p>A) NO CHANGE                      B) and were able to be heard                      C) and circumstances                      D) DELETE the underlined portion.</p>

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# RHETORIC | **CONCISION** | *Questions With No Prompts*

Some Redundancy Questions also have ANSWER CHOICES that test Concision. In general, the following rule about writing is respected: SHORTER IS BETTER. Whenever possible, opt for fewer words to express an idea.

SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> either repeat ideas already stated in the sentence OR are wordy, meaning they include unnecessary words. <b>THE CORRECT ANSWER CHOICE</b> is ALMOST ALWAYS the shortest one to choose from.</p>	<p><b>CONCISION</b> is being tested.</p> <p><b>Example 1</b></p> <p>For clarity, <u>wordy</u> refers to sentences or phrases with unnecessary words.</p> <p>Contrast the sentence above with the following sentence: Which words are unnecessary?</p> <p><b>Example 2</b></p> <p>In order to be as clear as possible, “wordy” is a term used to refer to any sentence or any phrase that makes use of unnecessary words even though those words do not add any meaning.</p> <p><b>Example 3</b></p> <p>When trying to improve on the SAT, students must actively learn and <u>figure out a way that will allow them to address their shortcomings</u>.</p> <p>A) NO CHANGE B) deal with their flaws and weaknesses. C) address their deficiencies. D) come up with a plan to deal with their deficiencies.</p> <p><b>ELIMINATE</b> answer choices that are redundant.</p> <p><b>READ THE SHORTEST ANSWER CHOICE</b> into the sentence to see if it appropriately conveys the idea needed for the sentence. If the shortest answer choice works in the sentence and does not leave out any essential information, then it is the correct answer. If not, go to the next shortest and try again.</p> <p><b>ELIMINATE</b> answer choices that use more words to convey the same idea (are wordy).</p>

# RHETORIC | **CONCISION** | *Questions With No Prompts*

## EXAMPLE 33

QUESTION	ANSWER CHOICES
<p>After researching a malaria vaccine for decades, scientists are now reporting success in clinical trials, with about 51% of [ 32 ] <u>participants in the study who were vaccinated</u> showing positive results.</p>	<p>[ 32 ]                      A) No Change                      B ) vaccinated individuals who got the vaccine                      C ) vaccinated participants                      D ) vaccinated individuals who were in the trial</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> include the same or similar terms with repetition and unnecessary words.</p>	<p><b>REDUNDANCY AND CONCISION</b> are being tested.  <b>ELIMINATE ANSWER CHOICES</b> that are redundant.  <b>READ THE SHORTEST ANSWER CHOICE</b> into the sentence to see if it appropriately conveys the idea needed for the sentence.  <b>IF THE SHORTEST ANSWER CHOICE</b> works in the sentence and does not leave out any essential information, then it is the correct answer. If not, go to the next shortest and try again.  <b>ELIMINATE ANSWER CHOICES</b> that use more words to convey the same idea (are wordy).  <b>ANSWER</b> _____</p>

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# RHETORIC | **FREQUENTLY CONFUSED WORDS**

Affect/Effect...Than/Then...Fewer/Less

On the SAT	Example
<b>AFFECT</b> is used as verb.	The sad movie <u>affected</u> the audience.
<b>EFFECT</b> is used as noun.	My new exercise program will have a positive <u>effect</u> on my health.
<b>THAN</b> is used to make comparisons.	She has more cake <u>than</u> I have. (Comparison)
<b>THEN</b> is used to show order or sequence.	<u>Then</u> the sun came up. (Time)
<b>FEWER</b> is used to describe things that can be counted (or words that can be made plural).	sticks, boys, dogs
<b>LESS</b> is used to describe things that cannot be counted (or cannot be made plural).	beauty, milk, shame

# RHETORIC | **TRANSITION WORDS AND PHRASES**

## In the Beginning, Middle, or End of a Sentence

*Transition Words and Phrases* signify a relationship between at least two complete thoughts. Transition words and phrases can show up in three areas of a sentence—**BEGINNING, MIDDLE, OR END**—depending on the preference of the writer.

Transition Words and Phrases (TW)	Example
<p><b><u>AT THE BEGINNING OF A SENTENCE FOLLOWED BY A COMMA</u></b> TW, IC</p>	<p>I do not understand how to properly use transition words. <u>However</u>, my teacher told me that practice with transition words will improve my understanding.</p>
<p><b><u>IN THE MIDDLE OF A SENTENCE SURROUNDED BY COMMAS</u></b> I, TW, C</p>	<p>I do not understand how to properly use transition words. My teacher told me, <u>however</u>, that practice with transition words will improve my understanding.</p>
<p><b><u>AT THE END OF A SENTENCE PRECEDED BY A COMMA</u></b> IC, TW</p> <p><b><u>TO IDENTIFY THE CORRECT RELATIONSHIP</u></b>, move the transition word/phrase to the beginning of the second sentence (identical to the first example).</p> <p>This move is only recommended to help you more easily identify the relationship between the sentences, not to imply "<u>however</u>" is in the wrong place.</p>	<p>I do not understand how to properly use transition words. My teacher told me that practice with transition words will improve my understanding, <u>however</u>.</p>
<p><b><u>IN THE MIDDLE OF A SENTENCE PRECEDED BY A SEMICOLON AND FOLLOWED BY A COMMA</u></b> IC; TW, IC</p>	<p>I do not understand how to properly use transition words; <u>however</u>, my teacher told me that practice with transition words will improve my understanding</p>

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# RHETORIC

## COMMONLY TESTED TRANSITION WORDS AND PHRASES

### In the Beginning, Middle, or End of a Sentence

*Transition Words and Phrases* signify a relationship between at least two complete thoughts. Transition words and phrases can show up in three areas of a sentence—**BEGINNING, MIDDLE, OR END**—depending on the preference of the writer.

Learn all of these by heart	Common Transitions
<b><u>SIMILARITY</u></b> to what came before	Also, similarly, likewise, just as, in the same way
Provides <b><u>ADDITIONAL SUPPORT</u></b>	In addition, additionally, again, also, as well as, furthermore, moreover, not to mention
<b><u>EMPHASIZES</u></b> point by adding specific detail/ <b><u>EXAMPLE</u></b>	For example, for instance, in fact, as a matter of fact, specifically, indeed, such as
<b><u>CONTRAST</u></b> with or opposition to other (usually previous) information	However, on the one hand—on the other hand, conversely, in contrast, on the contrary, despite, whereas, while, although, even as
<b><u>CONCEDES</u></b> previous point to move on to <b><u>DIFFERENT POINT</u></b>	Despite, granted, still, nevertheless, although, regardless, even so, even if, nonetheless
Info before is <b><u>CAUSE LEADING TO EFFECT</u></b> (effect/result after transition)	Therefore, accordingly, as a result, consequently, hence, for this reason, thus
Arrangement of <b><u>TIME</u></b> , sequence	First—next—finally, then, later, afterwards, meanwhile, during, before, now, recently, eventually, subsequently, previously
Providing <b><u>SUMMARY</u></b> or <b><u>CONCLUSION</u></b>	In conclusion, in summary, to summarize, in short, finally, in other words

# RHETORIC

## HOW TO SOLVE TRANSITION WORD/PHRASE QUESTIONS

### General Signal & Response Steps

SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> provide options between different transition words and phrases.</p>	<p><b>TRANSITION WORDS/PHRASES</b> are being tested.</p> <p><b>CAREFULLY READ</b> the sentences around which the transition words or phrases are used.</p>
<p><b>IF THE TRANSITION WORD</b> is in the middle of the sentence surrounded by commas or at the end of the sentence preceded by a comma, then</p> <p>I, TW, C</p> <p>IC, TW</p>	<p><b>MOVE THE TRANSITION WORD</b> to the beginning of the sentence.</p> <p>TW, IC</p> <p><b>IDENTIFY</b> which one of the Relationships in the Commonly Tested Transition Words and Phrases table on the previous page is most appropriate.</p>
<p><b>ANSWER CHOICES</b> that fall under the same meaning</p>	<p><b>WATCH FOR</b> multiple answer choices that fall under the same meaning/relationship because they are <b>ALMOST ALWAYS WRONG</b> and should be eliminated (e.g., both Therefore &amp; Thus as Answer Choices).</p>
<p><b>GIVEN THE OPTION</b> to delete the transition word</p>	<p><b>THAT ANSWER CHOICE IS OFTEN RIGHT</b> because you do not need to use transition words.</p> <p>However, you should still identify the relationship between the sentences to see if any of the given transition words fit.</p>
<p><b>IF YOU CANNOT IDENTIFY</b> the correct relationship</p>	<p><b>GO THROUGH EACH WORD/PHRASE</b>, identifying which relationship the word/phrase signifies and whether that relationship fits between the sentences provided.</p>

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# RHETORIC | **VOCABULARY** | *If you know the meaning*

An SAT *Writing Vocabulary Question* will ask you to **CHOOSE THE BEST WORD BASED ON THE CONTEXT OF THE SENTENCE**. This differs from the Reading Vocabulary Questions that ask you to replace a word to create a similar meaning. However, the process for choosing the correct answer to both types of questions is very similar. Reviewing the Reading Vocabulary section, with its detailed answer process, will be beneficial for answering Writing Vocabulary Questions.

SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> feature words or short phrases that differ only in meaning.</p>	<p><b>VOCABULARY</b> is being tested.</p> <p><b>CATEGORIZE</b> the words/phrases in the answer choices as</p> <p>Know the meaning</p> <p>or</p> <p>Don't know the meaning</p> <p>and apply the strategies listed below..</p>
<p><b>YOU KNOW THE MEANING</b> of the vocabulary words.</p>	<p><b>CHOOSE THE ANSWER CHOICE</b> that fits the style and tone of the passage and that has the appropriate meaning.</p> <p><b>READ YOUR PREFERRED ANSWER</b> into the sentence to ensure that the word makes sense in the context of the sentence. If the word does not fit when read into the sentence, then eliminate it as an answer choice.</p> <p><b>NEVER CHOOSE A WORD THAT</b> you know when you think it kind of fits—the word needs to precisely fit or you need to be brave enough to guess one of the words you are not as familiar with!</p>
<p><b>CHOOSING INFORMAL WORDS OR PHRASES</b></p>	<p><b>AVOID</b> choosing informal words or phrases that are fine in conversation but should not be used in formal writing. All vocabulary questions test the use of a word(s) in context, so read the word/phrase you think is correct into the entire sentence before selecting it as an answer choice.</p>

# RHETORIC | **VOCABULARY** | *If you do not know the meaning*

SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> feature words or short phrases that differ only in meaning.</p>	<p><b>VOCABULARY</b> is being tested.</p> <p><b>CATEGORIZE</b> the words/phrases in the answer choices as</p> <p>Know the meaning</p> <p>or</p> <p>Don't know the meaning</p> <p>and apply the strategies listed below..</p>
<p><b>YOU DO NOT KNOW THE MEANING</b> of the vocabulary words.</p> <p>A word that one does not know is just as likely to be the correct answer as a word that one does know.</p>	<p><b>NEVER ELIMINATE</b> words because you do not know their meaning.</p> <p><b>ONLY SELECT A WORD</b> you do NOT know IF you are certain that the words you DO know ARE WRONG in the context of the sentence.</p> <p><b>IF YOU MUST CHOOSE</b> between multiple words that you do not know, then simply guess.</p> <p><b>Example:</b></p> <p>Gun control on school campuses has become a heated issue, causing both sides to argue their position <u>importantly</u>.</p> <p>A) NO CHANGE                      B) vociferously                      C) warmly                      D) admittedly</p>
<p><b>VOCABULARY QUESTIONS</b> sometimes test phrases using prepositions. There are no consistent rules to use to figure out which preposition in the answer choices is correct.</p> <p>However, if English is not your first language, ask your SAT or English teacher for resources to help you learn about using prepositions.</p>	<p><b>THE BEST WAY TO TEST</b> which answer choice is correct is to read the phrase aloud (or rather, silently aloud in your head during the actual test) within the context of the sentence.</p> <p><b>Example:</b></p> <p>It's like trying to find a needle [in/on] a haystack.</p>

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# RHETORIC | QUESTIONS WITH PROMPTS

A *Rhetoric Question* **WITH A PROMPT ABOVE THE LIST OF ANSWER CHOICES** is demonstrated in the sample below. With this question type, the prompt identifies the question type within the statement itself.

## EXAMPLE 33

QUESTION	ANSWER CHOICES
<p>[ 33 ] <u>The Gates Charity gifted a grant to the Learning Center. The single condition of the grant was that the Center provide reports with student feedback each month.</u></p>	<p>[ 33 ] Which answer choice effectively combines the sentences at the underlined portion?</p> <p>A) The Gates Charity gifted the Learning Center a grant, and the grant came with one condition</p> <p>B) The Gates Charity gifted the Learning Center a grant, but there was a single condition installed</p> <p>C) The one condition of the grant offered by the Charity to the Learning Center was the condition</p> <p>D) The Gates Charity gifted a grant to the Learning Center on the condition</p>
SIGNAL	RESPONSE
<p><b>USE THE SIGNALS</b> provided in this section to properly identify which type of Rhetoric question you are facing.</p>	<p><b>AFTER IDENTIFYING</b> the Signal and identifying the type of Rhetoric question, apply the appropriate Responses provided in this section to choose your answer.</p>

## RHETORIC | **CONCISION** | *Questions With Prompts*

The prompts preceding the list of answer choices for these question types use wording similar to these basic lead-in statements:

**WHICH ANSWER CHOICE MOST** *Effectively Combines* two sentences?

**WHICH ANSWER CHOICE BEST** *Supports* a Claim?

**WHICH ANSWER CHOICE BEST** *Introduces* specific content?

**WHICH ANSWER CHOICE BEST** *Transitions* between paragraphs or between sentences within a paragraph?

**WHICH ANSWER CHOICE BEST** *Interprets Graph* information?

**WHICH ANSWER CHOICE IS** *Most Relevant* to a specific place in a paragraph?

**WHICH ANSWER CHOICE IS THE BEST PLACE** to insert a sentence within a paragraph to maintain the *Logical Flow*?

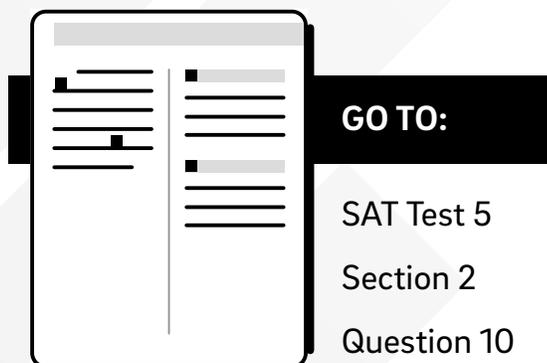
**WHICH ANSWER CHOICE BEST MAINTAINS** the *Logical Flow* of a paragraph?

## TEST EXAMPLES | **QUESTIONS/SOLUTIONS**

Some example questions in this section are taken directly from the Official SAT practice exams.

To indicate this kind of sample question, an icon similar to the following will appear at the top of the page:

The icon will tell you where to go to read the example question while still studying the Signal|Response in this book.

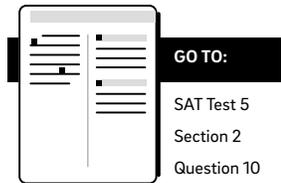


# RHETORIC | **EFFECTIVELY COMBINES** | *Questions with Prompts*

The Effectively Combines Question asks you to **MOST EFFECTIVELY COMBINE TWO UNDERLINED SENTENCES** or some underlined portion of the two sentences.

SIGNAL	RESPONSE
<p>When both full sentences are underlined:</p> <p><b><u>ANSWER CHOICE PROMPT</u></b> asks you which choice most effectively combines <b><u>THE UNDERLINED SENTENCES</u></b>.</p> <p>OR</p> <p>When portions of each sentence are underlined:</p> <p><b><u>ANSWER CHOICE PROMPT</u></b> asks you which choice most effectively combines <b><u>THE SENTENCES AT THE UNDERLINED PORTION</u></b>.</p>	<p><b><u>THESE ARE EFFECTIVELY COMBINES QUESTIONS.</u></b></p> <p><b><u>START WITH THE SHORTEST ANSWER CHOICE</u></b> when possible—it is usually correct.</p> <p><b><u>READ IT TO CHECK</u></b> if it has the same meaning as the original sentences and is clear and concise. If so, then the shortest answer choice is the correct answer.</p> <p><b><u>ALWAYS ELIMINATE</u></b> answer choices that are repetitive, wordy, or awkward as well as those that shift from the original meaning of the two sentences.</p> <p><b><u>MOVE ON TO THE NEXT SHORTEST ANSWER CHOICE</u></b> with the same plan.</p> <p><b><u>IF YOU ARE STILL UNSURE</u></b> which answer choice is correct, make sure the new sentence flows and connects well with the sentences before and after it.</p>
<p><b><u>ANSWER CHOICES</u></b> that include a semicolon—usually wrong.</p>	<p><b><u>ANSWER CHOICES THAT</u></b> include a semicolon, on this question type only, are almost always wrong.</p>
<p><b><u>TIME PERMITTING</u></b>, plan to read all the answer choices.</p>	<p>Even if the shortest answer looks correct, plan to read through the remaining answer choices to ensure that they are wrong.</p>

# TEST EXAMPLE | **EFFECTIVELY COMBINES**



SAT 5 | sec 2 | q. 10 | Questions With Prompts

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> contains “most effectively combines.”</p>	<p><b>THIS IS AN EFFECTIVELY COMBINES QUESTION</b></p> <p><b>EVALUATE THE ANSWER CHOICES</b> beginning with the shortest.</p>
<p><b>ANSWER CHOICE C</b> is the shortest.</p>	<p><b>ELIMINATE</b> any answer choices that are wordy, are awkward, contain a semicolon, or change the meaning of the original sentence.</p>
<p><b>ANSWER CHOICES A AND D</b> contain semicolons.</p>	<p>A) Answer choice contains a semicolon and adds unnecessary words. <b>ELIMINATE</b></p> <p>B) Answer choice adds unnecessary words “and their next decision was,” and the cause and effect relationship between the two sentences is no longer clear with the use of “and.” <b>ELIMINATE</b></p> <p>C) This is the shortest answer choice, and it is concise—it effectively and efficiently replaces “Because of the fossil’s delicate nature” with “so” to concisely keep the cause and effect relationship between the two sentences. <b>CORRECT</b></p> <p>D) Answer choice contains a semicolon, and it changes the meaning of the original sentences—the team did not remove the fossil from the rock. <b>ELIMINATE</b></p>
	<p><b>ANSWER C</b></p>

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# TEST EXAMPLE | **EFFECTIVELY COMBINES**



**GO TO:**

SAT Test 5  
Section 2  
Question 24

SAT 5 | sec 2 | q. 24 | Questions With Prompts

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> contains “most effectively combines.”</p>	<p><b>THIS IS AN EFFECTIVELY COMBINES QUESTION</b></p> <p><b>EVALUATE THE ANSWER CHOICES</b> beginning with the shortest.</p>
<p>Read through all of the answer choices and try to explain why the incorrect answers are wrong.</p>	<p><b>ELIMINATE</b> any answer choices that are wordy, are awkward, contain a semicolon, or change the meaning of the original sentence.</p> <p>A) Answer choice creates an awkward and nonsensical meaning. <b>ELIMINATE</b></p> <p>B) This is the shortest answer choice, and it is concise—it replaces the period with a colon, which indicates that the part of the sentence after the colon is explaining and providing additional detail about the clause before the colon. <b>CORRECT</b></p> <p>C) Answer choice reverses the order of the two sentences and replaces the period with “, and.” The reversal of the order does not flow well with the first sentence (previous sentence) of the paragraph. <b>ELIMINATE</b></p> <p>D) Answer choice creates an awkward and nonsensical meaning. <b>ELIMINATE</b></p> <p><b>ANSWER B</b></p>

# RHETORIC | **SUPPORT A CLAIM** | *Questions with Prompts*

An SAT Support a Claim Question will ask you to **SUPPORT THE MAIN IDEA** of the paragraph, an argument, a previous sentence, or some other claim made in the passage.

## **COMMON PROMPTS FOR SUPPORT A CLAIM ON THE SAT**

Based on the passage, which choice in the form of a sentence or part of a sentence...

- Best supports the main point of the paragraph? OR
- Most effectively supports the central point of the paragraph? OR
- Provides the best supporting example for the argument made in the paragraph?

## **THEN FOUR ANSWER CHOICES ARE LISTED**

## How to Answer a Support a Claim Question Type

SIGNAL	RESPONSE
<p><b><u>ANSWER CHOICE PROMPT</u></b></p> <p>The prompt is similar to the examples given above followed by a list of four answer choices.</p>	<p><b><u>THE QUESTION IS ASKING YOU TO SUPPORT A CLAIM</u></b></p> <p><b><u>READ THE PASSAGE CAREFULLY</u></b>, including the title. Notice information that <b>SUPPORTS</b> is usually evidence, facts, or examples that strengthen a claim.</p> <p>Find the appropriate claim and <b><u>UNDERLINE IT</u></b>.</p> <p><b><u>IF THIS QUESTION COMES AT THE END</u></b> of the paragraph, then go back into the paragraph to find the appropriate claim.</p> <p><b><u>IF THIS QUESTION COMES AT THE BEGINNING</u></b> of the paragraph, then read the rest of the paragraph first to carefully identify the claim.</p> <p><b><u>MAKE SURE</u></b> you understand the claim in the context of the paragraph.</p> <p><b><u>SEE IF</u></b> any of the answers provide direct support for the claim.</p> <p><b><u>ELIMINATE</u></b> answer choices that are off topic.</p> <p><b><u>ELIMINATE</u></b> answer choices that stay on topic but do not actually support the claim.</p>

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# TEST EXAMPLE | **SUPPORT A CLAIM**

SAT 6 | sec 2 | q. 18 | Questions With Prompts



**GO TO:**

SAT Test 6  
Section 2  
Question 18

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks "Which choice best supports the main point of the paragraph?" and is followed by a list of four answer choices.</p>	<p><b>THE QUESTION IS ASKING YOU TO SUPPORT A CLAIM</b></p> <p><b>READ</b> the paragraph carefully to <b>FIND THE MAIN POINT</b> and <b>UNDERLINE IT</b>. The main point of the paragraph is often stated in the first sentence.</p>
<p><b>THE CORRECT ANSWER</b> has something to do with the tilt of the tower.</p>	<p>Here the main point of the paragraph is for the committee to save the tower without ruining its aesthetic. However, it may not be clear from just that sentence. Keeping the title of the passage in mind—A Little to the Left, but Not Too Much!—and reading the rest of the paragraph, which focuses on reducing the tilt but not getting rid of the tilt, clarifies that the main point has to do with the tilt.</p>
<p><b>THE MAIN POINT ARGUES</b> to save the tower without ruining its tilt.</p> <p><b>LOOK FOR</b> an answer choice that supports the claim.</p>	<p>A) The paragraph is not about the fact that no one had accomplished something before, and there is no mention of tilt. <b>ELIMINATE</b></p> <p>B) The paragraph is not about people not agreeing, and there is no mention of tilt. <b>ELIMINATE</b></p> <p>C) Focuses on preserving the tilt without toppling the tower. <b>CORRECT</b></p> <p>D) Focuses on the pristine white marble finish, which is not discussed in the rest of the paragraph, and there is no mention of tilt. <b>ELIMINATE</b></p>
	<p><b>ANSWER C</b></p>

# RHETORIC | **INTRODUCE** | *Questions with Prompts*

An SAT *Introduce Question* will ask you to **INTRODUCE** (give a broad overview rather than specific details) something such as the main idea of a paragraph, a list of examples, an argument that follows, or even something specific such as the next two sentences.

## **COMMON INTRODUCE PROMPTS ON THE SAT**

Based on the passage, which choice...

- Best establishes the main idea of the paragraph? OR
- Most effectively sets up the list of examples that follows in the next sentence? OR
- Best establishes the argument that follows? OR
- Most effectively sets up the main idea of the following two sentences?

## **THEN FOUR ANSWER CHOICES ARE LISTED**

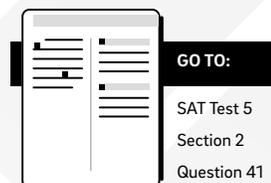
## How to Answer an Introduce Question Type

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> is similar to the examples given above followed by a list of four answer choices.</p>	<p><b>DETERMINE THAT THIS IS AN INTRODUCE QUESTION</b></p> <p><b>READ THE QUESTION</b> carefully to determine exactly what you are supposed to introduce.</p> <p><b>READ THE RELEVANT SECTION</b> of the passage.</p> <p><b>BEWARE OF READING ONLY PART</b> of the relevant section.</p>
<p><b>NOTE</b> It is better to read one or two extra sentences than to miss vital information that you are supposed to introduce.</p>	<p>Once clear on what the question is asking you to introduce, <b>ASK</b> yourself which choice provides a general description of the information in (or captures the entire scope of) that section of the passage.</p>
<p><b>NOTE</b> <b>IF NOT SURE</b> whether an answer choice is providing the correct description, <b>RE-READ</b> the section of the passage that must be introduced <b>AND</b> ask whether the answer choice provides a broad overview of the information in that section.</p>	<p><b>ELIMINATE</b> answer choices that are off topic (do not correctly describe what is being introduced) or too specific.</p>

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# TEST EXAMPLE | **INTRODUCE**

SAT 5 | sec 2 | q. 41 | Questions With Prompts



SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks, “Which choice most effectively sets up the examples in the following sentences?” and is followed by a list of four answer choices.</p>	<p><b>THIS IS AN INTRODUCE QUESTION</b></p> <p><b>READ</b> the entire paragraph carefully.</p> <p><b>DETERMINE</b> exactly what is to be introduced.</p>
<p><b>THE TOPIC SENTENCE STATES</b> that the decline of traditional print media does not necessarily mean the end of investigative journalism.</p>	<p>The sentences that follow support that claim by giving examples such as nonprofit enterprises, enterprising freelance reporters, and the Help Me Investigate Project as new avenues where investigative journalism is still surviving outside of the traditional print media.</p>
<p><b>LOOK FOR THE ANSWER CHOICE</b> that provides a general description of the kinds of examples and why they are being given.</p> <p><b>CHOICE C</b> is too specific for the examples listed and is outside the scope of those examples.</p> <p><b>REMEMBER</b> you are usually looking for a general description of the information that follows.</p>	<p>A) The examples have nothing to do with newsrooms still employing investigative reporters. <b>ELIMINATE</b></p> <p>B) The examples are not about how investigative journalism declined during a specified period. <b>ELIMINATE</b></p> <p>C) While there is some mention of social media in the example, it is not the primary focus. Also, the examples are not supporting the idea that most people get their news from the internet. <b>ELIMINATE</b></p> <p>D) This choice begins with the transition word “<u>Indeed</u>,” which indicates emphasis on a point from the previous sentence—the decline in print media does not mean the end of investigative journalism. The claim that “<u>recent years have witnessed innovative adjustments to changing times</u>” provides a general introduction to examples that illustrate new or innovative avenues where investigative journalism survives. <b>CORRECT</b></p>
	<p><b>ANSWER D</b></p>

# RHETORIC | **THREE TYPES OF TRANSITIONS**

An SAT Transition Question will ask you to **SELECT A SENTENCE** that effectively transitions from one paragraph to another or from one sentence to another within a paragraph.

Type / Definition	Rule
<b>INTRODUCTION</b> of a new paragraph that transitions from previous paragraph (Also see Introduce Questions definition on two previous pages.)	The correct answer must introduce the information in the new paragraph and contain some information that relates back to the previous paragraph.
<b>CONCLUSION</b> of a previous (first) paragraph that transitions to a new (second) paragraph	The correct answer must... (a) bring the topic of the first paragraph to a close or tie specific information in the paragraph back to the main purpose of the passage and (b) have some (usually small) reference to information that will follow at the beginning of the next paragraph.
<b>TRANSITION</b> between two sentences within a paragraph.	The correct answer must contain at least some detailed information that relates to both of the sentences. Look at the transition for key words or concepts that overlap from the first sentence and the second sentence.

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# RHETORIC | **TRANSITION** | *Questions with Prompts*

## **COMMON TRANSITION PROMPTS ON THE SAT**

Based on the passage, which answer provides the...

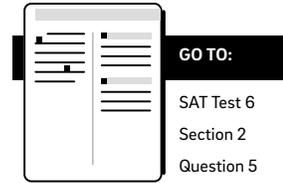
- Most effective transition from the previous paragraph? OR
- Best transition from the previous paragraph to this one? OR
- Most effective transition between ideas in the paragraph?

## **THEN FOUR ANSWER CHOICES ARE LISTED**

## How to Answer an Transition Question Type

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> is similar to the examples given above followed by a list of four answer choices.</p> <p>READ THE PROMPT CAREFULLY to determine whether it is a Transition-Introduce, a Transition-Conclusion, or a Transition-In Paragraph question. Also, make sure you are clear on the rules for each question type.</p>	<p><b>DETERMINE THAT THIS IS A TRANSITION QUESTION</b></p> <p><b>EVALUATE KEY WORDS AND CONCEPTS IN THE ANSWER CHOICES</b> to see whether they reference both information that came in the preceding paragraph/sentence and information from the next paragraph/sentence.</p>
<p><b>NOTE A TRANSITION BETWEEN SENTENCES</b> within a paragraph will have more detailed references to information from the sentences before and after it.</p>	<p><b>PAY ATTENTION TO THE MAIN IDEAS</b> in the paragraphs or sentences you are transitioning between. Doing so will provide insight into topics that should be mentioned in the correct answer choice.</p> <p><b>WATCH FOR KEY WORDS IN THE TRANSITION SENTENCE</b> that mention ideas in the surrounding sentences.</p> <p><b>WATCH FOR ANY PRONOUNS OR OTHER REFERENCE TERMS</b>, such as this idea or the plan, and make sure that the previous sentence(s) provides a clear antecedent for those terms.</p>
	<p><b>WHEN ASKED TO PROVIDE</b> a paragraph transition that relates to the new paragraph, skip the transition question temporarily as you read the new paragraph. Once you have completed reading and answering other questions from the new paragraph, return to the transition question.</p>

# TEST EXAMPLE | **TRANSITION**



SAT 6 | sec 2 | q. 5 | Questions With Prompts

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks, “Which choice provides the best transition from the previous paragraph to this one?”</p> <p><b>READ AND DETERMINE</b> the main idea of both paragraphs before answering the question.</p> <p><b>REMEMBER</b> A Transition-Introduce will focus more on the main idea of the new paragraph while referencing some part of the previous paragraph.</p>	<p><b>THIS IS AN INTRODUCE QUESTION</b></p> <p><b>PREVIOUS PARAGRAPH:</b> Determine main idea The previous paragraph discusses scientists investigating possible causes of algae affecting bodies of water such as Lake Erie and Lake 227.</p> <p><b>NEW PARAGRAPH:</b> Determine main idea The new paragraph discusses these same scientists conducting an experiment on Lake 226 to test a hypothesis about the cause of the algae.</p>
<p><b>THE CORRECT ANSWER</b> will introduce information in the new paragraph while relating back to the previous paragraph in some manner.</p>	<p>A) While potentially relevant to the first paragraph of the passage, this choice does not tie to either of the two paragraphs the question is transitioning between. <b>ELIMINATE</b></p> <p>B) The paragraphs neither discuss nor are concerned with the location of the lakes. <b>ELIMINATE</b></p> <p>C) Mentions another experiment using the new Lake 226 to isolate the cause of the algae. The new experiment in Lake 226 is the main point of the new paragraph, and the answer choice also references “another experiment,” the experiment on Lake 227, from the previous paragraph. <b>CORRECT</b></p> <p>D) The name of the process by which the water becomes enriched is not a concern of either paragraph. <b>ELIMINATE</b></p>
	<p><b>ANSWER C</b></p>

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# RHETORIC | **GRAPH** | *Questions with Prompts*

An SAT *Graph Question* will ask you either to **PROVIDE ACCURATE INFORMATION** from a graph/figure OR to **USE INFORMATION** from a graph/figure to support a claim in the passage (similar process to Support a Claim question type).

## **GRAPH PROMPT ON THE SAT**

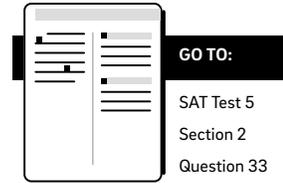
The prompt refers to a graph or figure provided in the passage.

## **THEN FOUR ANSWER CHOICES ARE LISTED**

## How to Answer a Graph Question Type

SIGNAL	RESPONSE
<b><u>ANSWER CHOICE PROMPT</u></b> refers to a graph or figure provided in the passage.	<b><u>DETERMINE THAT THIS IS A GRAPH QUESTION</u></b> <b><u>ASK</u></b> whether the prompt requires information from the graph to <b><u>SUPPORT A CLAIM</u></b> . OR whether it is asking for <b><u>ACCURATE INFORMATION</u></b> .
<b><u>ANSWER CHOICE PROMPT</u></b> requires information to support a claim.	Once clear on the graph information that supports the claim, ask which answer choice provides the most accurate information from the graph. <i>(For some questions, some answer choices are false based on the information in the graph.)</i>
<b><u>GRAPH PROMPT</u></b> requests <b><u>ACCURATE INFORMATION</u></b> .	Read the graph/figure carefully, including titles and keys, so that you can understand and completely interpret information on the graph figure.  Evaluate answer choices to see whether they are true or false based on the graph/figure. True answers are correct.

# TEST EXAMPLE | GRAPH



SAT 5 | sec 2 | q. 33 | Questions With Prompts

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks “Which choice offers an accurate interpretation of the data in the graph?”</p>	<p><b>THIS IS A GRAPH QUESTION REQUIRING ACCURATE INFORMATION</b></p> <p><b>CAREFULLY READ</b> the information on the graph to ensure you can interpret the graph correctly.</p>
<p><b>EVALUATE THE ANSWER CHOICES</b> to see which are true or false based on the information in the graph.</p>	<p>A) Category with lowest amount of money raised—dance—matches the most successfully funded category—dance. (True) <b>CORRECT</b></p> <p>B) Category with the highest average pledge amount—food—does not match the most successfully funded category—dance. (False) <b>ELIMINATE</b></p> <p>C) Category with the lowest average pledge amount—publishing—does not match the category with the most money raised—games. (False) <b>ELIMINATE</b></p> <p>D) Category with the highest average pledge amount—food—does not match the category with the most money raised—games. (False) <b>ELIMINATE</b></p>
	<p><b>ANSWER A</b></p>

# RHETORIC | **MISCELLANEOUS** | *Questions with Prompts*

An SAT *Miscellaneous Question* will ask you to PERFORM A SPECIFIC TASK outside of any of the types previously mentioned. The task is usually extremely specific.

**MISCELLANEOUS PROMPT ON THE SAT:**

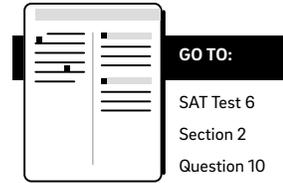
The prompt asks you to perform a specific task outside of any of the types previously mentioned.

**THEN FOUR ANSWER CHOICES ARE LISTED**

## How to Answer a Miscellaneous Question Type

SIGNAL	RESPONSE
<p><b><u>ANSWER CHOICE PROMPT</u></b> asks you to perform a specific task outside of any of the types already mentioned.</p>	<p><b><u>THIS IS A MISCELLANEOUS QUESTION</u></b>  <b><u>READ THE QUESTION CAREFULLY</u></b> to figure out the specific miscellaneous task you are asked to perform.</p>
	<p><b><u>REMEMBER</u></b> to <b><u>ADHERE TO THE EXACT LANGUAGE AND SPECIFIC TASK</u></b> from the prompt!</p>
	<p>Pick the answer choice that best completes the specific miscellaneous task from the prompt.</p>

# TEST EXAMPLE | MISCELLANEOUS



SAT 6 | sec 2 | q. 10 | Questions With Prompts

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks you to choose the answer that accomplishes the writer’s goal to add a “second policy outcome of the research described.”</p>	<p><b>THIS IS A MISCELLANEOUS QUESTION</b></p> <p><b>REMEMBER</b> to <b>ADHERE TO THE EXACT LANGUAGE AND SPECIFIC TASK</b> from the prompt!</p>
<p><b>ANSWER CHOICE PROMPT</b> asks for a “second policy...” Because the specific task entails finding a second policy, there must be a first policy in the paragraph to give you an idea of the type of policy you’re looking for.</p>	<p><b>THE SPECIFIC TASK</b> in this question is to choose the answer that accomplishes the writer’s goal to add a “second policy outcome of the research described”—adhere to this exact language when you are determining your answer.</p> <p>The first policy is in the previous sentence about Canada passing laws to ban phosphates in laundry detergent, which makes sense because the research discussed in the paragraph has to do with the correlation between the introduction of phosphates and the growth of algae.</p> <p><b>CHOOSE AN ANSWER</b> that accomplishes adding a second policy outcome of the research described.</p>
	<p>A) Does not introduce a policy. <b>ELIMINATE</b></p> <p>B) Introduces a policy by the United States that is similar to the one Canada introduced in the first example. <b>CORRECT</b></p> <p>C) Research is not a policy, and even if it were, the research is not related to acid rain. <b>ELIMINATE</b></p> <p>D) Does not introduce a policy. <b>ELIMINATE</b></p>
	<p><b>ANSWER B</b></p>

## RHETORIC | **RELEVANCY** | *Questions With Prompts*

The SAT tests the Relevancy of a Sentence by asking questions similar to the following:

The *writer is considering adding* the following sentence.  
Should the writer **MAKE THE ADDITION**?

The *writer is considering deleting* the underlined sentence.  
Should the **SENTENCE BE KEPT OR DELETED**?

Which choice adds the **MOST RELEVANT** supporting information to the paragraph?

At this point, the writer is considering adding the following sentence.  
Should the writer **MAKE THE ADDITION HERE**?

**THEN FOUR ANSWER CHOICES ARE LISTED**

# RHETORIC | **RELEVANCY** | *Questions with Prompts*

## How to Answer a Relevancy Question Type: FIRST QUESTION TO ASK

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks you to perform a specific task outside of any of the types already mentioned.</p>	<p><b><u>THIS IS A RELEVANCY QUESTION</u></b></p> <p><b>CAREFULLY READ</b> the Topic Sentence and entire paragraph so that you fully <b>UNDERSTAND THE SPECIFIC TOPIC AND PURPOSE OF THAT PARAGRAPH</b>. Consider it in the context of the overall passage.</p> <p><b>NEXT</b></p>
<p><b><u>USE TWO QUESTIONS</u></b></p>	<p><b><u>USE TWO QUESTIONS</u></b> to establish whether the sentence in question is relevant.</p>
<p><b><u>FIRST QUESTION</u></b></p>	<p><b><u>FIRST QUESTION</u></b></p> <p>Does the sentence discuss the same specific topic and purpose as the rest of the paragraph?</p> <p>IF <b>YES</b>, then it is likely relevant.</p> <p>IF <b>NO</b>, then it is not relevant.</p> <p><b><u>WHEN A SENTENCE IS NOT RELEVANT</u></b>, it is often because it blurs the focus of the paragraph. For example, the sentence may be completely off topic. Other times, a sentence may mention a topic related to the paragraph, but the information provided is too detailed so that it goes off topic or is too general to fit in with the purpose of the paragraph.</p> <p><b><u>LOOK FOR MULTIPLE KEYWORDS</u></b> from the sentence and see if those keywords are discussed in rest of the paragraph.</p> <p>Some sentences will provide details related to a topic discussed in the paragraph, but the details provided are not closely connected to the specific topic and purpose of the paragraph.</p>
<p><b><u>SECOND QUESTION</u></b></p> <p>If uncertain whether a sentence is relevant after asking Question 1, then consider the second question.</p>	<p><b><u>SECOND QUESTION</u></b> - NEXT PAGE</p>

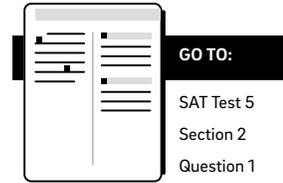
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# RHETORIC | **RELEVANCY** | *Questions with Prompts*

## How to Answer a Relevancy Question Type: SECOND QUESTION TO ASK

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> is similar to the examples given on p. 116 followed by a list of four answer choices.</p>	<p><i>Continued from previous 2 pages.</i></p>
<p><b>SECOND QUESTION</b> Does the information discussed in the sentence in question tie into information discussed in the sentences before and after?</p>	<p><b>IT IS RELEVANT IF</b> the information from the sentence ties to the sentences before and after.</p> <p><b>IT IS NOT RELEVANT IF</b> the sentence in question does not provide information that ties to the sentences before and after it.</p>
<p><b>THE PROMPT OF A RELEVANCY QUESTION</b> asks whether a sentence should be deleted or added.</p>	<p><b>GO INTO THE ANSWER CHOICES WITH A PREDICTION</b> about whether a sentence is relevant, but plan on reading ALL the answer choices.</p> <p><b>START WITH</b> the answer choices that reflect your prediction about whether the sentence should be kept or deleted.</p> <p><b>IF NONE OF THE ANSWER CHOICES THAT MATCH YOUR PREDICTION PROVIDE A CORRECT EXPLANATION</b>, then move on to the answer choices that do not match your prediction.</p> <p><b>ONLY SELECT AN ANSWER CHOICE</b> that provides a <b>TRUE</b> and <b>CORRECT</b> description of how the sentence in question relates to the paragraph.</p>

# TEST EXAMPLE | RELEVANCY



SAT 5 | sec 2 | q. 1 | Questions With Prompts

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks “Should the writer make this addition here?”</p>	<p><b>THIS IS A RELEVANCY QUESTION</b></p> <p><b>DETERMINE THE SPECIFIC TOPIC AND PURPOSE</b> of that paragraph (look to the topic sentence to help identify the topic and purpose of the paragraph).</p> <p>In this paragraph, the author is discussing how scientists are using modern technology to better understand the past, specifically using CT scanning and 3-D printing to create models of fossils.</p> <p><b>ASK QUESTION 1</b></p> <p><b>DOES THE SENTENCE DISCUSS</b> the same specific topic and purpose as the rest of the paragraph?</p> <p>The sentence you are trying to add focuses on how fossils can help scientists determine the age of rocks. There is no mention of technology, and the rest of the paragraph does not mention anything about rocks or their age.</p>
<p>If unsure about the answer to the first question (maybe you thought that it may be relevant because the sentence mentions fossils and so does the previous sentence), ask Question 2.</p>	<p><b>ASK QUESTION 2</b></p> <p><b>DOES THE INFORMATION</b> discussed in the sentence in question tie to information discussed in the sentences before and after?</p> <p>The sentence before discusses creating models of fossils, while the sentence after discusses benefits and uses of these models. There is no mention of rocks or determining age. Additionally, the sentence after begins with the phrase “These models,” which directly ties to the sentence before. You do not want to insert a sentence that interrupts that close tie.</p> <p><b>ANSWER B</b></p> <p>It does not directly relate to the main point of the paragraph.</p>

# TEST EXAMPLE | RELEVANCY

SAT 5 | sec 2 | q. 27 | Questions With Prompts



GO TO:

SAT Test 5  
Section 2  
Question 27

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks “Should the writer make this addition here?”</p>	<p><b><u>THIS IS A RELEVANCY QUESTION</u></b></p> <p><b><u>DETERMINE THE SPECIFIC TOPIC AND PURPOSE</u></b> of that paragraph (look to the topic sentence to help you identify the topic and purpose of the paragraph).</p> <p>In this paragraph, the first sentence notes that crowdfunding can exacerbate existing problems, which the rest of the paragraph continues to discuss with examples that support this statement.</p> <p><b><u>ASK QUESTION 1</u></b></p> <p><b><u>DOES THE SENTENCE DISCUSS</u></b> the same specific topic and purpose as the rest of the paragraph?</p> <p>The sentence you are trying to add focuses on the type of contributors crowdfunding attracts, but there is no indication in the paragraph that these contributors are a problem.</p> <p><b><u>ANSWER D</u></b></p> <p>It blurs the focus of the paragraph by inserting a poorly integrated piece of information.</p>

## RHETORIC | **LOGICAL FLOW** | *Questions With Prompts*

### How to Answer a Logical Flow Question Type:

An SAT Logical Flow Question will select a sentence and ask you to **CHOOSE THE MOST LOGICAL PLACE** to insert it within a given paragraph.

When a Logical Flow Question comes up, all of the sentences in the given paragraph will be numbered.

**THESE QUESTIONS ARE PROBABLY THE MOST TIME-CONSUMING AND CHALLENGING** in the Writing and Language section. Strive to understand not only the main topic of the paragraph but also the logical development of that main topic by the author.

### **EXAM ALERT**

If experiencing any difficulty finishing the Writing and Language section within the time constraints, then blindly GUESS on these types of questions to save time. Return to them at the end of the section, time permitting.

### **A COMMON INTRODUCE PROMPT ON THE SAT**

"To make this paragraph most logical, sentence 5 should be placed..."

### **THEN FOUR ANSWER CHOICES ARE LISTED**

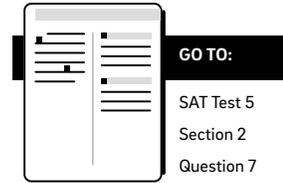
- A) where it is now
- B) after Sentence 2
- C) after Sentence 3
- D) after Sentence 6

# RHETORIC | **LOGICAL FLOW** | *Questions with Prompts*

## How to Answer a Logical Flow Question Type

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks, “To make this paragraph most logical, Sentence 5 should be placed...”</p>	<p><b>THIS IS A LOGICAL FLOW QUESTION</b></p>
<p>The sentence will not always have reference words or phrases, but it is imperative to identify all reference words or phrases when the sentence does contain them. Reference words refer back to things mentioned in the previous sentence.</p>	<p>1 <b>DETERMINE THE MAIN POINT</b> of the sentence referred to in the prompt of the question. Identify if the sentence contains any reference words or phrases such as “<u>this process</u>” or “<u>they</u>.”</p>
<p>Be aware of these developmental patterns:</p> <ul style="list-style-type: none"> <li>• Chronological (time-oriented)</li> <li>• Step-by-step (process-oriented), and</li> <li>• General discussion of a topic to a more Specific/ Narrow discussion of a topic (General to Specific) using examples, details, specific causes, etc.</li> </ul>	<p>2 <b>DETERMINE THE MAIN TOPIC AND PURPOSE</b> of the paragraph and how the author is trying to develop that main topic and purpose.</p>
<p>Often the SAT takes advantage of mistakes in the placement of the sentence with regard to the sentence that follows.</p>	<p>3 <b>PLACE THE SENTENCE WHERE IT CONNECTS</b> not only to the previous sentence but also to the sentence that follows. Double check this connection.</p>
<p>Connecting reference words or phrases from the sentence that follows to something mentioned in the placed sentence can be tricky!</p>	<p>4 <b>READ ALL THREE SENTENCES IN ORDER</b> before selecting your answer choice. If you try multiple places, then read all three sentences each time. Start by placing the sentence with the earliest option from the answer choices—for example, after Sentence 1 is easier than after Sentence 2 (which means wait to test the option “where it is now” until testing all earlier options).</p> <p>5 <b>USE ANY CONNECTING WORDS OR PHRASES</b> to help place the sentence.</p> <p>6 <b>CHECK CONNECTING WORDS OR PHRASES FROM THE SENTENCE THAT FOLLOWS</b> to see if there is a logical connection to the placed sentence.</p>
<p>Placement of the sentence interrupts two closely related sentences.</p>	<p>7 <b>MAKE SURE THE PLACEMENT</b> of the sentence <b>DOES NOT</b> interrupt two closely related sentences!</p> <p>For example, it may seem that the placed sentence would logically follow Sentence 2.</p> <p>However, you may fail to recognize that Sentences 2 and 3 have an even stronger logical connection, and that by inserting the placed sentence between Sentences 2 and 3, the connection is interrupted. Thus, the correct placement is not after Sentence 2 but may be after Sentence 3.</p>

# TEST EXAMPLE | LOGICAL FLOW



SAT 5 | sec 2 | q. 7 | Questions With Prompts

SIGNAL	RESPONSE
<p><b>ANSWER CHOICE PROMPT</b> asks “To make this paragraph most logical, Sentence 2 should be placed...”</p>	<p><b>THIS IS A LOGICAL FLOW QUESTION</b></p>
<p>The sentence is about how 3-D scale models can now be rearranged with ease.</p>	<p><b>DETERMINE THE MAIN POINT</b> of the sentence referred to in the prompt of the question. Identify if the sentence contains any reference words or phrases.</p> <p>The phrase “But now” is a big clue to use this sentence to contrast with something that happened earlier in time.</p>
<p>This paragraph is about a benefit of 3-D printing technology—its ability to create scale reproductions of fossils—and contrasting that benefit with the limitations in the past.</p>	<p><b>DETERMINE HOW THE AUTHOR</b> is trying to develop the main point and purpose of the paragraph.</p> <p>Using the connecting phrase “But now,” you should be comfortable placing the sentence somewhere after Sentence 4, which begins with the phrase “In the past.”</p>
<p><b>REMEMBER</b> Make sure not only to connect the phrase to a sentence before it but also to make sure it connects (or does not interrupt a connection) with the sentence after it.</p>	<p>Sentences 4 and 5 are closely related—Sentence 5 expands on the limitations the scientists experienced in Sentence 4. Realizing that these two sentences are closely related, do not interrupt their connection. Thus, place Sentence 2 after both of these sentences (after Sentence 5).</p>
	<p><b>ANSWER D</b></p>

# MATH

**UC SAN DIEGO** | SAT WORKBOOK

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# MATH

## On the SAT

ON THE EXAM, MATH WILL BE ORGANIZED INTO TWO SEPARATE TIMED SECTIONS—ONE THAT ALLOWS THE USE OF A CALCULATOR AND ONE THAT DOES NOT.

### **SECTION 3** No Calculator | 25 minutes

20 Questions—15 Multiple-Choice & 5 Grid-In

8 Heart of Algebra

9 Passport to Advanced Math

3 Additional Topics

### **SECTION 4** Calculator | 55 minutes

38 Questions—30 Multiple-Choice & 8 Grid-In

11 Heart of Algebra

7 Passport to Advanced Math

17 Problem Solving and Data Analysis

3 Additional Topics

The Multiple-Choice (MC) questions progress in order of difficulty, starting with easier problems and progressing to harder ones.

There is no penalty for guessing, so you must provide an answer on EVERY MC question.

ONCE YOU REACH THE GRID-IN (GI) QUESTIONS, THE LEVEL OF DIFFICULTY RESETS

Thus, the first 2 or 3 GI questions in the No Calculator section and the first 4 or 5 GI questions in the Calculator section are less difficult than the last few. GI questions always come at the end of each section.

### **58 Questions Total in Math**

#### **22 No Calculator Section**

#### **38 Calculator Section**

# Exam Strategies

The following advice ensures that you encounter all the less difficult questions with sufficient time to solve them, maximizing your scoring potential.

## Timing Advice

Begin with the easier Grid-In (GI) questions, or, if preferred, skip to the GI questions when you reach the middle of the Multiple-Choice (MC) questions. However, only attempt the GI questions that you believe you can solve in 90 seconds or less

If not confident based on the initial identification of a GI question that you can solve it in 90 seconds or less (or if, while attempting the problem, you run into difficulty), then skip that GI question and return to it after attempting the remaining MC questions, time permitting.

You will likely be able to solve at least a couple of GI questions on each section, so make sure to get those points before running out of time.

Additionally, if you follow this advice, the most difficult MC questions will be left to the end, where there still is a 1-in-4 chance of answering an MC question correctly, if you need to guess.

If you do not have time to attempt all the MC questions, following this advice ensures that you will be guessing on the most difficult MC questions on the exam. If you are likely to run out of time, be prepared to attempt some of the difficult MC questions out of order, prioritizing the familiar questions that you are more confident solving. You do not need to attempt the difficult MC questions in order.

## **REMEMBER**

Do not spend over a minute-and-a-half on any single question.  
Bubble in an answer for every MC question even if it is a complete guess!

## Tips

The answer to Question 16 on the No Calculator section is almost always a whole number and almost always a number from 1 to 5 (sometimes up to 10).

If the problem is a word problem or looks complicated and/or intimidating to solve mathematically, try plugging in numbers from 1 to 5 to see if you can solve it by Picking Your Own Numbers.

# MATH | SIGNAL & RESPONSES

The Signal & Response for Math is designed to help you quickly determine which math concepts are being tested and know the appropriate responses, which provide effective strategies to attack and solve the problem.

The Signal & Response for SAT math problems will look like this:

## EXAMPLE 1

QUESTION	ANSWER CHOICES
$11 - 2x = \frac{x+7}{x-1}$	<p>[ 1 ] Which of the following is a possible value of x?</p> <p>A) 2</p> <p>B) 3</p> <p>C) 4</p> <p>D) 5</p>
SIGNAL	RESPONSE
<p><b>IDENTIFY</b> any <b>SIGNALS</b> from the three math strategies as well as <b>SIGNALS</b> from the fundamental math topics by looking at the format of and what is given to you in both the question and the answer choices (covered throughout this section). <b>CONSIDER</b> the appropriate responses to the given SIGNALS.</p> <p>Many problems will have multiple <b>SIGNALS</b>. Try to identify as many as possible.</p>	<p><b>CONSIDER</b> the appropriate responses to the given <b>SIGNALS</b>.</p>
<p>Many problems will have multiple <b>SIGNALS</b>. Try to identify as many as possible.</p>	<p><b>DECIDE</b> which <b>RESPONSE</b> will enable you to solve the problem efficiently.</p>
	<p>APPLY that <b>RESPONSE</b>.</p>

# Three Math Strategies to Consider on Every Problem

Many math problems on the SAT can be solved in multiple ways: using fundamental math, including algebra, and/or using the three strategies described on the next page.

These three strategies provide methods that will enable you to solve some problems you could not otherwise solve or to solve them more efficiently.

Each strategy comes with its own set of **SIGNALS** that indicate which strategy (or strategies) can be used in **RESPONSE**.

First learn to identify the **SIGNALS** and apply the appropriate **RESPONSES** for each strategy. Then notice when one or more strategies could help solve particular problems.

Practice solving some of those problems at least twice: one time using an appropriate strategy and a second time using fundamental math.

Practice with different strategies builds solution identification skills. This knowledge will clarify the most effective and efficient methods to solve different types of SAT math problems.

Strategy	Signal
<b>Strategy 1</b>	<p><b><u>SIGNALS</u></b></p> <ul style="list-style-type: none"> <li>• Question asks for the value of <math>x</math>, <math>t</math>, etc.</li> <li>• Question asks for the solution(s) or solution set</li> <li>• Question and/or answer choices contain equation(s) and graphs or tables</li> <li>• Question and/or answer choices contain equation(s) and coordinate points</li> </ul> <p><b><u>RESPONSE PLUG IN THE ANSWER CHOICES</u></b></p> <p>Use answer choices that can be plugged into an equation (or equations) and easily solved to reveal true or false statements. Plug in answer choices and solve to find the one that creates a true statement—the correct answer.</p>
<b>Strategy 2</b>	<p><b><u>SIGNALS</u></b></p> <ul style="list-style-type: none"> <li>• Word Problems with no given equations and numbers as answer choices (Especially Percentages or System of Equation Problems)</li> <li>• Graphs with equations as answer choices</li> <li>• “Equivalent” problems involving expression(s) or equation(s) in factored form</li> </ul> <p><b>RESPONSE WORK Backward FROM ANSWER CHOICES</b></p> <p>Determine what the answer choices represent in the context of the problem and use the (differences among the) answer choices to help eliminate answers and solve the problem. When possible, test the answer choices by following the directions from the word problem.</p>
<b>Strategy 3</b>	<p><b><u>SIGNALS</u></b></p> <p>Question and/or answer choices contain:</p> <ul style="list-style-type: none"> <li>• Variables, especially <math>a</math>'s or <math>b</math>'s as unknowns</li> <li>• Word “equivalent” in question</li> <li>• Inequalities</li> <li>• Absolute values</li> </ul> <p>Question asks:</p> <ul style="list-style-type: none"> <li>• What “must be true”</li> </ul> <p><b><u>RESPONSE // PICK YOUR OWN NUMBERS</u></b></p> <p>Using the context of the problem, decide which number(s) to pick (and sometimes which variable(s) to replace) to more easily solve the problem. By picking numbers, you are creating scenarios that can be applied to the question, and then to the answer choices, to find a true statement.</p>

## STRATEGY 1 | **VALUE OF** | *Plug in Answer Choices*

### **SIGNALS**

- Question asks for the value of  $x$ ,  $t$ , etc.
- Question asks for the solution(s) or solution set
- Question and/or answer choices contain equation(s) and graphs or tables
- Question and/or answer choices contain equation(s) and coordinate points

### **RESPONSE // PLUG IN THE ANSWER CHOICES**

Use answer choices that can be plugged into an equation (or equations) and easily solved to reveal true or false statements. Plug in answer choices and solve to find the one that creates a true statement—the correct answer.

#### EXAMPLE 2

QUESTION	ANSWER CHOICES
$11 - 2x = \frac{x+7}{x-1}$	[ 1 ] Which of the following is a possible value of $x$ ? A) 2 B) 3 C) 4 D) 5
SIGNAL	RESPONSE
<b>PROBLEM ASKS</b> for the value of something.	<b>DECIDE TO PLUG IN THE ANSWER CHOICES</b> , determining which choice creates a true statement—the correct answer.
<b>ANSWER CHOICES USE</b> numbers that can be easily plugged into the equation.	<b>PLUG IN</b> A) $x = 2$ $11 - 2(2) = \frac{(2)+7}{(2)-1} \quad 7 \neq \frac{9}{1}$ $7 \neq \frac{9}{1}$ So A is incorrect
	<b>PLUG IN</b> A) $x = 3$ $11 - 2(3) = \frac{(3)+7}{(3)-1} \quad 5 = 5$ $5 = 5$ is a true statement, so B is correct.
Because there can be only one right answer choice, it is not necessary to test C or D.	<b>ANSWER B</b>

# STRATEGY 1 | EQUATIONS AND COORDINATE POINTS

## *Plug in Answer Choices*

## EXAMPLE 3

QUESTION	ANSWER CHOICES
$3x + 2y = 11$ $5y - 4x = -30$	Which of the following ordered pairs $(x, y)$ satisfies the system of equations?  A) (1, 4) B) (5, -2) C) (0, 6) D) (-3, -2)
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> equations and coordinate points.</p>	<p>DECIDE TO PLUG IN THE ANSWER CHOICES, determining which choice creates true statements for both equations.</p>
<p><b>ANSWER CHOICES</b> are coordinate points that can be easily plugged into the equations. Since the coordinate points must satisfy both equations, you must find the answer choice that yields a true statement for each equation.</p>	<p><b>PLUG IN</b></p> <p>A) <math>x = 1, y = 4</math></p> $3(1) + 2(4) = 11$ <p><u>True</u>, but still need to check the 2nd equation!</p> $5(4) - 4(1) = -30$ $16 \neq -30$ <p><u>False</u>, so A is not correct.</p>
<p>Make sure to place the x-coordinates into the x spot in each equation and to do the same for the y-coordinates.</p>	<p><b>PLUG IN</b></p> <p>B) <math>x = 5, y = -2</math></p> $3(5) + 2(-2) = 11$ $11 = 11$ <p><u>True</u>, but still need to check the 2nd equation!</p> $5(-2) - 4(5) = -30$ $-30 = -30$ <p><u>True</u>, so B is correct.</p>
<p>Because there can be only one right answer choice, it is not necessary to test C or D.</p>	<p><b>ANSWER B</b></p>

# STRATEGY 2 | WORD PROBLEMS

## Work Backward From Answer Choices

### SIGNALS

- Word Problems with no given equations and numbers as answer choices (Especially Percentages or System of Equation Problems)
- Graphs with equations as answer choices
- "Equivalent" problems involving expression(s) or equation(s) in factored form

### RESPONSE // WORK BACKWARD FROM ANSWER CHOICES

Determine what the answer choices represent in the context of the problem and use the (differences among the) answer choices to help eliminate answers and solve the problem. When possible, test the answer choices by following the directions from the word problem.

#### EXAMPLE 4

QUESTION	ANSWER CHOICES
Chris writes articles to make some extra money. He charges \$10 for a one-page article and an additional \$7.50 for a twopage article. This past week, Chris wrote 3 fewer two-page articles than one-page articles and made \$140. How many one-page articles did Chris write this past week?	A) 3 B) 5 C) 7 D) 9
SIGNAL	RESPONSE
<b>QUESTION</b> is a word problem containing no given equations with numbers as answer choices.	<b>DECIDE TO WORK BACKWARD FROM THE ANSWER CHOICES</b>
The answer choices represent the number of 1-page articles Chris wrote for \$10 each.	<b>DETERMINE</b> what the answer choices represent in the context of the word problem.
It's possible to test the remaining answers by following the directions from the word problem.	<b>LOOK FOR</b> any answer choices that can be eliminated. A) looks incorrect because 3 one-page articles = \$30 and 3 fewer 2-page articles = 0 <b>ELIMINATE</b>
Chris wrote 3 fewer 2-page articles for \$10 plus \$7.50 = \$17.50 each. Chris earned a total of \$140.	B) Chris wrote 5 one-page articles for \$50. Three fewer 2-page articles for \$17.50 would be $2(17.50) = \$35$ . $\$50 + \$25 = \$85$ $\$85 \neq \$140$ B is false <b>ELIMINATE</b>
Since C is correct, there is no need to test the remaining answer choice.	C) 7 one-page articles = \$70. Three fewer 2-page articles = $4(17.50) = \$70$ . $\$70 + \$70 = \$140$ <b>CORRECT</b>
	<b>OR SET UP</b> the system of equations if you choose to solve the problem Algebraically.

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## STRATEGY 2 | WORD PROBLEMS- PERCENTAGES

### *Work Backward From Answer Choices*

## EXAMPLE 5

QUESTION	ANSWER CHOICES
Athena follows two journalists on Twitter. Athena noticed that Journalist A has tweeted 30 percent more tweets than Journalist B has tweeted. If Journalist A tweeted 195 tweets, how many tweets did Journalist B tweet?	A) 135 B) 140 C) 150 D) 275
SIGNAL	RESPONSE
<b>QUESTION</b> is a word problem containing no given equations with numbers as answer choices.	<b>DECIDE TO WORK BACKWARD FROM THE ANSWER CHOICES</b>
Answer choices represent the number of tweets from Journalist B ("JB").	<b>DETERMINE</b> what the answer choices represent in the context of the word problem.
Journalist A ("JA") tweeted 30% more than JB. JA has a total of 195 tweets	<b>LOOK FOR</b> any answer choices that can be eliminated. D) It is impossible for JB (275) to tweet more than JA (195) <b>ELIMINATE</b>
It's possible to test the remaining answers by following the directions from the word problem.	A) $JB = 135 \cdot 30\% = .3 \cdot 135 = 40.5$ Since $JB = 135$ , $JA$ tweets $135 + 40.5 = 175.5$ It is false that $JA = 175.5$ , so <b>ELIMINATE</b>
<b>NOTE IF C WERE INCORRECT</b> , B would automatically be the correct answer, since it would be the only answer not to have been eliminated.	C) $JB = 150 \cdot 30\% = 45$ (30% more) Since $JB = 150$ , $JA$ tweets $150 + 45 = 195$ . It is true that $JA = 195$ .
	<b>CORRECT</b>

# STRATEGY 3 | **A & B PROBLEMS** | *Pick Your Own Numbers*

## **SIGNALS**

Question and/or answer choices contain:

- Variables, especially a's or b's as unknowns
- Word "equivalent" in question
- Inequalities
- Absolute values

Question asks:

- What "must be true"

## **RESPONSE // PICK YOUR OWN NUMBERS**

Using the context of the problem, decide which number(s) to pick (and sometimes which variable(s) to replace) to more easily solve the problem. By picking numbers, you are creating scenarios that can be applied to the question, and then to the answer choices, to find a true statement.

**TIP** Pick numbers that are logical and allow for easy calculations ( i.e. 0, 1, 2, 10).

### EXAMPLE 6

QUESTION	ANSWER CHOICES
$36 = a^{b/3}$	If $a$ & $b$ are positive integers, what is one possible value for $b$ ?
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> <math>a</math>'s &amp; <math>b</math>'s. Solving this problem with algebra looks difficult because "<math>b</math>" is part of a fraction that is part of an exponent. It is probably faster to pick numbers that could replace "<math>b</math>" and be easily tested in the equation.</p> <p>Consider rules of exponents before picking numbers.</p>	<p>Try to <b>PICK YOUR OWN NUMBERS</b></p> <p>When considering picking numbers and facing multiple unknowns, first pick a number for the unknown in the most complicated spot. In this problem, <math>b</math> is in the most complicated spot because it is part of a fractional exponent.</p>
<p>What would be a couple of good numbers to pick for <math>b</math>?</p>	<p>You could pick 6 for "<math>b</math>" <math>36 = a^{6/3}</math> <math>36 = a^2</math></p> <p>This exponent would become 2, meaning "<math>a</math>" would have to be 6. This creates a valid scenario where <math>36 = 36</math>, so 6 is a possible value for "<math>b</math>".</p>

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## STRATEGY 3 | **INEQUALITIES** | *Pick Your Own Numbers*

### EXAMPLE 7

QUESTION	ANSWER CHOICES
If $3y + x > 11$ and $y < 5$	Which of the following represents the range of solutions for $x$ ? A) $x < -4$ B) $x > -4$ C) $-4 < x < 5$ D) $x < 4$
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> inequalities.	When faced with inequalities, look to <b>PICK YOUR OWN NUMBERS</b> that will test the validity of the inequalities—sometimes using the answer choices, sometimes using additional information given in the problem.
We know $y < 5$	<b>FIRST STEP:</b> Figure out numbers to pick and where you use them. Plugging in a value for $y$ into the primary equation $3y + x > 11$ makes the most sense because we know $y < 5$ . A reasonable starting number is $y = 0$ because it is easy to calculate.  Plugging in 0 for $y$ to the original equations yields: $3(0) + x > 11 \quad x > 11$
We know $x > 11$ is one valid scenario, since we picked a value for $y > 5$ .	Next Step—Evaluate the truth of answer choices against the created scenario ( $x > 11$ ). Any answer choice that contradicts is incorrect. <b>ELIMINATE</b>  A) $x < -4$ contradicts $x > 11$ , making it false. <b>ELIMINATE</b> The only answer choice that contains an inequality that is true for $x > 11$ is B. <b>CORRECT</b>
<b>NOTE</b> Sometimes the scenario created by picking your own numbers will be true for more than one answer choice. In that case, pick another number and test the answer choices with the new scenario. So long as your scenario follows the rules in the problem, it is valid and cannot be contradicted.	<b>ANSWER B</b>

## STRATEGY 3 | **ABSOLUTE VALUE** | *Pick Your Own Numbers*

### EXAMPLE 8

QUESTION	ANSWER CHOICES
Two different points on a number line are both 5 units from the point with the coordinate -3.	<p>The solution to which of the following equations gives the number-line coordinates of both points?</p> <p>A) <math> x - 3  = 5</math></p> <p>B) <math> x + 3  = 5</math></p> <p>C) <math> x - 5  = 3</math></p> <p>D) <math> x + 5  = 3</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> absolute values. When faced with a problem containing absolute value symbols, it is often possible to figure out and then pick numbers that should create true statements.</p>	<p><b>PICK YOUR OWN NUMBERS</b> to test the true value of the absolute value equations in the answer choices.</p> <p>In this problem, it is possible to figure out the coordinates of the two points that are 5 units from -3 (those would be the points with coordinates 2 &amp; -8).</p>
<p>The correct number-line coordinate points now provide numbers to pick in order to test the truth of the answer choices.</p>	<p>Plug in both points to the answer choices to see which equation yields two true statements:</p> <p>A) <math> 2 - 3  \neq 5</math> <u>False</u> so not correct. No need to test -8.</p> <p>B) <math> 2 + 3  = 5</math> <u>True</u>, but still need to check the 2nd point!</p> <p>B) <math> -8 + 3  = 5</math> <u>True</u>, so B is <b>CORRECT</b></p>
<p>Because there can be only one right answer for the correct points 2 &amp; -8, it is not necessary to test C or D.</p>	<p><b>ANSWER B</b></p>

## STRATEGY 3 | **MUST BE TRUE** | *Pick Your Own Numbers*

### EXAMPLE 9

QUESTION	ANSWER CHOICES
If $a/b > 0$ , which of the following must be true?	A) $a + b > 0$ B) $a - b > 0$ C) $a b > 0$ D) $ a  -  b  > 0$
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> the phrase “must be true,” $a$ ’s & $b$ ’s, inequalities, and absolute values. Why is Strategy 3 preferable for this problem?	If you see any one of these four signals in a problem, the response should be to consider using Strategy 3, <b>PICK YOUR OWN NUMBERS</b>
Since there are no restrictions on the numbers you can pick, choose numbers that make the calculations easy, such as 0, 1, -1, 2. However, make sure they are numbers that create a True statement	First step—Pick numbers that would create a True statement from the given information. Picking $a = 1$ & $b = 1$ yields a True statement as $1/1 > 0$
A & C were True statements, so pick new numbers to create a new scenario and evaluate A & C.	<b>EVALUATE</b> the answer choices with $a = 1$ & $b = 1$ . B & D become False statements. <b>ELIMINATE B &amp; D</b> A & C yield True statements. <b>KEEP FOR NOW</b>
Since C is the only remaining True answer choice, C is the correct answer.	<b>PICK YOUR OWN NUMBERS</b> to evaluate the two remaining answer choices. Picking $a = -1$ & $b = -1$ Yields a True statement as $-1/-1 > 0$ . <b>EVALUATE</b> the answer choices with $a = -1$ & $b = -1$ . A becomes a False statement <b>ELIMINATE A</b> C remains as a True statement. <b>ANSWER C</b>

## MATH STRATEGIES | **EQUIVALENT PROBLEMS**

*Equivalent Problems* often look intimidating, and in some instances, the mathematically correct way to solve them requires advanced Algebra. These types of problems require manipulating the given expression/equation into another expression/equation that is equivalent to the one given. Essentially, the problem is asking you to **CHANGE THE WAY THE GIVEN EQUATION OR EXPRESSION LOOKS BUT NOT THE VALUE OF IT!**

Almost every Equivalent question can be solved using Strategy 3 **PICK YOUR OWN NUMBERS**, but this strategy may not be the most efficient or ideal way to solve that problem.

**NOTE** When picking numbers for Equivalent problems, try not to use 0 or 1 unless absolutely necessary. When using 0 or 1, realize that those numbers may not allow you to eliminate three answer choices.

SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> the word “equivalent.” As a general rule, Equivalent problems that appear earlier in the section—easier problems—are usually solved most efficiently by using Algebra.	<b>DECIDE</b> whether to solve the question using Algebra, Strategy 2 <b><u>WORK BACKWARD FROM ANSWER CHOICES</u></b> , or Strategy 3 <b><u>PICK YOUR OWN NUMBERS</u></b> .

### Khan Academy Practice:

Passport of Advanced Mathematics:

- (1) Structure in Expressions
- (2) Operations with Rational Expressions
- (3) Operations with Polynomials

## STRATEGY 2 OR 3 | **EQUIVALENT** | *Pick Your Own Numbers*

### EXAMPLE 10

QUESTION	ANSWER CHOICES
<p>Which of the following expressions is equivalent to <math>2x^2 + 4x + 7</math>?</p>	<p>A) <math>2(x + 1)^2 - 5</math>            B) <math>2(x + 1)^2 + 2</math>            C) <math>2(x + 1)^2 + 5</math>            D) <math>2(x + 1)^2 + 4x + 5</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> the word “equivalent.” *When the problem or the answer choices contain expressions in factored form, using the answer choices to work backward is often an efficient way to solve the problem (Strategy 2).</p> <p>Using Strategy 3 <b>PICK YOUR OWN NUMBERS</b> is another option.</p> <hr/> <p>The correct answer will yield the same solution as the original expression when you plug in the same value for <math>x</math> (<math>x = 2</math>).</p> <p><b>NOTE</b> When the problem and the answer choices contain quadratics, using the answer choices to work backward is often an efficient way to solve the problem (Strategy 2). In this problem, you can FOIL the answer choices and combine like terms to see which answer choice matches the original equation in the problem. See Example 11 on the next page.</p> <p>For detailed information on using FOIL, see Passport to Advanced Math, Factoring, Quadratics (Parabolas): Factoring.</p> <p><b>NOTE</b> Check all answer options, since you may get two true statements, which will require testing a second number.</p>	<p><b>DECIDE</b> whether to solve by using Algebra, using Strategy 2 <b>WORK BACKWARD FROM ANSWER CHOICES</b>, or using Strategy 3 <b>PICK YOUR OWN NUMBERS</b>.</p> <p>Using Strategy 3:</p> <p>First Step—<b>PICK A NUMBER</b> for any of the unknowns in the original expression and solve.</p> <p>In this problem, the only unknown is <math>x</math> (with no restrictions on <math>x</math>), so picking <math>x = 2</math> is often a good choice. Doing so yields:</p> <p><math>2(2)^2 + 4(2) + 7</math>, which calculates to 23.</p> <hr/> <p>Next Step—Plug in the same number you picked for the unknown(s) in the original expression (<math>x = 2</math>) to the unknowns in the answer choices.</p> <p>Plugging in <math>x = 2</math> to the answer choices yields:</p> <p>A) <math>2(2 + 1)^2 - 5</math>, calculates to 13            B) <math>2(2 + 1)^2 + 2</math>, calculates to 20            C) <math>2(2 + 1)^2 + 5</math>, calculates to 23            D) <math>2(2 + 1)^2 + 4(2) + 5</math>, calculates to 31</p>
	<p><b>ANSWER C</b></p>

## STRATEGY 2 OR 3 | EQUIVALENT

### *Work Backward From Answer Choices*

## EXAMPLE 11

QUESTION	ANSWER CHOICES
<p>Which of the following expressions is equivalent to <math>2x^2 + 4x + 7</math>?</p>	<p>A) <math>2(x + 1)^2 - 5</math>            B) <math>2(x + 1)^2 + 2</math>            C) <math>2(x + 1)^2 + 5</math>            D) <math>2(x + 1)^2 + 4x + 5</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> the word “equivalent.”</p> <p>When the problem and the answer choices contain expressions in factored form, using Strategy 2 <b>WORK BACKWARD FROM ANSWER CHOICES</b> is often an efficient way to solve the problem.</p> <p>To solve Algebraically, you would most likely need to complete the square.</p>	<p><b>DECIDE</b> whether to solve by using Algebra, using Strategy 2 or using Strategy 3.</p> <p>Using <b>WORK BACKWARD FROM ANSWER CHOICES</b> (Strategy 2):</p> <p>First Step—Expand the answer choices to see which one matches the original expression. In this problem, all the answer choices contain <math>2(x + 1)^2</math></p> <p>Expand the parenthesis by remembering to rewrite as <math>(x + 1)(x + 1)</math> and use FOIL to get <math>(x^2 + 2x + 1)</math></p>
<p>For detailed information on using FOIL, see Passport to Advanced Math, Factoring, Quadratics (Parabolas): Factoring.</p>	<p>Next Step—Distribute the 2 that is still in front of the expanded expression <math>2(x^2 + 2x + 1)</math>, which yields <math>2x^2 + 4x + 2</math> for the first part of all four answer choices.</p> <p>Next Step—Notice the differences among the remaining answer choices, and that you need to add 5 to match the original expression.</p>
	<p><b>ANSWER C</b></p>

## STRATEGY 2 OR 3 | **EQUIVALENT**

### *Work Backward From Answer Choices*

## EXAMPLE 12

QUESTION	ANSWER CHOICES
Which of the following expressions is equivalent to $\frac{3x^2 + 5x}{3x + 2} = ?$	A) $x$ B) $x + 3$ C) $x - \frac{2}{3x + 2}$ D) $x + 1 - \frac{2}{3x + 2}$
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> the word "equivalent."	<b>DECIDE</b> whether to solve by using Algebra, using Strategy 2 or using Strategy 3.
Pick the smallest and easiest number you can to simplify solving the expression. To solve Algebraically, you would need to perform difficult long division.	<b>USING PICK YOUR OWN NUMBERS</b> (Strategy 3) First Step—Pick $x = 2$ , which yields: $\frac{3x^2 + 5x}{3x + 2} = \frac{3(2)^2 + 5(2)}{3(2) + 2} = \frac{22}{8}$
The correct answer will yield the same number you calculated, $\frac{22}{8}$ , when plugging in $x = 2$ to the original expression.	Next Step—Plug in whatever number was chosen for the unknown(s) in the original expression ( $x = 2$ ) to the unknowns in the answer choices. A) $(2)$ calculates to 2. Not the same as $\frac{22}{8}$ , <b>ELIMINATE</b> . B) $(2) + 3$ calculates to 5. Does not match $\frac{22}{8}$ , <b>ELIMINATE</b> . C) $(2) - \frac{2}{3(2) + 2} = \frac{16}{8} - \frac{2}{8}$ , calculates to $\frac{14}{8}$ , <b>ELIMINATE</b> . D) $(2) + 1 - \frac{2}{3(2) + 2} = \frac{16}{8} - \frac{2}{8}$ , which calculates to $\frac{22}{8}$ .
	<b>ANSWER D</b>

STRATEGY 2 OR 3 | **EQUIVALENT***Pick Your Own Numbers*

## EXAMPLE 13

QUESTION	ANSWER CHOICES
<p>If <math>x &gt; 3</math>, which of the following expressions is equivalent to <math>\frac{x}{x-3} - \frac{3}{x+5}</math>?</p>	<p>A) <math>\frac{1}{x+5}</math></p> <p>B) <math>\frac{x-3}{x+5}</math></p> <p>C) <math>\frac{x^2+2x-9}{x^2+2x-15}</math></p> <p>D) <math>\frac{x^2+2x+9}{x^2+2x-15}</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> the word “equivalent” and there is an inequality.</p>	<p><b>DECIDE</b> whether to solve by using Algebra, using Strategy 2 or using Strategy 3.</p>
<p>The only unknown is <math>x</math>, and the question states <math>x &gt; 3</math>.</p>	<p><b>USING PICK YOUR OWN NUMBERS</b> (Strategy 3)</p> <p>First Step—Since <math>x &gt; 3</math>, pick <math>x = 4</math>. This yields:</p> $\frac{(4)}{(4)-3} - \frac{3}{(4)+5} = \frac{(4)}{1} - \frac{3}{9} = \frac{39}{9} - \frac{3}{9} = \frac{33}{9}$
<p>The correct answer will yield the same solution you calculated, <math>\frac{33}{9}</math>, when plugging in the same number you picked (<math>x = 4</math>) to the original expression.</p>	<p>Next Step—Plug in whatever number was chosen for the unknown(s) in the original expression (<math>x = 2</math>) to the unknowns in the answer choices.</p> <p>A) <math>\frac{1}{(4)+5}</math> calculates to <math>\frac{1}{9}</math></p> <p>B) <math>\frac{(4)-3}{(4)+5}</math> calculates to <math>\frac{1}{9}</math></p> <p>C) <math>\frac{(4)^2+2(4)-9}{(4)^2+2(4)-15}</math> calculates to <math>\frac{15}{9}</math></p> <p>D) <math>\frac{(4)^2+2(4)+9}{(4)^2+2(4)-15}</math> calculates to <math>\frac{33}{9}</math></p>
	<p><b>ANSWER D</b></p>

# MATH

# You Must Know

Basic Algebra .....#

Distribute, Combine Like Terms, and Isolate .....#

In Terms Of..... #

Equations, Inequalities, or Expressions as  
Answer Choices + Word Problems .....#

# BASIC ALGEBRA

When encountering parentheses, check for numbers and/or signs in front to distribute to the terms inside. Whenever using Basic Algebra to solve a problem, always consider whether it is possible to combine like terms. After combining like terms, **ISOLATE** any term (or terms) required to get to the correct answer choice.

SIGNAL	RESPONSE
x not by itself	<p>Ask, "What is preventing x (or the unknown in the problem) from being by itself?"</p> <p><b>ISOLATE</b> by moving (using opposite operations) all obstacles preventing x (or the unknown in the problem) from being by itself—one at a time—to the other side of the equation.</p> <p><b>COMBINE LIKE TERMS</b> when possible.</p>

## Khan Academy Practice:

Passport to Advanced Mathematics: (1) Isolating Terms

# BASIC ALGEBRA

## DISTRIBUTE, COMBINE LIKE TERMS, AND ISOLATE

## EXAMPLE 14

QUESTION	ANSWER CHOICES
$11x + 3 = -9x + 13$	Which of the following is a solution to the equation shown to the left? A) $\frac{1}{4}$ B) $\frac{1}{2}$ C) $\frac{3}{2}$ D) $\frac{5}{2}$
SIGNAL	RESPONSE
<p><b>PROBLEM ASKS FOR</b> the solution to an equation that requires isolating <math>x</math>.</p>	<p><b>PLUG IN THE ANSWER CHOICES</b> to see which choice creates a true statement (Strategy 1) OR solve Algebraically.</p>
<p>Fractions in the answer choices make solving the problem Algebraically the best method.</p>	<p>Solve Algebraically: <b>ISOLATE</b> <math>x</math></p> <p>First Step—<b>COMBINE LIKE TERMS</b> where <math>11x</math> and <math>-9x</math> are like terms and <math>3</math> and <math>13</math> are like terms. Add <math>9x</math> to both sides and subtract <math>3</math> from both sides:</p> $\begin{array}{r} 11x + 3 = -9x + 13 \\ + 9x \quad + 9x \\ \hline 20x + 3 = 13 \\ - 9x \quad - 9x \\ \hline 20x = 10 \end{array}$ <p>Next Step—<b>ISOLATE</b> <math>x</math> by dividing both sides by <math>20</math>:</p> $x = \frac{1}{2}$ <p><b>ANSWER B</b></p>

# BASIC ALGEBRA | **DISTRIBUTE, COMBINE LIKE TERMS**

## EXAMPLE 15

QUESTION	ANSWER CHOICES
$(2x^2y - 4x + 6xy^2) - (-x^2y - 3xy^2 + 7x)$	Which of the following is equivalent to the expression shown to the left? A) $x^2y + 3xy^2 - 11x$ B) $3xy^2 + 3xy^2 + 3x$ C) $3x^2y + 9xy^2 - 11x$ D) $3x^2y + xy^2 - x$
SIGNAL	RESPONSE
<p><b>PROBLEM ASKS FOR</b> the “equivalent” expression, and the expression in the question has like terms that can be combined.</p> <p>It is not clear how Strategy 2 would help, and using Strategy 3 would be more time consuming than solving Algebraically.</p> <p><b>REMEMBER</b> with parentheses to check for any number or signs out front and distribute those numbers and signs to all terms!</p> <p><b>LIKE TERMS</b> are not in the same order! Combine carefully!</p> <p><b>NOTE</b> Be methodical and cross out any terms you have already added to avoid mistakes or double counting.</p>	<p><b>CONSIDER</b> using Strategy 2, 3, or Algebra.</p> <p><b>DECIDE</b> to solve Algebraically.</p> <p>First Step—Get rid of the parentheses by distributing (-1).  <math>2x^2y - 4x + 6xy^2 + x^2y + 3xy^2 - 7x</math></p> <p>Next Step—Combine like terms.  <math>3x^2y - y + 9xy^2 - 11x</math></p> <p><b>ANSWER C</b></p>

# BASIC ALGEBRA | **DISTRIBUTE, MATCH THE FORMAT**

## EXAMPLE 16

QUESTION	ANSWER CHOICES
$3x(x - 2) - 4(2x + 5) = ax^2 + bx + c$	In the equation to the left, $a$ , $b$ , and $c$ are constants. If the equation is true for all values of $x$ , what is the value of $a - c$ ? A) 60 B) 23 C) 31 D) 27
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> sets of parentheses, with expressions using $x$ , with a negative sign in front of one of those sets on the left. A generic expression is on the right side of the equation. Consider whether the expression on the left can match the format of the expression on right.	<b>DECIDE</b> to solve Algebraically in order to match the format of the expressions on both sides of the equation.
<b>REMEMBER</b> distribute the negative sign to all terms!	First Step—Focus on the left side of the equation and use distribution to get rid of the parentheses. $3x^2 - 6x - 8x - 20$
	Next Step—Combine like terms to match the format of $ax^2 + bx + c$ . $3x^2 - 6x - 8x - 20$ combines to $3x^2 - 14x - 20$
<b>REMEMBER</b> the problem ultimately asked for the value of $a - c$ .	If $3x^2 - 14x - 20 = ax^2 + bx + c$ and $a$ , $b$ , and $c$ are constants, then: $a = 3$ , $b = (-14)$ , $c = (-20)$ $a - c = 3 - (-20) = 23$
	<b>ANSWER B</b>

# IN TERMS OF PROBLEMS

These problems require you to **ISOLATE** a term, something either

(a) **FROM A GIVEN EQUATION**

OR

(b) **FROM AN EQUATION YOU MUST CREATE** using the information given in the question.

## SAT Algebra Tips:

- It is often best to leave whichever term the problem is asking you to isolate on its current side.
- If the term is in the denominator of a fraction, then cross-multiply to get rid of the fraction. Move everything else to the other side in a logical, Algebraic manner (use opposite operation to do so).
- Once the term has been isolated, interpret the answer choices.
- If necessary, flip the two sides of the equation, keeping the signs next to each term the same.
- The solutions to the problem will typically provide clues on which variable needs to be isolated. If each solution option starts with "X =", then it is logical to assume that one must isolate "X," regardless of the story behind the question posed in the problem. Don't get too caught up in the question or try to interpret the meaning behind the question.

Do not be bullied by the SAT!

**REMEMBER**, the problem just requires you to **ISOLATE** a given term.

## Khan Academy Practice:

Passport to Advanced Mathematics: (1) Isolating Terms

# IN TERMS OF

## EXAMPLE 17

QUESTION	ANSWER CHOICES
<p><math>P = \frac{(R - E)}{4}</math></p> <p>The preceding formula gives the average quarterly profit, P, calculated from the yearly revenue, R, and yearly expenses, E, from a certain company.</p> <p>Which of the following gives E in terms of P and R?</p>	<p>A) <math>E = 4P - R</math></p> <p>B) <math>E = R - 4P</math></p> <p>C) <math>E = 4P - 4R</math></p> <p>D) <math>E = 4R - 4P</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> equations or expressions as answer choices <b>AND</b> the phrase “in terms of” in the question stem.</p>	<p><b>ISOLATE</b> the term before the phrase “in terms of” and/or the term already isolated in the answer choices.</p>
<p>“E” is before the phrase “in terms of” and is isolated in the answer choices. So “E” must be isolated Algebraically.</p>	<p>First Step—Move 4 to the other side by multiplying each side of the equation by 4 to get:</p> $4P = R - E$
	<p>Next Step—Move R to the other side of the equation by subtracting R from each side of the equation:</p> $4P - R = -E$
	<p>Next Step—Get rid of the negative sign in front of E by multiplying each side of the equation (so each term) by -1:</p> $-4P + R = E$
	<p>Next Step—Compare the above equation to the answer choices (same as B) or rearrange (<b>keep all signs the same in front of each term</b>) the equation to:</p> $E = R - 4P$
	<p><b>ANSWER B</b></p>

# IN TERMS OF

## EXAMPLE 18

QUESTION	ANSWER CHOICES
<p>In Newtonian mechanics, the momentum <math>p</math> of an object is calculated by the product of the mass <math>m</math> and velocity <math>v</math> of that object.</p> <p>Which of the following equations gives the mass <math>m</math> in terms of <math>p</math> and <math>v</math>?</p>	<p>A) <math>m = v/p</math></p> <p>B) <math>m = v p</math></p> <p>C) <math>m = P/v</math></p> <p>D) <math>m = p - v</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> equations or expressions as answer choices <b>AND</b> the phrase “in terms of” in the question stem.</p>	<p><b>ISOLATE</b> the term before the phrase “in terms of” and/or the term already isolated in the answer choices.</p>
<p>Since <math>m</math> is before the phrase “in terms of” and is isolated in the answer choices, <math>m</math> must be isolated Algebraically.</p>	<p>First Step—Because the problem did not give an original equation, you must write the original equation from the information provided.</p> <p>The problem states that the momentum <math>p</math> is calculated by the product (which means multiplication) of the mass <math>m</math> and velocity <math>v</math>. So the original equation is:</p> $p = m v$ <p>Next Step—Isolate <math>m</math> by dividing by <math>v</math> on both sides of the equation.</p> $m = P/v$ <p>Next Step—Compare the above equation to the answer choices.</p> <p><b>ANSWER C</b></p>

# EQUATIONS, INEQUALITIES, OR EXPRESSIONS AS ANSWER CHOICES + WORD PROBLEMS

The best approach to Equations, Inequalities, or Expressions as Answer Choices + Word Problem questions is to **WORK BACKWARD FROM THE ANSWER CHOICES** by focusing on and attacking the differences among the answer choices as they relate to information provided in the word problem.

If true, **KEEP**. If false, **ELIMINATE**.

SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> Word Problems (without the phrase “in terms of” in the question stem), with Equations, Inequalities, or Expressions as Answer Choices.	<p><b>DECIDE</b> to <b>WORK BACKWARD FROM ANSWER CHOICES</b> (Strategy 2)</p> <p><b>LOOK FOR THE DIFFERENCES</b> among the answer choices (signs, numbers, order, etc.).</p> <p><b>USE THOSE DIFFERENCES</b> to locate the relevant language in the word problem.</p> <p><b>ELIMINATE ANSWER CHOICES</b> that do not correctly portray the information provided in the word problem.</p>

## Khan Academy Practice:

Heart of Algebra:

- (1) Linear Equation Word Problems
- (2) Linear Inequality Word Problems
- (3) Linear Function Word Problems
- (4) System of Linear Inequalities Word Problems
- (5) System of Linear Equations Word Problems

Passport to Advanced Mathematics:

- (1) Quadratic and Exponential Word Problems

# EQUATIONS, INEQUALITIES, OR EXPRESSIONS AS ANSWER CHOICES + WORD PROBLEMS

## EXAMPLE 19

QUESTION	ANSWER CHOICES
<p>A store buys two different jars of marbles. Jar A contains 30% red marbles and Jar B contains 15% red marbles. Together, the jars of marbles bought by the store contain 120 red marbles.</p> <p>Which of the following equations models this relationship, where <math>x</math> represents the number of marbles in Jar A and <math>y</math> represents the number of marbles in Jar B?</p>	<p>A) <math>30x + 15y = 120</math>            B) <math>15x + 30y = 120</math>            C) <math>.30x + .15y = 120</math>            D) <math>.15x + .30y = 120</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> a word problem (without the phrase “in terms of” in the question stem) <b>PLUS</b> equations as answer choices.</p>	<p><b>DECIDE</b> to <b>WORK BACKWARD FROM ANSWER CHOICES</b> (Strategy 2)</p> <p><b>ELIMINATE</b> based on those differences when they misrepresent the information from the problem.</p>
<p>There are two differences among the answer choices in this problem: (1) Which variable (<math>x</math> or <math>y</math>) should the 15 and 30 be in front of and (2) Whether the 15 and 30 should be expressed as whole numbers or decimals.</p>	<p>Addressing Difference 1—30% and <math>x</math> relate to Jar A, while 15% relates to Jar B.</p> <p>So the 30 must be next to <math>x</math> and the 15 next to <math>y</math>.</p> <p><b>ELIMINATE</b> B &amp; D.</p>
<p>Unless every number in the equation represents a percentage, percentages should be expressed as decimals when converting them to expressions or equations.</p>	<p>Addressing Difference 2—Because 120 does not represent a percentage (it represents the number of red marbles), the percentages should be expressed as decimals in the equations.</p> <p><b>ELIMINATE</b> A</p>
	<p><b>ANSWER</b> C</p>

**NOTE** On the SAT, almost always convert a percentage into decimal form.

# EQUATIONS, INEQUALITIES, OR EXPRESSIONS AS ANSWER CHOICES + WORD PROBLEMS

## EXAMPLE 20

QUESTION	ANSWER CHOICES
<p>A store sells <math>b</math> brownies for \$2.00 each and <math>c</math> cookies for \$3.00 each. On Saturday, the store sold 7 more cookies than brownies and made a total of \$56.00.</p> <p>Which system of equations can be used to determine the number of brownies and cookies sold?</p>	<p>A) <math>3b + 2c = 56</math> <math>b = c + 7</math></p> <p>B) <math>3b + 2c = 56</math> <math>c = b + 7</math></p> <p>C) <math>2b + 3c = 56</math> <math>b = c + 7</math></p> <p>D) <math>2b + 3c = 56</math> <math>c = b + 7</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> a word problem (without the phrase “in terms of” in the question stem) <b>PLUS</b> equations as answer choices.</p> <p>There are two differences among the answer choices in this problem: (1) Which variable (<math>b</math> or <math>c</math>) should the 2 and 3 be in front of and (2) Whether 7 should be added to <math>b</math> or <math>c</math>.</p> <p><b>Be careful</b>—just because the 7 is closer to cookies does not necessarily mean that it should be added to cookies.</p> <p><b>To avoid</b> being tricked by the language in the problem, create your own scenario—such as if the store sold 10 brownies, then it must have sold 17 cookies—to plug in to the answer choices.</p> <p><b>NOTE</b> by picking numbers in this small piece of solving the problem, you are utilizing Strategy 3 from your toolbox of strategies.</p>	<p><b>DECIDE</b> to <b>WORK BACKWARD FROM ANSWER CHOICES</b> (Strategy 2)</p> <p><b>ELIMINATE</b> based on those differences when they misrepresent the information from the problem.</p> <p>Addressing Difference 1— \$2.00 is the cost of <math>a</math> brownie and <math>b</math> represents brownies, while \$3.00 is the cost of a cookie and <math>c</math> represents cookies. So the 2 must be next to <math>b</math> and the 3 next to <math>c</math>.</p> <p><b>ELIMINATE</b> A &amp; B</p> <p>Addressing Difference 2—Evaluating this phrase “<i>the store sold 7 more cookies than brownies</i>” will determine whether 7 should be added to <math>b</math> or <math>c</math>.</p> <p><b>DETERMINE</b> whether more cookies or more brownies were sold.</p> <p><b>ELIMINATE</b> C</p> <p><b>ANSWER</b> D</p>

# EQUATIONS, INEQUALITIES, OR EXPRESSIONS AS ANSWER CHOICES + WORD PROBLEMS

## EXAMPLE 21

QUESTION	ANSWER CHOICES
<p>A student avoids studying for the SAT by playing two different video games and earning points for every minute she plays each game.</p> <p>She plays Video Game A for <math>x</math> minutes and earns 10 points for each minute she plays, and she plays Video Game B for <math>y</math> minutes and earn 15 points for each minute she plays. Since she must study for the SAT at some point, she limits the number of points she earns by playing the two video games to no more than 1000. She plans to spend at least double the amount of minutes on Video Game A compared to the amount of minutes on Video Game B.</p>	<p>Which of the following systems of inequalities best represents the situation?</p> <p>A) <math>10x + 15y \leq 1000</math>  <math>x \geq 2y</math></p> <p>B) <math>10x + 15y \leq 1000</math>  <math>2x \geq y</math></p> <p>C) <math>20x + 15y \leq 1000</math>  <math>x \geq 2y</math></p> <p>D) <math>20x + 15y \leq 1000</math>  <math>2x \geq y</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> a word problem (without the phrase “in terms of” in the question stem) PLUS equations, inequalities, or expressions as answer choices.</p>	<p><b>DECIDE</b> to <b>WORK BACKWARD FROM ANSWER CHOICES</b> (Strategy 2)</p>
<p>There are two differences among the answer choices: (1) Whether there should be a 10 or a 20 in front of <math>x</math> in the top equation and (2) Whether the 2 should be in front of the <math>x</math> or <math>y</math> in the bottom equation.</p>	<p><b>ELIMINATE</b> based on those differences when they misrepresent the information from the problem.</p>
<p>The minutes (<math>x</math> or <math>y</math>) are being doubled but not the points, (10 &amp; 15). So it does not make sense to double 10 to 20 because points are different units than minutes.</p>	<p>Addressing Difference 1—The student earns 10 points for every minute she plays Video Game A. Should 10 be doubled to 20 because the student is playing Video Game A for at least double the minutes she is playing Video Game B? No.</p>
<p><b>Be careful</b>—just because double is closer to Video Game A does not necessarily mean that the 2 should be placed next to Video Game A.</p>	<p><b>ELIMINATE</b> C &amp; D</p>
<p><b>To avoid</b> being tricked by the language in the problem, create your own scenario—such as if she spends 60 minutes on Video Game A (<math>x</math>), she must spend at most 30 minutes on Video Game B (<math>y</math>) (but could spend 29 or 25 minutes).</p>	<p>Addressing Difference 2—Evaluating “She plans to spend at least double the amount of minutes on Video Game A compared to the amount of minutes on Video Game B” will determine whether 2 should multiply <math>x</math> or <math>y</math>.</p>
	<p><b>DETERMINE</b> whether the student is playing Video Game A or Video Game B longer.</p>
	<p>Because the number of minutes spent playing Video Game A should be larger than the number of minutes spent playing Video Game B, the 2 should be multiplying the smaller <math>y</math> to calculate the larger <math>x</math>.</p>
	<p><b>ELIMINATE</b> B</p>
	<p><b>ANSWER</b> A</p>

# HEART OF ALGEBRA

## More Math You Must Know

- Linear Equations .....#
- Recognizing Linear Equations.....#
- Slope .....#
- y-intercept.....#
- Recognizing Linear Graphs .....#
- Signal & Response .....#
- Examples .....#
- System of Equations .....#

# LINEAR EQUATIONS

One third of SAT math problems will test **Heart of Algebra**, which focuses on linear relationships. Solving these problems will often require using **Basic Algebra from Math You Must Know**.

Lines are also tested in some of the Problem Solving and Data Analysis questions (for example, questions with scatterplots that represent lines or tables with data that represent a linear relationship). Having a thorough understanding of linear relationships and basic Algebra is essential.

These concepts represent about half your SAT math score (potentially more when considering the problems that can be solved using the three strategies).

Solving problems with linear relationships requires the ability to do the following:

- **RECOGNIZE** linear equations that appear in the question or the answer choices.
- **EXPRESS** linear equations in the slope-intercept form.
- **CALCULATE** the slope of a line by using two points.
- **IDENTIFY** the y-intercept.
- **DETERMINE** whether a line on a graph has a positive or negative slope.

# RECOGNIZING LINEAR EQUATIONS

Recognizing Linear Equations on the SAT is imperative!

**Every linear equation represents a line.**

A Linear Equation is any equation that has variable(s) with an exponent value of 1, regardless of the arrangement of the equation (with the exception of rational equations).\*

**For example:  $20x + 15y = 12$  is a linear equation**

(both  $x$  and  $y$  have an exponent value of 1).

No equation that has a variable with an exponent value **GREATER** than 1, such as  $x^2$  or  $y^2$ , is a linear equation.

Two common forms of linear equations:

Standard Form

$$Ax + By = C$$

Slope-Intercept Form

$$y = \underline{mx} + \underline{b}$$

↑
↑  
 SLOPE                      Y-INTERCEPT

A linear equation can also appear as a function:

$$f(x) = mx + b$$

**NOTE** When working on a problem with only one linear equation provided, slope-intercept form is usually best because the SAT almost always focuses on either the slope or the  $y$ -intercept (or both). Slope-intercept form is ideal for quickly determining both the slope and the  $y$ -intercept of a linear equation.

\*For information regarding rational equations, see Khan Academy or see your SAT instructor.

**Khan Academy Practice:**

Heart of Algebra:

- (1) Solving Linear Equations and Linear Inequalities
- (2) Interpreting Linear Functions
- (3) Linear Equation Word Problems
- (4) Linear Inequality Word Problems
- (5) Graphing Linear Equations
- (6) Linear Function Word Problems

# LINEAR EQUATIONS | SLOPE

In the slope-intercept form of a linear equation ( $y = mx + b$ ),  $m$  represents the slope of the line.

$$\text{Slope} = m = \text{rate of change} = \frac{\text{rise}}{\text{run}} = \frac{\Delta y}{\Delta x} = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

**Linear equations have a constant rate of change, which is the slope.**

Essentially, slope is how much  $y$  changes ( $\Delta y$ ) over (per) how much  $x$  changes ( $\Delta x$ ), and that relationship stays constant over any interval of the line.

Understanding that slope is made up of both  **$x$  and  $y$  units** can be important on linear word problems or problems that have words as answer choices.

**LEARN TO SPOT** these words or phrases—**Increase, Decrease, Additional Amount, Change, Per**—as they almost always indicate that the question is asking about the slope or that an answer choice refers to the slope.

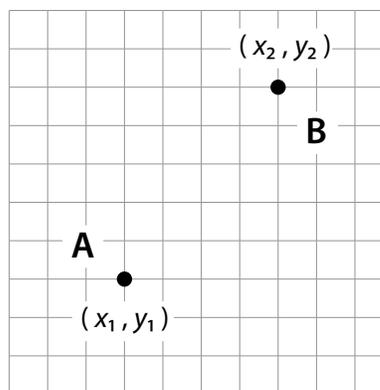
The following formula is used to calculate the slope of a line when two points from the line are given (in the problem, answer choices, table data, or a graph):

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

**Slope = constant rate of change**

For example, if  $y$  changes  $+3$  units [per  $+2$   $x$  units] in a line, then the slope of that line is  $\frac{3}{2}$ . Since changes on the  $y$ -axis move up or down while changes on the  $x$ -axis move left or right, a slope of  $\frac{3}{2}$  means the line would rise 3 units for every run of 2 units to the right.

**The slope of a line from 2 points**



Point A ( $x_1, y_1$ ) & Point B ( $x_2, y_2$ )

**NOTE** It doesn't matter which point is ( $x_1, y_1$ ) vs ( $x_2, y_2$ ) as long as the formula is followed.

# LINEAR EQUATIONS | **y-INTERCEPT**

In the slope-intercept form of a linear equation ( $y = mx + b$ ),  $b$  represents the  $y$ -intercept of the line. The  $y$ -intercept is where the line crosses the  $y$ -axis when the line is graphed.

The  $y$ -intercept always occurs when  $x = 0$

The  $y$ -intercept

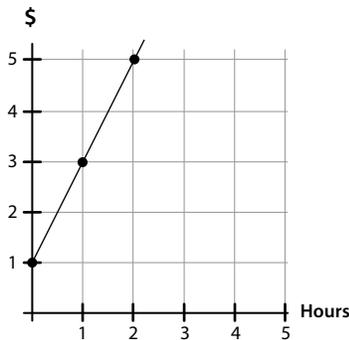
To see this, plug in 0 for  $x$  to the slope-intercept form:

$$\begin{aligned} y &= mx + b \\ y &= m(0) + b \\ y &= b \end{aligned}$$

Making  $x = 0$  zeroes out the  $mx$  portion of the equation (because any slope multiplied by 0 is 0), leaving only  $y$  equals  $b$ .

- Is always expressed in whichever units are represented by  $y$  (dollars, inches, etc.).
- Sometimes represents the initial amount or starting point, depending on the context of the problem.

The  $y$ -intercept always occurs when  $x = 0$



Chris wants to rent a scooter to ride around the bay for a day. To do so it will cost him \$1 to start the scooter and 2 additional dollars for every hour he wants to continue riding.

The equation for this scenario is the following:

$$y = 2x + 1$$

When no time has passed ( $x = 0$ ) and Chris starts the scooter, it costs him \$1 (the initial cost):

$$y = 2(0) + 1$$

$$y = 1 \rightarrow \text{The } y\text{-intercept, which is expressed in \$ (the units).}$$

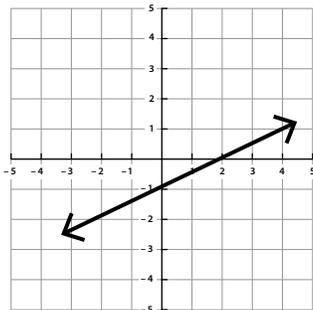
The slope of is interpreted as 2 dollars ( $y$  units) per (or over).

1 hour ( $x$  units)  $\rightarrow$  slope is  $\frac{\Delta y}{\Delta x}$

# LINEAR EQUATIONS | **RECOGNIZING LINEAR GRAPHS**

Lines with Positive, Negative, Zero, and Undefined Slope

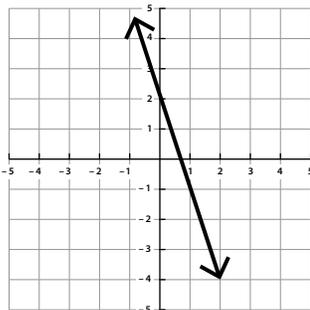
**Positive Slope**



Line goes “up hill”  
from left to right.

$$y = \frac{1}{2}x - 1$$

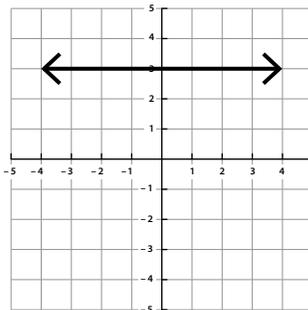
**Negative Slope**



Line goes “down hill”  
from left to right.

$$y = -2x + 2$$

**Zero Slope**



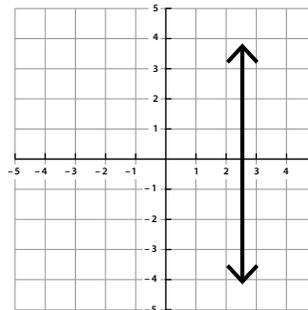
Line is horizontal.

$$m = \frac{\text{rise} = 0}{\text{run}}$$

$$y = \frac{0}{2}x + 3$$

$$y = 3$$

**Undefined Slope**



Line is vertical.

$$m = \frac{\text{rise}}{\text{run} = 0}$$

$$x = 2.5$$

## **NOTE**

- Always try to recognize linear equations in the question or the answer choices.
- When you are given a linear graph, the answer choices will often be linear equations. Focus on the slope and y-intercept of each of the equations and eliminate based on information you can determine from the graph.

**Khan Academy Practice:**

(1) Solving Systems of Linear Equations

# LINEAR EQUATIONS | **SIGNAL & RESPONSE**

PROBLEMS WITH ONE LINEAR EQUATION OR FUNCTION

OR WITH A GRAPH OF A LINEAR EQUATION OR FUNCTION

SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> linear equations in answer choices.</p>	<p><b>LOOK TO THE LANGUAGE</b> of the question and the answer choices to help determine whether the problem is asking for the slope and/or the <math>y</math>-intercept.</p>
<p><b>PROBLEM CONTAINS</b> one linear equation.</p>	<p><b>FOCUS ON</b> the slopes and <math>y</math>-intercepts of each of the equations and eliminate based on the information given.</p>
	<p><b>PLUG IN</b> if the problem provides a coordinate point <math>(x, y)</math>, plug that point into the given equation.</p>
	<p>If there is no equation provided, use the slope-intercept equation (<math>y = mx + b</math>) and <b>PLUG IN</b> whatever is given to solve for any unknown, such as the slope (<math>m</math>) or the <math>y</math>-intercept (<math>b</math>).</p>

# LINEAR EQUATIONS | ONE LINEAR EQUATION

## EXAMPLE 22

QUESTION	ANSWER CHOICES
<p><math>S = 317 + 85t</math></p> <p>The number of schools, <math>S</math>, in a particular county <math>t</math> years after January 1, 2010, is given by the equation above. Which of the following statements is the best interpretation of the number 317 in this context?</p>	<p>A) The number of schools increases by 317 every year.</p> <p>B) The number of schools will increase to a maximum of 317.</p> <p>C) There were 317 schools in the county on January 1, 2010.</p> <p>D) There were 317 schools when the county was founded.</p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> one linear equation.</p> <p>Since the equation asks about the <math>y</math>-intercept, answer choices that address slope can be eliminated.</p> <p>The remaining answer choices test the meaning of the <math>y</math>-intercept in the context of the information provided in the problem.</p> <p>The <math>y</math>-intercept occurs when <math>x = 0</math>. Which variable is equivalent to <math>x</math> in this problem?</p>	<p><b>LOOK TO THE LANGUAGE</b> of the question and the answer choices to help determine whether the problem is asking for the slope and/or the <math>y</math>-intercept.</p> <p>First Step—The question is asking about 317, which is the <math>y</math>-intercept (the number not next to a variable).</p> <p>Next Step—Evaluate the answer choices for any answers using words that indicate slope and eliminate them. A &amp; B use the word “increase,” which refers to slope.</p> <p><b>ELIMINATE</b> A &amp; B</p> <p>Next Step—Evaluate the remaining answer choices. The difference between C &amp; D tests whether there were 317 schools in the county when the county was founded OR as of January 1, 2010. The problem states that the equation represents the number of schools in the county <math>t</math> years <b>after January 1, 2010</b>, meaning that January 1, 2010, is the same as <math>t = 0</math>.</p> <p>Since the <math>y</math>-intercept <b>always</b> occurs when <math>x = 0</math> (or in this case when <math>t = 0</math>), C is the correct answer.</p> <p><b>ANSWER</b> C</p>

# LINEAR EQUATIONS | ONE LINEAR EQUATION

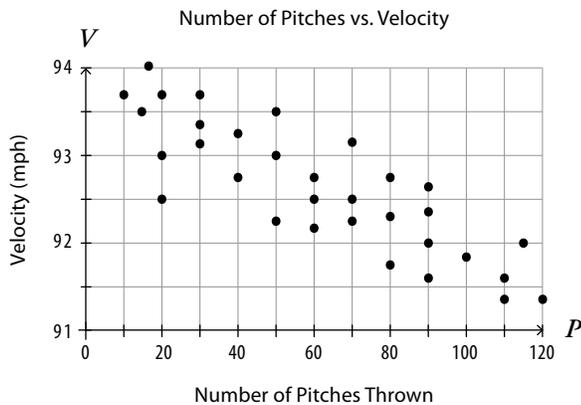
## EXAMPLE 23

QUESTION	ANSWER CHOICES
<p><math>I = 1000 - .12p</math> For a particular printer in a business office, the amount of ink, <math>I</math>, in ounces, left in that printer after printing <math>p</math> pages is given by the equation above. How many ounces of ink are used per printed page?</p>	<p>Grid-In Questions will not offer Answer Choices.</p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> one linear equation.</p>	<p><b>LOOK TO THE LANGUAGE</b> of the question and the answer choices to help determine whether the problem is asking for the slope and/or the y-intercept.</p> <p>First Step— The question uses the word <b>per</b>, which refers to <b>slope</b>.</p>
<p>Since the question asks about the slope, look to the linear equation to determine the slope.</p>	<p>Next Step—The slope is <math>-.12</math> or <math>(-.12)/1</math>. The question asks for the amount of ink used per page (meaning per 1 page).</p> <p>Next Step—A slope of <math>-.12</math> or <math>(-.12)/1</math> indicates that the printer uses <math>.12</math> ounces of ink per printed page.</p>
	<p><b>ANSWER</b> <math>.12</math></p>

# LINEAR EQUATIONS | GRAPH & EQUATIONS

## EXAMPLE 24

### QUESTION



### ANSWER CHOICES

The number of pitches and velocity for various pitches were measured and recorded in the scatterplot to the left. Given  $P$  represents the number of pitches by a pitcher and  $V$  represents velocity in miles per hour (mph), which of the following equations best models the relationship between  $V$  and  $P$ ?

- A)  $V = 93.7 - 40x$
- B)  $V = 92.8 - 40x$
- C)  $V = 93.7 - 0.25x$
- D)  $V = 92.8 - 0.25x$

### SIGNAL

**PROBLEM CONTAINS** a graph and linear equations as answer choices. Use the differences among the answer choices (signs, numbers, etc.) to locate and check the relevant information in the graph.

**ELIMINATE** answer choices whose differences do not align with the information in the graph AND/OR plug points from the graph into one or more equations.

**NOTE** With scatterplots determine the line (or shape) that best fits the information given to answer the question. The line of best fit for this question is one that goes through the majority of points.

### RESPONSE

**First Step**—Notice differences in the y-intercepts and slopes in the answer choices. In this problem, two answer choices have y-intercept values of 92.8 while two answer choices have y-intercept values of 93.7. There is a similar split for slopes—two choices with  $-0.25$  and two choices with  $-40$ .

**Next Step**—Use those differences to locate the relevant information in the graph and eliminate answer choices. **SKETCH IN THE LINE OF BEST FIT** on the graph, which clarifies that the y-intercept is greater than 93.

#### ELIMINATE B & D

**Next Step**—Estimate the slope of the graph by picking two points on or close to the line of best fit. For example, use  $(60, 92.5)$  and  $(90, 92)$  and plug those points into the following equation:

$$m = \frac{(y_2 - y_1)}{(x_2 - x_1)}$$

Calculate an approximation of the slope:

$$m = \frac{92.5 - 90}{60 - 90} = \frac{2.5}{-30} = -0.0833$$

The approximated slope is closer to  $-0.25$  than  $-40$ .

### ANSWER C

# LINEAR EQUATIONS | GRAPH & EQUATIONS

## EXAMPLE 25

QUESTION	ANSWER CHOICES
<p>Which of the following is an equation of a line that passes through the point (4, 2) and is parallel to the line whose equation is <math>3x - 2y = 10</math> ?</p>	<p>A) <math>y = -\frac{3}{2}x + 2</math>            B) <math>y = \frac{3}{2}x - 1</math>            C) <math>y = \frac{3}{2}x - 4</math>            D) <math>y = -\frac{2}{3}x - 1</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> linear equations as answer choices, a linear equation in the question with a coordinate point, and the word “parallel.”</p> <p><b>PARALLEL LINES</b> having the same slope are in this question. The answer choice that matches the slope described in the original equation is the correct one. The first step is to determine the slope in the original equation. The next step is to eliminate answer choices with slopes that differ.</p>	<p><b>LINEAR EQUATIONS THAT ARE PARALLEL INDICATE</b> the equations must have the same slope but different y-intercepts!</p> <p><b>WHEN A COORDINATE POINT IS GIVEN</b> in the problem or answer choices, it is best to consider whether it is helpful to <b>PLUG IN</b> that point.</p>
<p><b>NOTE</b> When plugging a coordinate point into a linear equation, if the solution results in a false statement, then the line does not pass through that point.</p>	<p>First Step—To determine the slope, put the original equation into <math>y = mx + b</math> format.</p> <p>Subtract <math>3x</math> from each side. <math>3x - 2y = 10</math>            Divide each term by <math>-2</math>. <math>-2y = -3x + 10</math></p>
<p><b>NOTE</b> For Line Problems with the words “Perpendicular” or “Parallel,” know the following two relationships:</p> <ul style="list-style-type: none"> <li>• Lines that are <b>PARALLEL</b> to each other have the same slope but different y-intercepts.</li> <li>• Lines that are <b>PERPENDICULAR</b> (cross at a 90-degree angle) to each other have negative reciprocal slopes (flip the fraction and flip the sign, such as <math>\frac{1}{2}</math> and <math>-\frac{2}{1}</math>).</li> </ul>	<p><math>y = \frac{3}{2}x - 5</math>, so the slope of the original line is <math>\frac{3}{2}</math>.</p> <p>Next Step—<b>ELIMINATE</b> A &amp; D, answer choices that do not have a slope of <math>\frac{3}{2}</math>.</p> <p>Next Step—Plug point (4, 2) into B &amp; C:</p> <p>B) <math>(2) = \frac{3}{2}(4) - 1</math>, false statement, <b>ELIMINATE</b>.</p>
<p><b>Bonus Question</b>—Which of the answer choices gives an equation of a line perpendicular to <math>3x - 2y = 10</math> ?</p>	<p>C) <math>(2) = \frac{3}{2}(4) - 4</math>, true statement.</p> <p><b>ANSWER C</b></p>

# LINEAR EQUATIONS | SYSTEM OF EQUATIONS

The **SIGNAL** for a System of Equations problem will be that at least two equations are provided in the question.

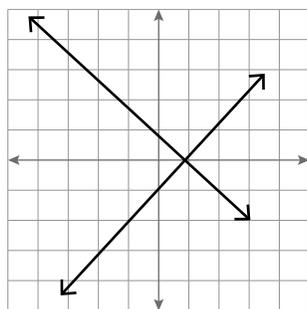
Example:  $Ax + By = C$   
 $Dx + Ey = F$

The **solution** or solutions to a System of Equations question is the **point or points of intersection** between the two equations when graphed.

When the System of Equations consists of two linear equations, there are three possible outcomes OR number of solutions:

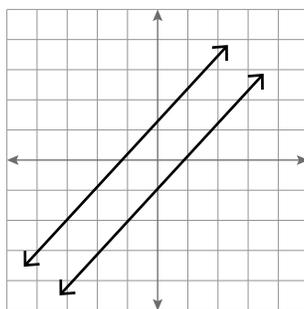
## System of Equations

### One Solution



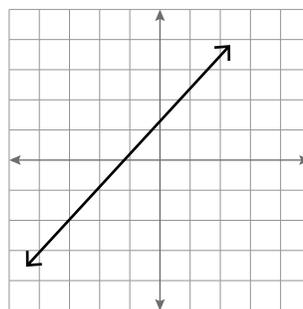
Slopes: Different  
 ~ Intersect at 1 point

### No Solutions



Slopes: Same  
 y-Intercepts: Different  
 ~ Never intersect  
 ~ Lines are parallel

### Infinite Solutions



Slopes: Same  
 y-Intercepts: Same  
 ~ Intersect everywhere  
 ~ Lines are the same

After identifying the **SIGNAL** for a System of Equations problem, your **RESPONSE** is to solve using (what you determine is) the most efficient of the following three methods:

- (1) Setting the equations equal.
- (2) Substitution (sometimes considered the same as setting the equations equal to each other) or
- (3) Elimination.

## Khan Academy Practice:

- (1) Solving Systems of Linear Equations

# LINEAR EQUATIONS | SYSTEM OF EQUATIONS

## EXAMPLE 26

QUESTION	ANSWER CHOICES
$x - 2y = 10$ $3x + 2y = 6$ For the solution $(x, y)$ to the system of equations shown, what is the value $x - y$ ?	Grid-In Questions will not offer Answer Choices.
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> multiple linear equations.	Set equations equal, use substitution, or use elimination.
When isolating a variable is easy, consider substitution.	First Step— <b>ISOLATE</b> the variable that's easiest to get by itself: The first equation has just an $x$ . The $x$ is an easy variable to get by itself by adding $2y$ to both sides of the equation: $x = 2y + 10$ Next Step— <b>SUBSTITUTE</b> $2y + 10$ in for $x$ in the second equation: $3(2y + 10) + 2y = 6$ Next Step— <b>SOLVE FOR THE REMAINING VARIABLE</b> $y$ : Distribute the 3 to get rid of the parentheses, combine like terms, and isolate $y$ : Distribute the 3. $3(2y + 10) + 2y = 6$ Combine like terms. $6y + 30 + 2y = 6$ Subtract 30 from each side. $8y + 30 = 6$ Divide by 8 on each side. $8y = -24$ $y = -3$
Once one variable is solved for, substitute that variable into one of the original equations (whichever one seems easiest) to solve for the other variable.	Next Step— <b>SUBSTITUTE</b> $y = -3$ into whichever equation seems easier to solve (it may be either), and solve for $x$ . Using the first equation: Substitute $y = -3$ $x - 2(-3) = 10$ Subtract 6 from each side $x + 6 = 10$ Solution $x = 4$
Pay careful attention to what the question asks for and make sure you have answered that question.	Next Step— <b>SOLVE</b> what is the value of $x - y$ ? $x - y = 4 - (-3) = 7$
	<b>ANSWER 7</b>

# LINEAR EQUATIONS | SYSTEM OF EQUATIONS

## EXAMPLE 27

QUESTION	ANSWER CHOICES
$6x - 3y = -5$ $3x + 2y = 8$	For the solution $(x, y)$ to the system of equations shown, what is the value $x/y$ ?  Grid-In Questions will not offer Answer Choices.
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> multiple linear equations.	Set equations equal; use substitution; or use elimination.
Solving by elimination is more efficient because it avoids working with fractions.	First Step— <b>SET UP</b> the elimination of $x$ :  Multiply the second equation by 2 to match the $6x$ in the first equation. $2(3x + 2y = 8)$ $6x + 4y = 16$ The second equation becomes:
<b>REMEMBER:</b> When subtracting any equation, multiply everything by $-1$ , thus distributing the negative sign.	Next Step— <b>SUBTRACT</b> the new second equation from the first equation to eliminate $x$ :  $\begin{array}{r} 6x - 3y = -5 \\ - (6x + 4y = 16) \\ \hline -7y = -21 \end{array}$
	Next Step— <b>SOLVE</b> for $y$ by dividing each side by $-7$ :  $\begin{array}{r} -7y = -21 \\ y = 3 \end{array}$
	Next Step— <b>SUBSTITUTE</b> $y = 3$ into whichever equation seems easier to solve, and solve for $x$ . Using the second equation:  Substitute $y = 3$ . $3x + 2(3) = 8$ Subtract 6 from each side. $3x + 6 = 8$ Divide each side by 3. $3x = 2$ $x = 2/3$
Pay careful attention to what the question asks for and make sure you have answered that question.	Next Step— <b>SOLVE</b> what is the value of $x/y$ ? $x/y = \frac{2/3}{3}$ , which can be rewritten as $2/3 \div 3/1$ ,  and rewritten again as $2/3 \times 1/3 = 2/9$  <b>ANSWER</b> $2/9$

# PASSPORT TO ADVANCED MATH

- Quadratics (Parabolas).....#
- Recognizing Quadratics | Parabolas .....#
- Graphs & Equations .....#
- Factoring .....#
- System of Equations .....#
- Function Notation .....#
- Exponential Equations .....#

# QUADRATICS (PARABOLAS)

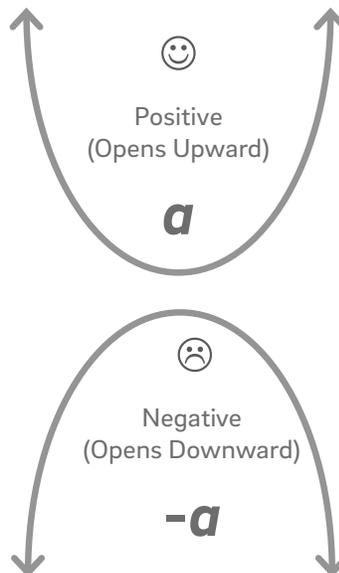
Quadratic equations are first steps to design almost every product we use, determining safety, life expectancy, and other variables. Every new car, truck, motorcycle, airplane or rocket, sound system, electronic circuit, or cell phone has had these calculations figured out first before we see them in the store or take them for a test drive.

It may not seem practical now; however, the higher paying jobs go to those who can use the quadratic equation to design safe and useful products for people.

Common to all quadratic equations:

If ***a* is positive** 😊, the parabola opens upward (like a smile).

If ***a* is negative** ☹️, the parabola opens downward (like a frown).



## Khan Academy Practice:

Passport to Advanced Mathematics:

- (1) Quadratic and Exponential Word Problems
- (2) Manipulating Quadratic and Exponential Expressions
- (3) Nonlinear Equation Graphs
- (4) Function Notation

Problem Solving and Data Analysis:

- (1) Linear and Exponential Growth
- (2) Data Collection and Conclusions
- (3) Linear and Exponential Growth
- (4) Ratios, Rates, and Proportions

## RECOGNIZING QUADRATICS | PARABOLAS

Recognizing a Quadratic Equation is also essential. When a question contains a quadratic equation or expression (parabola), know that the question is likely focused on either the solutions (also called the x-intercepts, roots, zeroes) or the vertex.

The Standard Form of a quadratic equation is:  $y = ax^2 + bx + c$

The  $c$  value is the ***y-intercept*** (similar to  $b$  in a linear equation).

Again, the ***y-intercept*** occurs when  $x = 0$ .

In the Standard Form, the ***x-coordinate*** of the ***vertex*** can be determined using the following shortcut:  $-b/2a$

To get the ***y-coordinate*** of the ***vertex***, plug the  $x$ -coordinate of the vertex into the original equation.

### EXAMPLE

If given  $y = x^2 - 4x - 12$

Calculate the  $x$ -coordinate of the vertex as:

$$\frac{-4}{2x} = \frac{-(-4)}{2(1)} = 2$$

Plug in the  $x$ -coordinate to the original equation to get the  $y$ -coordinate of the vertex:

$$(2)^2 - 4(2) - 12 = -16$$

The vertex coordinates for this equation are:

(2, -16)

The Vertex Form of a quadratic equation is:  $a(x - h)^2 + k = 0$   
where  $(h, k)$  are the coordinates of the vertex.

When determining the vertex  $(h, k)$  always take the opposite (positive/negative) value of the  $h$  term in the parentheses (but not the opposite value of the  $k$  term).

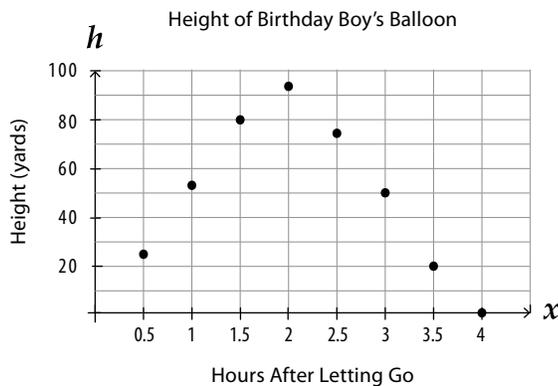
### EXAMPLE

If given  $(x - 3)^2 - 5 = 0$ , the coordinates of the vertex would be (3, -5).

# QUADRATICS | GRAPH & EQUATIONS

## EXAMPLE 28

### QUESTION



### ANSWER CHOICES

The scatterplot to the left depicts the height,  $h$ , in yards of a helium-filled party balloon  $x$  hours after it was accidentally let go by the birthday boy. Which of the following equations best describes the relationship shown?

A)  $h(x) = 22.5x^2 + 91.7x + 2.35$

B)  $h(x) = -22.5x^2 + 91.7x + 2.35$

C)  $h(x) = 2.35(22.5)^x$

D)  $h(x) = 22.5(2.35)^x$

### SIGNAL

**PROBLEM CONTAINS** a graph and equations as answer choices.

**THE DIFFERENCES** among the answer choices (signs, numbers, etc.) can be used to locate the relevant information in the graph to solve the problem.

Answer choices A & B are quadratic equations, while answer choices C & D are exponential equations

Does a positive or negative  $a$  term represent a parabola that opens downward?

**NOTE** The keys to scatterplot questions are to determine the line (or shape) of best fit and to answer the question according to the information deduced from the line (or shape) of best fit.

### RESPONSE

**DECIDE** to work backward from the answer choices.

**ELIMINATE** answer choices whose differences do not align with the graph, OR plug points from the graph into the equations to see which equation yields true statements.

First Step—Notice that the scatterplot represents a parabola and notice the differences in equation types in the answer choices.

**ELIMINATE** the two exponential answer choices C & D because the graph represents a parabola.

Next Step— Notice differences in the remaining answer choices. In this problem, the only difference between A & B is 22.5 vs. -22.5 as the  $a$  term in the standard form of a quadratic,  $ax^2 + bx + c$ .

Next Step—Use those differences to locate the relevant information in the graph and eliminate answer choices that don't match.

Since this graph is a downward parabola, the  $a$  term must be negative.

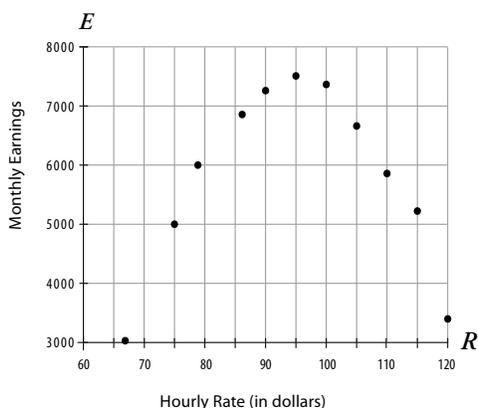
**ELIMINATE A**

**ANSWER B**

# QUADRATICS | GRAPH & EQUATIONS

## EXAMPLE 29

### QUESTION



### ANSWER CHOICES

A math tutor decided to conduct an experiment by fluctuating his hourly rate,  $R$ , each month and measuring the effect the rate change had on his monthly earnings. The scatterplot to the left shows his monthly earnings,  $E$ , for one year.

- A)  $E = 5.8(R - 96)^2 + 7500$   
 B)  $E = -5.8(R - 96)^2 + 7500$   
 C)  $E = 5.8(R + 96)^2 + 7500$   
 D)  $E = -5.8(R + 96)^2 + 7500$

### SIGNAL

**PROBLEM CONTAINS** a graph and the vertex form of quadratic equations as answer choices.

**THE DIFFERENCES** among the answer choices (signs, numbers, etc.) may be used to locate the relevant information in the graph to solve the problem.

Two answer choices have a negative a term ( $-5.8$ ) while two have a positive a term ( $5.8$ ). There is a similar split for the number inside of the parentheses ( $96$  vs.  $-96$ ).

**REMEMBER** the vertex form of a quadratic equation [ $a(x - h)^2 + k = 0$ , where  $(h, k)$  are the coordinates of the vertex]. Also, the x-coordinate of the vertex is always the opposite value of  $h$  inside the parentheses of the equation.

### RESPONSE

**DECIDE** to work backward from the answer choices.

**ELIMINATE** answer choices whose differences do not align with the graph, OR plug points from the graph into the equations to see which equation yields true statements.

First Step—**NOTICE DIFFERENCES** in answer choices.

Next Step—Since this graph is a scatterplot of a downward parabola, the  $a$ -term should be negative.

**ELIMINATE** A & C.

Next Step—**ELIMINATE** D because the vertex has a positive x-coordinate value.

In the vertex form of a quadratic equation, the  $h$ -term must be negative ( $-96$ ) to reflect the positive x-coordinate of the vertex, making B the correct answer.

**ANSWER** B

# FACTORING

When you see a question that has a variable and that same variable squared (such as  $x$  and  $x^2$ ) either in **STANDARD FORM** or that can be easily put in **STANDARD FORM**, it is a **SIGNAL** for quadratic equations. When this occurs, most of the time your **RESPONSE** is to think **FACTOR!**

Things to keep in mind when factoring:

---

## Make sure the equation is in the Standard Form.

Set one side of the equation = 0.

$$ax^2 + bx + c = 0$$

You are solving for the  $x$ -intercepts when factoring, so setting one side of the equation equal to 0 is the same as making  $y = 0$ , which must be true at any  $x$ -intercept.

The GOAL of factoring is to figure out which two numbers would multiply to the  $c$  term and add to the  $b$  term.

### **EXAMPLE**

$$x^2 + 4x - 5 = 0 \text{ factors to } (x + 5)(x - 1) = 0.$$

$$x = -5 \quad x = 1$$

The  $(x + 5)$  and the  $(x - 1)$  are called the Factors, while the Solutions (or  $x$ -intercepts) are  $-5$  and  $1$  (which have the opposite signs of the numbers inside the Factors).

---

## If there is a value **other than 1** for the $a$ term...

...check to see if you can divide everything by that term to get rid of it before attempting to factor.

### **EXAMPLE**

$3x^2 + 12x - 15 = 0$  has a value of 3 for the  $a$  term, making it intimidating to factor. However, it's possible to divide all the terms by 3, and simplify the equation to  $x^2 + 4x - 5 = 0$ , which is less intimidating to factor.

---

## The Difference of Squares...

...occurs when there is no  $b$  term and there is a minus sign between the  $a$  term and the  $c$  term.

### **EXAMPLE**

$$x^2 - 9 = 0 \text{ can be factored as } (x - 3)(x + 3) = 0.$$

Take the square root of the  $a$  term and the square root of the  $c$  term (3) and put a  $+$  sign in one factor and a  $-$  sign in the other factor.

---

## If there is **NO C** term...

...factor out an  $x$ , which will always mean that one of the  $x$ -intercepts is 0.

### **EXAMPLE**

$x^2 - 5x = 0$  can be factored as  $x(x - 5) = 0$ , meaning the two solutions (or  $x$ -intercepts) would be 0 and 5.

FOIL, which means First, Outside, Inside, then Last is the opposite of factoring. When a question shows up in factored form, use FOIL if needed to put the equation back in Standard Form.

### **EXAMPLE**

$$(x + 2)(x + 3) = x^2 + 3x + 2x + 6 = x^2 + 5x + 6$$

# QUADRATICS | FACTORING

## EXAMPLE 30

QUESTION	ANSWER CHOICES
$3x^2 - 15x + 18 = 0$ What are the solutions to the equation above?	A) $x = -2$ and $x = -3$ B) $x = 2$ and $x = 3$ C) $x = -1$ and $x = -6$ D) $x = 1$ and $x = 6$
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> a quadratic (parabola) equation—most likely asking about either the <math>x</math>-intercepts or the vertex. Question asks for solutions to the quadratic equation, meaning the <math>x</math>-intercepts..</p>	<p><b>CONSIDER</b> factoring when given a quadratic equation in this format. Factoring will provide the <math>x</math>-intercepts.</p> <p><b>ANSWER CHOICES ARE</b> solutions—so it also may be possible to <b>PLUG IN</b> the answer choices.</p> <p>The following explanation uses factoring to solve.</p>
<p>If needed, compare this equation to the Standard Form of a quadratic equation to figure out where the <math>a</math> term is..</p>	<p>First Step—Make sure the quadratic is <math>= 0</math>, which it is.</p> $3x^2 - 15x + 18 = 0$ <p>Next Step—If <math>a</math> is not 1, check to see if it's possible to divide all of the terms by that number to simplify the equation.</p> $a = 3$ <p>Since every other term is divisible by 3, divide everything by 3 to simplify:</p> $3x^2 - 15x + 18 = x^2 - 5x + 6 = 0$
<p>If plugging in the answer choices, both solutions for <math>x</math> must result in true statements.</p>	<p>Next Step—Factor and solve (could also plug in answer choices at this point).</p> $x^2 - 5x + 6 = 0$ $(x - 3)(x - 2) = 0$ $x = 3 \text{ and } x = 2$
	<p><b>ANSWER B</b></p>

# QUADRATICS | **FACTORIZING: FACTORED FORM**

## EXAMPLE 31

QUESTION	ANSWER CHOICES
<p><math>(x + \frac{2}{3})(x + t) = 0</math></p> <p>In the equation above, <math>t</math> is a constant. If <math>-\frac{2}{3}</math> and <math>\frac{5}{3}</math> are solutions to the equation, then what is the value of <math>t</math>?</p>	<p>A) <math>-\frac{5}{3}</math></p> <p>B) <math>-\frac{2}{3}</math></p> <p>C) <math>\frac{2}{3}</math></p> <p>D) <math>\frac{5}{3}</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> a quadratic (parabola) equation in factored form—most likely asking about either the <math>x</math>-intercepts or the vertex.</p>	<p><b>CONSIDER</b> interpreting the equation in the given factored form (find value of <math>x</math>-intercepts) or get rid of the parentheses by FOILing.</p> <p><b>ANSWER CHOICES</b> are solutions—making it possible to <b>PLUG IN</b>.</p> <p>The following solution uses factoring.</p> <hr/> <p>First Step—The problem asks for the value of <math>t</math>, which is part of a factor, so find the solutions and take the opposite value.</p> <p>The two solutions given are: <math>-\frac{2}{3}</math> and <math>\frac{5}{3}</math></p> <p>Because the numbers inside of the factors are always the opposite values of the solutions, the numbers inside the parentheses of the two factors should be:</p> <p style="text-align: right;"><math>\frac{2}{3}</math> and <math>-\frac{5}{3}</math></p> <p><math>\frac{2}{3}</math> is in the first set of parentheses, so <math>-\frac{5}{3}</math> is the proper value for <math>t</math>.</p> <hr/> <p><b>ANSWER A</b></p>

# QUADRATICS | FACTORING: WORKING BACKWARD

## EXAMPLE 32

QUESTION	ANSWER CHOICES
$9x^2 + 24xy + 16y^2$ Which of the following is equivalent to the expression shown?	A) $(3x + 4y)^2$ B) $(4.5x + 8y)^2$ C) $(3x^2 + 4y^2)^2$ D) $(9x^2 + 16y^2)^2$
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> the word “equivalent” and answer choices in the $( )^2$ format, meaning they can be FOILed.	<b>WORK BACKWARD</b> from the answer choices (Strategy 2) by using FOIL.  First Step—When FOILING an expression in $( )^2$ format, it is often best to rewrite it as $( )( )$ .  REWRITE each of the answer choices in this format. A) $(3x + 4y)(3x + 4y)$ B) $(4.5x + 8y)(4.5x + 8y)$ C) $(3x^2 + 4y^2)(3x^2 + 4y^2)$ D) $(9x^2 + 16y^2)(9x^2 + 16y^2)$
When FOILING, work backward from the answer choices by asking which one would multiply to provide the first term $9x^2$ and the last term $16y^2$ from the original equation.	Next Step— <b>CHECK TO SEE</b> which FIRST terms multiplied together would yield $9x^2$ and which LAST terms multiplied together would yield $16y^2$ .  Only $3x$ times $3x$ would equal $9x^2$ and only $4y$ times $4y$ would equal $16y^2$ , so A is the correct answer.
Bonus question, why is C wrong?	<b>ANSWER A</b>

# SYSTEM OF EQUATIONS

Occasionally, the SAT will create a System of Equations problem with one linear equation and one quadratic equation.

The solution process is still the same as described in *Linear System of Equations*.

Identify the **SIGNAL** as more than one equation (in this case one linear equation and one quadratic equation).

The **RESPONSE** is to determine the most efficient method between (1) **SUBSTITUTION** or (2) **SETTING THE EQUATIONS EQUAL**. Most of the time, isolate a variable in the linear equation and substitute whatever that variable is equal to into the quadratic equation. This will create a new quadratic equation. Use this to solve by combining like terms, setting equal to zero, and factoring.

**NOTE** Using (3) **ELIMINATION** is not necessary when given a linear equation and a quadratic equation.

# QUADRATICS | SYSTEM OF EQUATIONS

## EXAMPLE 33

QUESTION	ANSWER CHOICES
$y = 2x + 10$ $y - 4 = x^2 + x$ If $(x, y)$ is a solution to the system of equations shown above and $x > 0$ , what is the value $xy$ ?	Grid-In Questions will not offer Answer Choices.
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> one linear equation and one quadratic equation.	USE substitution or set equations equal.
<b>NOTE</b> When you are graphing a linear equation and a quadratic equation, the two graphs can intersect zero, one, or two times (versus two lines which can intersect zero, one or infinite times).	First Step— <b>ISOLATE</b> the variable that is easiest to get by itself (usually in the linear equation): $y$ is already isolated in the first equation.  Next Step— <b>SUBSTITUTE</b> $2x + 10$ in for $y$ in the second equation: $(2x + 10) - 4 = x^2 + x$
<b>REMEMBER</b> when you have an $x^2$ and an $x$ in an equation, you almost always want to think Factor.	Next Step— <b>COMBINE LIKE TERMS, SET ONE SIDE OF THE EQUATION EQUAL TO ZERO, FACTOR, and SOLVE</b> :  Combine like terms $2x + 10 - 4 = x^2 + x$ Set one side equal to zero $0 = x^2 - x - 6$ Factor $0 = (x - 3)(x + 2)$ $x = 3$ or $x = -2$
Because the problem specifies $x > 0$ , $x$ must = 3	
Pay careful attention to what the question asks for and make sure to answer that question.	Next Step— <b>SUBSTITUTE</b> $x = 3$ into either equation (most likely the linear equation) and solve for $y$ :  Substitute $x = 3$ into the first equation $y = 2(3) + 10$ $y = 16$  Next Step— <b>SOLVE</b> what is the value of $xy$ ? $xy = (3)(16) = 48$
	<b>ANSWER</b> 48

## FUNCTION NOTATION | $f(x) =$

When the **SIGNAL** is function notation, take whatever is inside of the parentheses (whether it's a number such as 2 or an expression such as  $a + 3$ ) and plug it in for  $x$ .

Additionally, when interpreting a function such as  $f(3) = 5$ , **REMEMBER** whatever is inside of the parentheses is the value of  $x$  and whatever is on the other side of the equal sign is the value of  $y$ .

## FUNCTION NOTATION | **BASICS OF $f(x) =$**

**When a problem asks for the maximum or minimum value**, or even a general value of a function, that problem is asking for a  **$y$ -value** (or coordinate).

**When a problem asks for an  $x$ -value**, it will state something similar to the following: "At which  $x$ -value does the maximum value of the function occur?"

To solve, locate the highest point of the function (the maximum  $y$ -value) and determine the corresponding  $x$ -value.

$$f(x) = y$$

$$f(3) = 5$$

Value of  $y$

Value of  $x$

**This means that when  $x = 3$ ,  $y = 5$**

It is equivalent to stating that the function contains or passes through the point  $(3, 5)$  or that  $(3, 5)$  is a solution to the function.

### Interpreting function from a graph:

#### 1) What is the value of $f(0)$ ?

To solve, first locate  $x = 0$  on the graph, and then find the corresponding  $y$ -value, which is 1. So  $f(0) = 1$

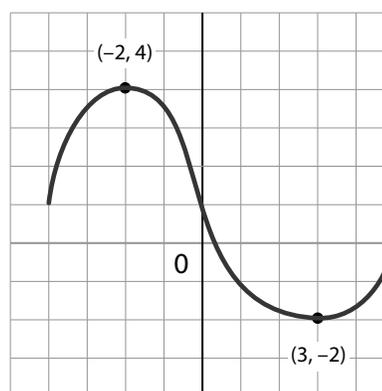
#### 2) What is the maximum value of the function?

To solve, locate the graph's highest point. On this graph, the **highest point** has the coordinates  $(-2, 4)$ . The maximum value of the function is the  $y$ -value of this coordinate, which is 4.

#### 3) At which $x$ -value does the minimum value of function $f(x)$ occur?

To solve, locate the graph's lowest point. On this graph, the **lowest point** has the coordinates  $(3, -2)$ . The question wants the  $x$ -value of this coordinate, which is 3.

### Graph $f(x) = y$



### Khan Academy Practice:

Passport to Advanced Mathematics: (1) Function Notation

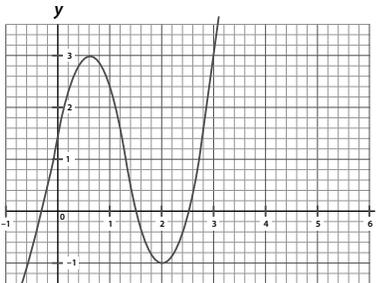
# FUNCTION NOTATION

## EXAMPLE 34

QUESTION	ANSWER CHOICES
If $f(x) = \frac{x^2 - 2x + 7}{x - 3}$ , what is the value of $f(-2)$ ?	A) -3 B) -2 C) 2 D) 3
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> function <b>NOTATION:</b> $f(x)$ and $f(-2)$ .	PLUG IN whatever is inside the function parentheses for all instances of $x$ in the given function.
Replace instances of $x$ in the given function with $(-2)$ :	First Step—PLUG IN $(-2)$ for all instances of $x$ to the original function and simplify. $f(-2) = \frac{(-2)^2 - 2(-2) + 7}{(-2) - 3} = \frac{4 + 4 + 7}{-5} = \frac{15}{-5} = -3$
	<b>ANSWER A</b>

# FUNCTION NOTATION

## EXAMPLE 35

QUESTION	ANSWER CHOICES
<p><math>g(x) = y</math></p> 	<p>The graph of <math>g(x)</math> is shown to the left.</p> <p>If <math>f(x) = (x^2 - 3)(x + 7)</math>, what is the value of <math>g(2) - f(1)</math>?</p> <p>A) -15 B) -9 C) 8 D) 15</p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> function <b>NOTATION</b>, an equation, and a graph.</p>	<p><b>DETERMINE</b> the value of <math>g(2) - f(1)</math>.</p>
<p><b>REMEMBER</b> when determining a value for a function, as with <math>g(2)</math>, look for a y value <b>FROM THE GRAPH</b>.</p>	<p>First Step—<b>DETERMINE</b> the value of <math>g(2)</math>.</p> <p><b>PLUG</b> whatever is inside of the parentheses for <math>x</math> into the equation or determine the corresponding <math>y</math> value on the graph.</p>
<p><b>LOCATE</b> the <math>y</math> value <b>ON THE GRAPH</b> where <math>x = 2</math>.</p>	<p>USE the number inside of the parentheses, 2, as the corresponding <math>x</math> value.</p> <p>The <math>y</math> value is -1, so <math>g(2) = -1</math>.</p>
	<p>Next Step—<b>DETERMINE</b> the value of <math>f(1)</math>.</p> <p><b>USE</b> the <math>f(x)</math> equation given. <b>PLUG IN</b> 1 (the number inside of the parentheses) for <math>x</math> in the equation. The solution will be the value for <math>f(1)</math>.</p> $f(1) = ((1)^2 - 3)((1) + 7)$ $f(1) = (-2)(8)$ $f(1) = -16$
	<p>Next Step—<b>SOLVE</b> for the value of <math>g(2) - f(1)</math>: <b>PLUG IN</b> the values just determined.</p> $(-1) - (-16) = -1 + 16 = 15$
	<p><b>ANSWER</b> D</p>

# EXPONENTIAL EQUATIONS

When an equation has a **VARIABLE IN THE EXPONENT POSITION**, that equation is an exponential equation, which has the following basic formats:

$$y = ab^x \text{ or } y = a(1 \pm r)^x$$

$a$  is the initial amount of what the equation or function is trying to grow or decay.

Often the exponent will be expressed as  $t$  instead of  $x$  because the exponent almost always relates to time.

When both linear equations and exponential equations are given as answer choices to the same question, the question is likely focused on **THE PRIMARY DIFFERENCE BETWEEN AN EXPONENTIAL EQUATION AND A LINEAR EQUATION.**

## Khan Academy Practice:

Passport to Advanced Mathematics:

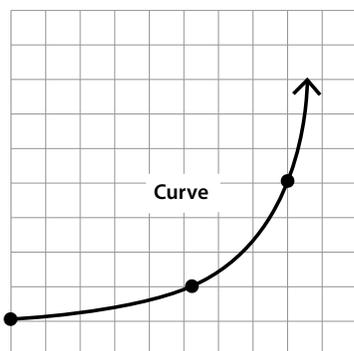
- (1) Quadratic and Exponential Word Problems
- (2) Manipulating Quadratic and Exponential Expressions
- (3) Nonlinear Equation Graphs

Problem Solving and Data Analysis

- (1) Linear and Exponential Growth

# LINEAR EQUATIONS | SYSTEM OF EQUATIONS

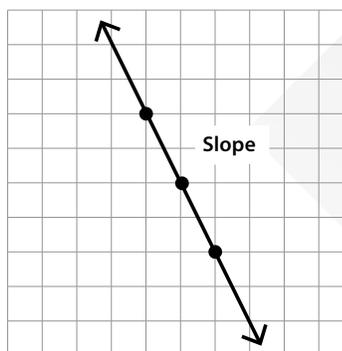
An exponential equation has a non-constant rate of change (a curve!) while a linear equation has a constant rate of change (the slope!).



Exponential Equation  $y = ab^x$

Variable in the exponent position

Non-constant rate of change



Linear Equation  $y = -2x + 2$

Variable has an exponent value of 1.

Constant rate of change

$b$  or  $(1 \pm r)$  offers two formats for the growth or decay rate. Essentially, whatever rate or percentage the problem contains, turn it into a decimal and put it in place of  $r$ .

## EXAMPLE

If given an initial amount of 380 bacteria that are decaying at an annual rate of 23%, then the proper equation would be:  $y = 380(1 - .23)^x$ , using a minus sign instead of a plus sign because the substance is decaying.

The equation simplifies to:  $y = 380(.77)^x$

## EXAMPLE

Although the phrase "doubling every year" may sound like a constant change, it would result in a sequence such as 2, 4, 8, 16, 32, 64... This kind of change is not constant but rather growing exponentially.

# EXPONENTIAL EQUATIONS

## EXAMPLE 36

QUESTION	ANSWER CHOICES
<p>The first year the chess club was established, it had 3 members. For each of the next 4 years, the number of members who joined the club triples from the number of members of the previous year. If <math>g(x)</math> is the number of members of the club <math>x</math> years since the club was established, which of the following statements best describes the <math>g</math> function?</p>	<p>A) The function <math>g</math> is an increasing linear function.            B) The function <math>g</math> is a decreasing linear function.            C) The function <math>g</math> is an increasing exponential function.            D) The function <math>g</math> is a decreasing exponential function.</p>
SIGNAL	RESPONSE
<p><b>ANSWER CHOICES</b> mention both linear and exponential functions.</p>	<p><b>DETERMINE</b> whether the function is changing at a constant rate (linear) or at a non-constant rate (exponential).</p>
	<p>When established—members (given in problem)</p> <p>End of 1st year—9 members (3 times 3), which is an increase of 6 members from the previous year.</p> <p>End of 2nd year—27 members (3 times 9), which is an increase of 6 members from the previous year.</p> <p>End of 3rd year—81 members (3 times 27), which is an increase of 54 members from the previous year.</p> <p>End of 4th year—243 members (3 times 81), which is an increase of 162 members from the previous year.</p>
<p><b>FOR REFERENCE</b></p> <p>The expression for this exponential function is <math>g(x) = 3(3)^x</math></p> <p>1st year, <math>x = 1</math> <math>3(3)^1 = 9</math>            2nd year, <math>x = 2</math> <math>3(3)^2 = 3 \times 9 = 27</math>            3rd year, <math>x = 3</math> <math>3(3)^3 = 3 \times 27 = 81</math>            4th year, <math>x = 4</math> <math>3(3)^4 = 3 \times 81 = 243</math></p>	<p>The number of members is increasing at a non-constant rate, so it must be an exponential function rather than a linear function.</p> <p><b>ELIMINATE</b> A &amp; B answer choices.</p> <p><b>ELIMINATE</b> D because the function is increasing.</p> <p><b>ANSWER C</b></p>

# PROBLEM SOLVING & DATA ANALYSIS

- Ratios & Proportions .....#
- Table Data | Basics .....#
- Table Data | Probabilities .....#
- Statistical Data | Basic Terminology .....#
- Statistical Data | Valid Conclusions .....#

# RATIOS & PROPORTIONS

Ratios can be expressed as 1:2, 1 to 2, or  $\frac{1}{2}$ . On the SAT, ratios are usually expressed as fractions as they are easy to convert to one of the other formats.

- **A proportion** is two ratios set equal.
- When two fractions are set equal, **cross multiply to solve!**

# RATIOS & PROPORTIONS

## EXAMPLE 37

QUESTION	ANSWER CHOICES
<p>A professor is conducting research on a racing video game. During the study, the professor observes the racing times on Stage One of 1000 randomly selected gamers. 550 of those 1000 gamers completed Stage One in less than one minute. The remaining gamers took longer than one minute to complete Stage One.</p>	<p>What is the ratio of gamers who took longer than one minute completing Stage One to gamers who needed less than one minute to complete Stage One ?</p> <p>A) <math>\frac{9}{11}</math>            B) <math>\frac{11}{9}</math>            C) <math>\frac{9}{20}</math>            D) <math>\frac{11}{20}</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> the word “ratio” in the question stem and fractions are given as the answer choices.</p>	<p><b>MAKE A FRACTION</b> from the ratio by determining which number goes in the numerator and the denominator of that fraction.</p>
<p>The ratio of A to B would be expressed as <math>\frac{A}{B}</math> in the numerator and B in the denominator.</p>	<p>First Step—Find and determine the two numbers (numerator and denominator) that will be part of the ratio. The numerator is the number of gamers that took longer than one minute to complete Stage One (<math>1000 - 550 = 450</math>); the denominator is the number of gamers that took less than one minute to complete Stage One (550).</p>
<p>Since the question asks for the ratio of longer than one minute gamers to less than one minute gamers, which group belongs in the numerator?</p>	<p>Next Step—make a fraction and reduce!</p> <p><math>\frac{450}{550} = \frac{45}{55} = \frac{9}{11}</math> which matches answer choice A</p>
<p>On some questions, such as those that ask for proportions, it may be necessary to make a proportion (2 ratios set equal to each other) and cross multiply to solve.</p>	<p><b>ANSWER A</b></p>

### Khan Academy Practice:

Problem Solving and Data Analysis: (1) Ratios, Rates, and Proportions

# TABLE DATA

Just as graphs provide a relationship between two variables, usually  $x$  and  $y$ , so can a table of data.

If you are given equations as answer choices and a table of data, one column or row must represent the  $x$  values and one column or row must represent the  $y$  values.

Treat these tables as a set of coordinate points. Either plug in points from the table to determine when they create a true statement for an answer choice OR, if the table represents a linear equation or function, use the points to calculate the slope.

## Khan Academy Practice:

Problem Solving and Data Analysis: (1) Linear and Exponential Growth

# LINEAR EQUATIONS | **SYSTEM OF EQUATIONS**

SIGNAL	RESPONSE / EXAMPLE
<p><b>PROBLEM CONTAINS</b> equations as answer choices and a table of data.</p>	<p><b>TREAT THESE TABLES AS A SET OF COORDINATE POINTS.</b> One column or row must represent the x values and one column or row must represent the y values.</p>
<p>For SAT example problems see:</p> <p>SAT PT5 Sec 4 23</p> <p>SAT PT8 Sec 4 25</p> <p>SAT PT8 Sec 4 38</p>	<p><b>PLUG IN</b> points from the table to determine when they create a true statement for one of the answer choices.</p> <p>OR</p> <p>If the table represents a linear equation (function), <b>USE THE POINTS TO CALCULATE</b> the slope and find the answer choice with the same slope.</p> $\frac{(y_2 - y_1)}{(x_2 - x_1)}$

# PROBLEM SOLVING & DATA ANALYSIS

## TABLE DATA: PROBABILITIES

The key to probability questions is to determine the denominator first (which is the number of possible outcomes). To do this, it is vital to determine how much of the table truly counts as possible outcomes. Look for language that indicates that the question is focused only on parts of the table. Determine whether to use the whole table or to use limited possible outcomes from the table based on the context of the question.

When seeing the word probability, make a fraction.

$$\text{probability} = \frac{\text{\# of favorable outcomes}}{\text{\# of possible outcomes}}$$

SIGNAL	RESPONSE / EXAMPLE
<p><b>PROBLEM CONTAINS</b> the word “probability” in the question stem and there is table data.</p>	<p><b>MAKE A FRACTION</b> by determining which number goes in the numerator and the denominator of that fraction.</p> <p>First step—Determine the denominator first by figuring out which parts of the table count as possible outcomes. Look for language that limits.</p> <p><b>EXAMPLE</b>—If a person is chosen at random <i>from those who recalled at least 1 dream...</i> means the denominator would be the number of people who recalled <i>at least one dream</i>.</p> <p><b>EXAMPLE</b>—If a contestant from a three-day reading contest (where contestants can receive a score from 1 to 5 on each day) is selected at random, what is the probability that the selected contestant received a score of 5 on Day 2 or Day 3, <i>given that</i> he scored at least a score of 5 on one of the three days...means the number of people who scored exactly a 5 on any of the three days would be the denominator.</p> <p><b>EXAMPLE</b>—<i>Of the people who chose chocolate cake...</i> means the denominator would be made up of only people who chose chocolate cake.</p>

### Khan Academy Practice:

Problem Solving and Data Analysis: (1) Ratios, Rates, and Proportions

# PROBLEM SOLVING & DATA ANALYSIS

## TABLE DATA: PROBABILITIES

## EXAMPLE 38

QUESTION		ANSWER CHOICES																																		
<p>The Table shows the letter grades (A through F) received by 200 students who were given a week to study for a math test. Students either studied hard (2+ hours of studying a night) or did not study hard (fewer than 2 hours of studying a night).</p> <table border="1"> <thead> <tr> <th rowspan="2">STUDIED HARD</th> <th colspan="5">GRADE</th> <th rowspan="2">TOTAL</th> </tr> <tr> <th>A</th> <th>B</th> <th>C</th> <th>D</th> <th>F</th> </tr> </thead> <tbody> <tr> <td>YES</td> <td>55</td> <td>35</td> <td>8</td> <td>2</td> <td>0</td> <td>100</td> </tr> <tr> <td>NO</td> <td>3</td> <td>20</td> <td>51</td> <td>20</td> <td>6</td> <td>100</td> </tr> <tr> <td>TOTAL</td> <td>58</td> <td>55</td> <td>59</td> <td>22</td> <td>6</td> <td>200</td> </tr> </tbody> </table>		STUDIED HARD	GRADE					TOTAL	A	B	C	D	F	YES	55	35	8	2	0	100	NO	3	20	51	20	6	100	TOTAL	58	55	59	22	6	200	<p>The following are examples of different prompts for the same question:</p> <ul style="list-style-type: none"> <li>If the student studied hard for the test, what is the probability the student received a Grade of an A or a B?</li> <li>What is the probability the student received a Grade of an A or a B given that the student studied hard for the test?</li> <li>If a student is chosen at random from those students who studied hard for the test, what is the probability that student received a Grade of an A or a B?</li> </ul> <p>A) <math>\frac{87}{200}</math>            B) <math>\frac{113}{200}</math>            C) <math>\frac{90}{200}</math>            D) <math>\frac{90}{100}</math></p>	
STUDIED HARD	GRADE					TOTAL																														
	A	B	C	D	F																															
YES	55	35	8	2	0	100																														
NO	3	20	51	20	6	100																														
TOTAL	58	55	59	22	6	200																														
SIGNAL		RESPONSE																																		
<p><b>PROBLEM CONTAINS</b> the word “probability” in the question and table data.</p>		<p><b>THE KEY TO PROBABILITY QUESTIONS</b> is to determine the denominator first (the number of possible outcomes). When determining the number of possible outcomes, look to the context of the question to determine which parts of the table to include.</p> <p><b>WATCH</b> for language that indicates that the question is not including the entire table.</p> <p>Next Step—In the questions, the table is being limited to students who Studied Hard for the test. Therefore, the denominator of the fraction will be the total number of students who Studied Hard for the test, which is 100.</p> <p>Next Step—Determine, out of those students, how many received an A or a B, which would be 90 (55 + 35).</p> <p>Thus, the correct fraction would be 90/100.</p> <p><b>ANSWER D</b></p>																																		

# STATISTICAL DATA | **BASIC TERMINOLOGY**

The following terminology provides the basis for understanding Statistical Data.

## **MEAN OR AVERAGE**

To calculate, add all the terms together and divide by the number of terms.

## **MEDIAN**

To calculate, arrange all the terms in increasing order. If you have an odd number of terms, the median is the middle term. If you have an even number of terms, the median is the average of the middle two terms.

## **MODE**

The term that is repeated the most.

## **RANGE**

To calculate, arrange all the terms in increasing order. Subtract the smallest term from the largest term.

## **STANDARD DEVIATION**

You won't have to calculate the standard deviation, which is essentially a measure of how spread out a set of terms is. The more bunched or grouped together a set of terms is, the smaller the standard deviation. The more spread out or varied a set of terms is, the larger the standard deviation.

# PROBLEM SOLVING & DATA ANALYSIS

## TABLE DATA: PROBABILITIES

1) Calculate the Mean, Median, Mode, and Range of the following two sets of terms.

2) Which set has a larger deviation?

EXAMPLE 39, 40 & 41

1) SET 1	ANSWERS
1, 2, 3, 4, 5	<p><b>MEAN</b> <math>\frac{1+2+3+4+5}{5} = \frac{15}{5} = 3</math></p> <p><b>MEDIAN</b> The terms are already arranged in increasing order, and the set contains an odd number of terms (five), so the median is the Middle term, 3.</p> <p><b>MODE</b> None, because no term is repeated more than another.</p> <p><b>RANGE</b> The terms are already arranged in increasing order, so the range is the largest minus the smallest, which in this set is 5 minus 1 = 4</p>
2) SET 2	ANSWERS
1, 16, 16, 7, 3, 5	<p><b>MEAN</b> <math>\frac{1+16+16+7+3+5}{6} = \frac{48}{6} = 8</math></p> <p><b>MEDIAN</b> The terms are not arranged in increasing order, which must be done first: 1, 3, 5, 7, 16, 16. The set contains an even number of terms (six), so the median is the average of the middle two terms, 6.</p> <p><b>MODE</b> The term repeated most is 16.</p> <p><b>RANGE</b> Once the terms are arranged in increasing order (see the median above), the range is the largest minus the smallest, which in this set is 16 minus 1 = 15.</p>
2) SET 1 & 2	ANSWERS
	<p>2) Set 2 is going to have the larger standard deviation because its terms are more spread out while Set 1's terms are bunched next to each other.</p>

# STATISTICAL DATA | **VALID CONCLUSIONS**

To be able to draw valid conclusions from statistical data, the sample or survey must have a large enough sample size and must be taken from a random sample of the population (no biased samples such as conducting a survey about animal lovers at a dog park).

Normally on the SAT there will NOT be any sample size issues if the survey involves 20+ people (maybe even fewer in some instances).

If given a random sample of a particular population (with a large enough sample size), you can use that data to draw conclusions about that particular population (but only that particular population!) as a whole. So, think larger scale. Those conclusions will always be **approximations**—NOT exact values.

SIGNAL	RESPONSE / EXAMPLE
<p><b>PROBLEM CONTAINS</b> sample or survey data. The question asks for valid conclusions.</p>	<p><b>EXAMPLE</b>—A random sample of 1000 San Diegans found that 620 preferred Candidate A, while 380 preferred Candidate B.</p>
<p>For any conclusion to be valid, it must align with the statistical data gathered.</p>	<p><b>VALID CONCLUSIONS that can be drawn from this data:</b></p> <ul style="list-style-type: none"> <li>• Of the entire San Diego population, approximately 62% will prefer Candidate A, while approximately 38% will prefer Candidate B.</li> </ul>
	<p><b>INVALID CONCLUSIONS from this data:</b></p> <ul style="list-style-type: none"> <li>• Of another 1000 randomly selected San Diegans, exactly 620 will prefer Candidate A, while exactly 380 will prefer Candidate B.</li> <li>• Of the entire San Diego population, exactly 62% will prefer Candidate A, while exactly 38% will prefer Candidate B.</li> <li>• Of the entire California population (a survey using people from San Diego only cannot be used to draw conclusions about CA as a whole), approximately 62% will prefer Candidate A, while approximately 38% will prefer Candidate B.</li> </ul>

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# STATISTICAL DATA | VALID CONCLUSIONS

## EXAMPLE 42

QUESTION	ANSWER CHOICES
<p>At School X in City A, 500 students are randomly divided into 10 classrooms of 50 students to watch a presentation on the negative effects of too much screen time.</p> <p>Before the presentation begins, a survey is conducted in which the students in Classroom 1 are asked whether they have an e-Phone, Droid phone, or no cell phone.</p> <p>The results of the survey indicate that 30 students have an e-Phone, 10 students have a Droid, and 10 students have no cell phone.</p>	<p>Which of the following are valid conclusions that can be drawn from the survey?</p> <p>I. Of all the students at School X, the number of students who have a Droid phone is the same as the number of students who have no cell phone.</p> <p>II. At School X, 100 students have a Droid phone.</p> <p>III. At School X, approximately three times as many students have e-Phones as Droid phones.</p> <p>IV. At School Y in City B, approximately 60% of students have an e-Phone.</p> <p>A. I, II, III, &amp; IV</p> <p>B. II, III, &amp; IV</p> <p>C. III &amp; IV</p> <p>D. III</p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> sample or survey data. The question asks for valid conclusions.</p>	<p>Valid Conclusions about the represented population (approximations, not exact figures) can only be drawn from randomly selected samples (no bias) with a large enough sample size.</p> <p>Evaluate the Statements:</p>
<p>There can be NO valid conclusions about exact values within the represented population—only <b>approximate</b> figures can be valid.</p>	<p>I. This statement is NOT valid because it makes claims regarding exact numbers.</p>
<p>If this conclusion had stated that approximately 100 students at School X have a Droid phone, then it would have been valid.</p>	<p>II. This statement is NOT valid because it draws exact conclusions about an exact number, 100 students.</p>
<p>The approximated figures align with the survey data.</p>	<p>III. This approximate statement is valid because it approximates about the population.</p>
<p>Valid conclusions can ONLY be made about the population from which the sample has been drawn.</p>	<p>IV. This statement is NOT valid. It draws a conclusion about a <b>different</b> population—School Y in City B— than the population the sample data is drawn from—School X in City A.</p>
<p>Statement III provides the only valid conclusion that can be drawn from the survey.</p>	<p><b>ANSWER D</b></p>

# STATISTICAL DATA | **VALID CONCLUSIONS**

## EXAMPLE 43

QUESTION	ANSWER CHOICES
<p>A principal asked a random sample of students how many pencils they brought to school today. Based on their responses, the estimated mean was found to be 6 pencils, with an associated margin of error of 1 pencil. Which of the following is the best conclusion from these data?</p>	<p>A) It is likely that all students brought between 5 and 7 pencils to school.            B) It is likely that most students brought exactly 6 pencils to school.            C) It is not possible that any student brought more than 7 pencils to school.            D) It is plausible that the mean number of pencils brought to school today by students is between 5 and 7 pencils.</p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> sample or survey data. The question asks for valid conclusions.</p>	<p><b>THE KEY</b> to margin of error problems is to remember that the true mean is only plausibly—not guaranteed—to be within the margin of error.</p> <p>A) Is incorrect because the margin of error is not the range of how many total pencils any one student brought.            B) The mean is not an interpretation of the most common number of pencils students brought.            C) The range of the margin of error does not mean that a student did not bring more pencils than the upper bound of that range.            D) Correct</p> <p><b>ANSWER D</b></p>

# ADDITIONAL TOPICS IN MATH

Geometry .....#  
Picture Problems .....#  
Circles & Radians .....#  
Triangles .....#  
Complex Numbers .....#



## GEOMETRY | PICTURE PROBLEMS

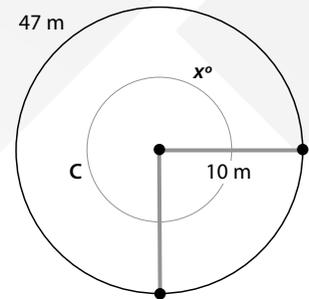
Any time a problem contains a figure or shape, that geometric shape should immediately be recognizable to you. Always check whether the picture provides a notation about scale of the drawing. If the statement “Note: Figure not drawn to scale” is NOT immediately beneath the picture, then the figure IS drawn to scale.

**Without note** about the scale under a drawing means: *it is drawn to scale*

**SIGNAL** Picture has NO note about the scale. This indicates the figure IS drawn to scale.

**RESPONSE** You may be able to estimate if useful.

When using estimation to solve, determine whether the question is asking for a length or an angle measure. If the question is asking for a length, you can make a ruler from an eraser, pencil, or your answer sheet by using one of the known lengths in the picture as the scale of the ruler. Use common sense and reasoning to estimate. If the question is asking for an angle measure, draw in a familiar angle(s), such as a 90-degree angle, to help estimate. You can use the corner of your answer sheet to help out your angle estimates.



### Khan Academy Practice:

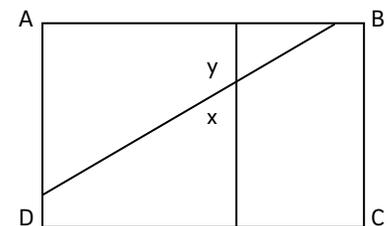
Numerous Places—Any Problem with a Picture or Graph without the language “Note: Figure not drawn to scale.”

**With note** “Figure not drawn to scale,” means: *it is not drawn to scale*.

**SIGNAL** Picture has note “Note: Figure not drawn to scale” beneath it.

**RESPONSE** When the question contains a picture that is not drawn to scale or does not contain a picture at all (but is asking about a Geometry concept), then it usually must be solved using fundamental Geometry.

If necessary, particularly with volume of a cylinder problems, consult the formulas given at the front of each of the math sections. However, some of these problems can be solved by using Strategy 3—PICK YOUR OWN NUMBERS—especially when the problem contains variables or unknowns.



Note: Figure not drawn to scale.

### Khan Academy Practice:

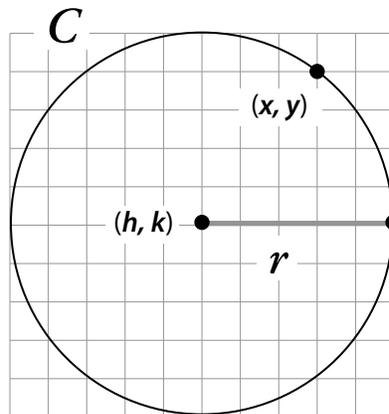
Any Additional Topics in Math Questions with the language “Note: Figure not drawn to scale.”

## GEOMETRY | PICTURE PROBLEM: CIRCLES

When the SIGNAL is a circle in a problem, in addition to applying the fact that a circle contains 360 degrees, you may need to identify the radius (if useful, consider drawing in additional radii, especially to make an isosceles triangle inside of the circle) and determine whether the problem is asking about the area or the circumference (or potentially both), meaning you need to know how to apply both the following formulas:

**Area:**  $A = \pi r^2$

**Circumference:**  $C = 2\pi r$



With circle problems that *do not* contain pictures, the question is often testing basic understanding of the standard form of the circle equation:

**Standard Form of a Circle Equation:**

$$(x - h)^2 + (y - k)^2 = r^2$$

Center of the Circle:  $(h, k)$

$r$  is the radius

$(x, y)$  is a Point ON the Circle

**EXAMPLE**

$$(x - 3)^2 + (y + 4)^2 = 25$$

The center point of this circle (take the opposite of the numbers inside the parentheses, similar to vertex form of a parabola) is  $(3, -4)$ , and the radius is 5 (from  $\sqrt{25}$ ).

In some (rare) difficult problems, the question may present the circle equation in the general form:

**General Form of a Circle Equation:**

$$Ax^2 + By^2 + Cx + Dy + E = 0$$

If so, it may be helpful to know how to complete the square to move from the **General Form** to the **Standard Form** of a circle equation.\*

\*If interested in learning how to complete the square, search Khan Academy Algebra to learn how to do so.

**Khan Academy Practice:**

Additional Topics in Math: (1) Angles, Arc Lengths, and Trig Functions; (2) Circle Theorems

## GEOMETRY | PICTURE PROBLEM: CIRCLES

Circle problems can also test or request answers in a unit of measure called radians (**SIGNAL** is the word “radians”). You must memorize and apply the following conversions:

$$\pi \text{ radians} = 180 \text{ degrees}$$

$$2\pi \text{ radians} = 360 \text{ degrees}$$

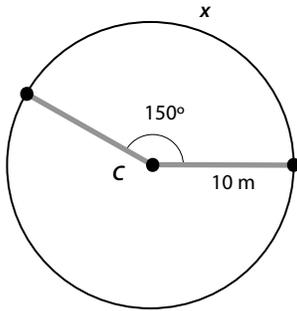
### EXAMPLE 44

QUESTION	
The number of radians in a 540-degree angle can be written as $c\pi$ , where $c$ is a constant. What is the value of $c$ ?	Grid-In Questions will not offer Answer Choices.
SIGNAL	RESPONSE
<b>PROBLEM CONTAINS</b> the word “radians” in the question.	Any place you see $\pi$ , replace it with 180 degrees and simplify.  First Step—Convert the 540-degree angle to radians by setting it equal to $c\pi$ .  Since $\pi$ radians = 180, replace $\pi$ with 180 and simplify. $540 = c\pi$ $540 = c180$ SOLVE for $c$ . Divide both sides by 180. $540/180 = c$ Reduce the fraction. $540/180 = 54/18 = 27/9 = 3/1$
	<b>ANSWER 3</b>

# GEOMETRY | PICTURE PROBLEM: CIRCLES | *Estimation*

## EXAMPLE 45

### QUESTION



In the diagram to the left, circle C has a radius of 10 meters (m). Which of the following best approximates the measure of arc length  $x$  ?

- A) 13
- B) 26
- C) 78
- D) 1500

### SIGNAL

#### PROBLEM CONTAINS

There is no note indicating the figure is not drawn to scale, so the figure IS drawn to scale—may be able to ESTIMATE if useful.

Since the problem asks for a length and there is a length provided in the picture, estimation is a good option to solve.

On multiple-choice questions, use your ruler and estimation to attack answer choices according to the scale of the picture.

### RESPONSE

Using estimation to solve, you can make a ruler from an eraser, pencil, or answer sheet by using one of the known lengths as the scale to mark lengths on the ruler. Use common sense and reasoning to estimate.

First Step—Use a given length in the problem to create a scale for your chosen ruler. ELIMINATE any answer that would be nonsensical according to the scale of the picture. The only length given is the radius of 10 meters. It would be hard to get an exact measure of the arc with just a straight line with a given length of 10, so attack the answer choices first.

Next Step— **ELIMINATE** C & D

They do not make any sense because they are way too big relative to the scale of 10m.

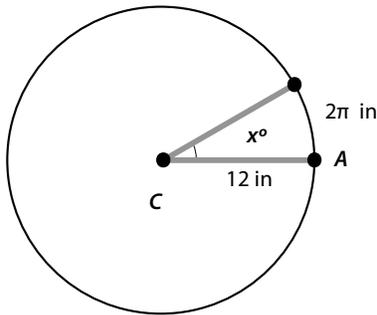
Next Step— Ask whether the arc length is about 1.5 radius lengths (answer choice A) or 2.5 radius lengths (answer choice B). Or use your ruler to estimate whether the arc is more than 2 times larger than the radius.

**ANSWER B**

# GEOMETRY | PICTURE PROBLEM: CIRCLES | *Estimation*

## EXAMPLE 46

### QUESTION



In the image to the left, a Circle with center  $C$ , a radius of 12 inches, and a central angle of  $x^\circ$  intercepts an arc of  $2\pi$  inches. What is the value of  $x$ ?

### SIGNAL

#### **PROBLEM CONTAINS PICTURE ONLY**

There is no note indicating the figure is not drawn to scale, so the figure IS drawn to scale—may be able to ESTIMATE if useful.

If helpful, align the corner of an object or piece of paper like your answer sheet with  $\overline{CA}$  to draw in the  $90^\circ$  angle.

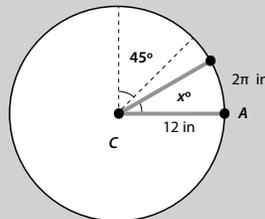
**TIP** Most angles on the SAT end in 5 or 0, such as  $30^\circ$ .

### RESPONSE

To solve with estimation, you can use the corner of an eraser or the answer sheet to draw a  $90^\circ$  angle. Use common sense and reasoning, such as splitting angles in half, to assist your estimation.

**First Step**—Determine whether the problem is asking for a length or angle measure. Here, the problem asks for the measure of angle  $x$ .

**Next Step**—Draw a  $90^\circ$  angle from  $\overline{CA}$  that encompasses  $x$ .



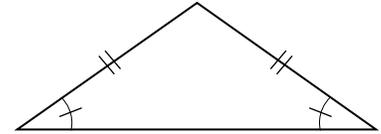
**Next Step**— Draw another line that splits the  $90^\circ$  angle in half, so two  $45^\circ$  angles are shown. Use reasoning to estimate angle  $x$  relative to  $45^\circ$ .

**Next Step**— Doing so, a reasonable estimate for angle  $x$  would be  $30^\circ$ , which is the correct answer.

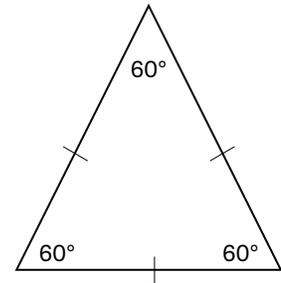
**ANSWER** 30

# GEOMETRY | PICTURE PROBLEM: TRIANGLES

An **Isosceles Triangle** has two sides with the same length that are across from two identical angles.



An **Equilateral Triangle** has three sides with the same length and three 60 degree angles.



When you see a **Right Triangle** (a triangle with a 90-degree angle) in a problem, the problem is almost always testing either the

**Pythagorean Theorem:**

$$a^2 + b^2 = c^2$$

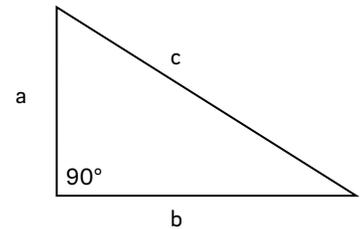
OR **Trigonometry** (sometimes even both).

Normally, the SAT contains no more than one Trig question, and often the test contains no Trig questions. This class is not going to focus on Trig, but many of the Trig questions can be answered by applying either:

SOH CAH TOA or

by using the identities:

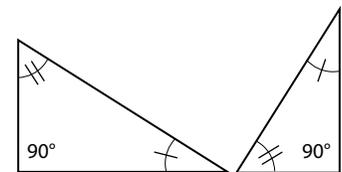
$$\sin x = \cos (90 - x) \text{ and } \cos x = \sin (90 - x).$$



These identities are especially relevant when identifying the **SIGNAL** that the problem contains or asks about both sine and cosine.

When multiple triangles are in one picture, the problem is almost always testing **similar triangles**, which are triangles that have the same three corresponding angles as each other and side lengths that are proportional.

The **RESPONSE** to the **SIGNAL** of similar triangles is to figure out how many times bigger one side of the larger triangle is compared to the corresponding side of the smaller triangle. Then apply that same relationship to the three corresponding sides of the larger and smaller triangles.

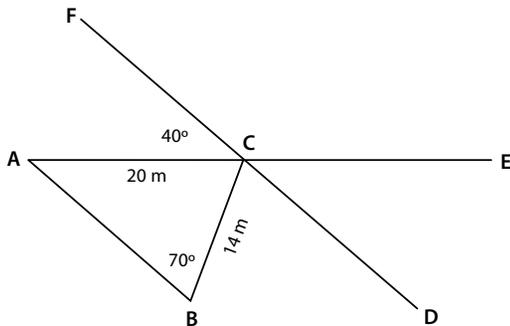


Be sure to align the corresponding sides of the triangle first (some problems require turning one triangle to line up the corresponding sides with the other triangle).

# GEOMETRY | PICTURE PROBLEM TO SCALE | TRIANGLES | *Estimation*

## EXAMPLE 47

## QUESTION



In the figure to the left,  $\overline{AB}$  and  $\overline{FD}$  are parallel. What is the length in meters (m) of  $\overline{AB}$ ?

## SIGNAL

**PROBLEM CONTAINS PICTURE ONLY**

There is no note indicating the figure is not drawn to scale, so that means the figure IS drawn to scale—may be able to ESTIMATE if useful.

Since multiple lengths are given, decide which ones to mark onto your ruler.

**NOTE** Other times it may be better to create the ruler with smaller values, making it easier to see the mismatch between lengths and to more accurately estimate the unmatched part of the line.

If needed, you could mark both 14m and 20m on your ruler, which would also provide the measurement for 6m

## RESPONSE

Using estimation to solve, make a ruler from an eraser, pencil, or answer sheet by using one of the known lengths as the scale of the ruler. Use common sense and reasoning to estimate.

First Step—Determine whether the problem is asking for a length or angle measure. Here, the problem asks for the measure of angle  $x$ .

Next Step—Use a given length in the problem to create a scale or ruler. There are a couple different lengths to choose from— $\overline{AC}$  is 20m or  $\overline{BC}$  is 14m. Since  $\overline{AC}$  seems relatively close to  $\overline{AB}$ ,  $\overline{AC}$  is likely the better choice.

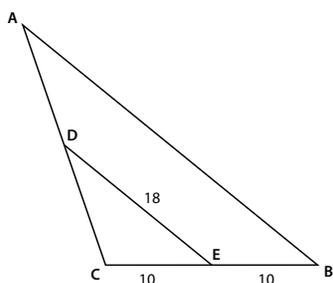
Using estimation techniques,  $\overline{AB}$  is the same length as  $\overline{AC}$ , 20m.

**ANSWER 20**

# GEOMETRY | PICTURE PROBLEM: SIMILAR TRIANGLES

## EXAMPLE 48

### QUESTION



In the figure to the left, what is the length of  $\overline{AB}$ ?

### SIGNAL

#### **PROBLEM CONTAINS PICTURE ONLY**

There is no note indicating the figure is not drawn to scale, so that means the figure IS drawn to scale—may be able to ESTIMATE if useful.

Multiple triangles often indicate Similar Triangles. The lengths of corresponding sides are provided for both triangles. Consider using similar triangles to solve.

**REMEMBER** to align the triangles properly (some problems require turning one triangle to line up the corresponding sides with the other triangle).

When the smaller triangle is inside the larger triangle, the sides are already aligned properly

### RESPONSE

To solve using Similar Triangles, ask how many times bigger one side of the larger triangle is compared to the corresponding side of the smaller triangle. If using estimation to solve, make a ruler from an eraser, pencil, or answer sheet by using one of the known lengths as the scale of the ruler.

Use common sense and reasoning to estimate.

First Step—Determine how many times bigger the larger triangle is compared to the smaller triangle by looking at corresponding sides.

Compare side  $\overline{CB}$  (20m) of the larger triangle to corresponding side  $\overline{CE}$  (10m) of the smaller triangle. Determine that the sides of the larger triangle are two times larger than the corresponding sides.

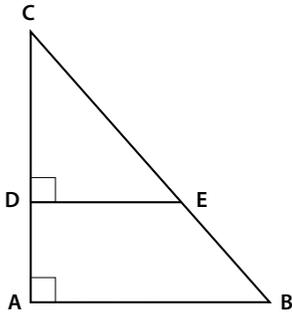
Next Step—Determine the length of side  $\overline{AB}$ . Since side  $\overline{AB}$  (of the larger triangle) is twice as big as side  $\overline{DE}$  (18m) of the smaller triangle, multiply 18m by 2 to get 36m, the length of  $\overline{AB}$ .

**ANSWER** 36

# GEOMETRY | PICTURE PROBLEM: SIMILAR TRIANGLES

## EXAMPLE 49

### QUESTION



Note: Figure not drawn to scale.

In  $\triangle ABC$  to the left,  $\overline{AB} = 5$  and  $\overline{AC} = 12$ .  
If  $\overline{CD} = 6$ , what is the length of  $\overline{CE}$ ?

### SIGNAL

#### **PROBLEM CONTAINS PICTURE ONLY**

There is a note indicating the “figure is NOT drawn to scale.”

Multiple triangles often indicate Similar Triangles. The lengths of corresponding sides are provided for both triangles. Consider using Similar Triangles to solve.

Right triangles often indicate the use of the Pythagorean theorem.

### RESPONSE

To solve a figure “NOT drawn to scale” problem, you will likely need to use fundamental Geometry.

**First Step**—To solve using Similar Triangles, ask how many times bigger one side of the larger triangle is compared to the corresponding side of the smaller triangle.

Compare side  $\overline{AC}$  (12) of the larger triangle to the corresponding side  $\overline{CD}$  (6) of the smaller triangle. The sides of the larger triangle are two times bigger than the corresponding sides of the smaller triangle.

**Next Step**—Calculate the length of side  $\overline{BC}$  by using the Pythagorean theorem:  $a^2 + b^2 = c^2$

$$\begin{aligned} 5^2 + 12^2 &= BC^2 \\ 25 + 144 &= BC^2 \\ 169 &= BC^2 \\ 13 &= BC \end{aligned}$$

**Final Step**—Determine the length of side  $\overline{CE}$  by using Similar Triangles. Because the smaller triangle is half as large as the larger triangle, side  $\overline{CE}$  must be half the length of side  $\overline{BC}$ .  $\overline{CE} = 6.5$

**ANSWER** 6.5

## COMPLEX NUMBERS | **ALGEBRA** | *Problems Involving $i$*

Problems involving  $i$  are *rare* on the SAT.

The majority of  $i$  problems are testing basic Algebra concepts such as combining like terms or FOIL.

# COMPLEX NUMBERS | ALGEBRA: PROBLEMS INVOLVING $i$

Never substitute the  $\sqrt{(-1)}$  in for  $i$ . (The answer choices will almost always still contain  $i$ ).

If you encounter an  $i^2$ , substitute in -1.

More complex  $i$  problems may require you to Rationalize the Denominator by multiplying by the conjugate (search Khan Academy general math concepts to learn more) OR to know the progression of  $i$  to higher powers (the progression repeats itself after every four powers).

$$i^1 = \sqrt{-1} = i$$

$$i^2 = \sqrt{(-1)} \times \sqrt{(-1)} = -1$$

$$i^3 = i^2 \times i = -1 \times i = -i$$

$$i^4 = i^2 \times i^2 = -1 \times -1 = 1$$

$$i^5 = i$$

$$i^6 = -1$$

and so on...

## EXAMPLE 1

$$i^{37}$$

Which of the numbers to the right is equivalent to the complex number shown above?

- A)  $i$
- B)  $-i$
- C)  $37i$
- D)  $-1$
- E)  $-37i$

## SOLUTION

$$37/4 = 9 \text{ and a remainder of } 1.$$

Raise  $i$  to the power of the remainder.

$$i^{37} = i^1 = i$$

## EXAMPLE 2

$$i^{75}$$

Which of the numbers to the right is equivalent to the complex number shown above?

- A)  $i$
- B)  $-i$
- C)  $-1$
- D)  $-77i$

## SOLUTION

$$75/4 = 18 \text{ and a remainder of } 3.$$

Raise  $i$  to the power of the remainder.

$$i^{75} = i^3 = -i$$

# COMPLEX NUMBERS | ALGEBRA: PROBLEMS INVOLVING $i$

## EXAMPLE 50

QUESTION	
<p><math>(3 - 2i)^2</math></p> <p>Which of the following is equivalent to the complex number shown above?</p> <p><b>NOTE</b> <math>i = \sqrt{-1}</math></p>	<p>A) 5</p> <p>B) <math>5 - 12i</math></p> <p>C) <math>13 - 12i</math></p> <p>D) <math>13 + 12i</math></p>
SIGNAL	RESPONSE
<p><b>PROBLEM CONTAINS</b> <math>(3 - 2i)^2</math>.</p> <p><b>NOTE</b> Equivalent Strategies 2 &amp; 3 are not relevant to <math>i</math> problems.</p>	<p>Write the term in parentheses twice, FOIL, and combine like terms.</p> <p>To begin, <math>(3 - 2i)^2</math> is rewritten as: <math>(3 - 2i)(3 - 2i)</math></p> <p>First Step—FOIL to get: <math>9 - 6i - 6i + 4i^2</math></p> <p>Next Step—Combine like terms: <math>9 - 12i + 4i^2</math></p>
<p><b>REMEMBER</b> <math>i^2 = -1</math></p>	<p>Next Step—Substitute <math>-1</math> for <math>i^2</math>: <math>9 - 12i + 4(-1)</math></p> <p>Next Step—Simplify: <math>5 - 12i</math></p> <p><b>ANSWER</b> B</p>

# READING

UC SAN DIEGO | SAT WORKBOOK

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# READING

## On the SAT

The first section of the SAT is Reading. You will be given 52 questions over 5 passages with 10 or 11 questions in each passage.

There will be 65 minutes to complete the section, which averages to 13 minutes per passage.

### **PASSAGE ORDER & SUBJECT**

- 1st Literature
- 2nd Social Science OR Historical Document
- 3rd Science
- 4th Social Science OR Historical Document (*whichever of the two the 2nd Passage wasn't*)
- 5th Science

**NOTE** One of these passages will be split into two shorter passages and act as the comparative passage.

### **52 Questions Total**

### **5 Passages**

### **10 or 11 Questions per Passage**

Strive to read, mark up, and annotate each passage in under 5 minutes. This will allow for about 8 minutes to read the questions, research the passage when needed, choose answers, and bubble in the answer choices.

# ESSENTIAL SKILLS & PRACTICE

## Goal

This course demonstrates how to maintain a consciously active and engaged mindset while reading.

After completing the classes and homework for this section, you will have learned effective Active Reading strategies.

With practice, you will learn to use these strategies to increase your comprehension, interest level, and reading speed while completing your initial read of the passage. This, in turn, will help improve your accuracy and timing as you answer the questions.

# SKILLS

## 1 | Initial Read

Obtain solid comprehension of passages with Active Reading techniques, markups, and annotations.

## 2 | Timing

Follow timing strategies, which focus on specific passage challenges and question types.

## 3 | Question Types

Know the exact phrases that **SIGNAL** each of the Seven Reading Question Types plus the right **RESPONSE** in order to solve.

## Practice

Hone your skills with effective study practices using practice SAT exams and Khan Academy.

# 1 | INITIAL READING GOALS

*Topic | Main Idea or Central Claim |  
Author's Purpose | Structure of Passage*

Read to Identify the Following

**TOPIC**—Determine what the passage is about. Usually the topic, or a hint relating to what the topic will be, can be found in the italicized portion before the passage and/or in the first paragraph.

**MAIN IDEA or CENTRAL CLAIM**—Determine the idea/claim the author is trying to argue, present, explore, discuss, or explain.

**AUTHOR'S PURPOSE**—Determine why the author took the time to write this passage (to persuade, inform, explain, etc.).

**STRUCTURE OF THE PASSAGE**—Determine how each paragraph in the passage relates to the Main Idea/Central Claim. Determine why the author included each paragraph and how each paragraph fits in to the Author's Purpose.

# 1 | INITIAL READ | **COMPREHEND BY ASKING QUESTIONS:**

*After Each Paragraph, Pause, Then Ask...*

Pause and Think

ASK THESE QUESTIONS	BENEFITS
<p><b><u>WHAT WAS THE MAIN IDEA</u></b> of that paragraph?</p> <p><b><u>WHY DID THE AUTHOR INCLUDE</u></b> that paragraph?</p> <p><b><u>HOW DOES THAT PARAGRAPH FIT</u></b> into the structure of the passage?</p>	<p><b><u>ALLOWS</u></b> the brain to process information in small pieces before taking in more information; prevents the brain from becoming overwhelmed with information.</p>
<p><b><u>WHAT WAS MOST IMPORTANT</u></b> about that paragraph?</p> <p><b><u>WHAT DO I PREDICT</u></b> the next paragraph will discuss?</p>	

# 1 | INITIAL READ | **DO MARKUP:**

Underline Circle Box

**ALWAYS** read the passage before looking at any of the questions. However, instead of passively reading the passage for the first time, effectively use the following three active markup techniques.

The benefit of doing this is it:

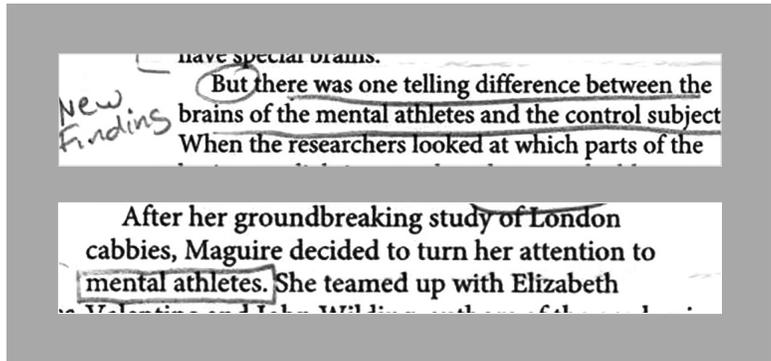
- Provides a plan to attack the passage.
- Helps engagement in the passage.
- Encourages Active Reading of the passage.
- Helps you locate key areas or topics when you go back into the passage.

**UNDERLINE**—Main Point, Topic Sentences (usually first sentence of each paragraph, but underline only what is important), and Summaries of what has been introduced or written about (usually last sentence of paragraph, but again, underline only what is important). Additionally, underline any Conclusions or important Opinions. **DO NOT** underline details or descriptions.

**CIRCLE**—Transition words (e.g., however, despite, for example, for instance, further, therefore, on the other hand, something similar, but, at first, most significantly, etc.). Transition words will help you determine the structure of the passage! Pay particular attention to contrasting words because those words signal shifts in the passage! Words that emphasize or highlight something as important (it would be common to have a question about that important thing).

**BOX** (optional)—People, groups (such as John Doe, critics, scientists, advocates, or proponents, who give an Assertion/Opinion in the passage).

**NOTE**—It helps to keep track of who is making which claim and whose Point of View is being discussed. The Author's Point of View will be asked about the most. But students will see some questions about other Points of View.



reading markup examples

# 1 | INITIAL READ | **ADD: NOTES/ANNOTATIONS**

😊 ☹️ + – CC

Take brief notes in the margin about the main point and purpose of each paragraph.

The benefit of doing this is it:

- Forces you to focus.
- Promotes comprehension.
- Aids memory.
- Organizes your thoughts.
- Provides structure and context when a question requires you to return to the passage.

**HEAVILY ABBREVIATE YOUR NOTES** so that you can understand your abbreviations within the hour that you work on the section but probably would not understand them a few days later.

Consider using symbols for common themes, such as + for pros/evidence supporting, – for cons/evidence against, 😊 for author positive attitude, **CC** for compare and contrast.

Consider using brackets or a vertical line along the margin of the text you are annotating. For example, in a paragraph that presents a question and answer, you might put the question inside brackets with a "?" and a vertical line in the margin alongside the answer with the abbreviation "Ans."

**GOOD ANNOTATIONS** will help you quickly locate topics being asked about in the questions and provide immediate clues to the correct answer.

You can use your markup and annotations TO REVIEW your understanding of what you may have missed in the passage after grading your answers. The greater the overlap between markups/annotations and SAT questions, the better!

The image shows a sample of reading markup examples on a text passage. The text is about mental athletes and their brains. The annotations include:

- HYP** (Hypothesis) written in the margin next to a vertical line, with a bracket pointing to the text: "remembering. But when the researchers reviewed the imaging data, not a single significant structural difference turned up. The brains of the mental athletes appeared to be indistinguishable from those
- MA vs. CS** (Mental Athletes vs. Control Subjects) written in the margin next to a vertical line, with a bracket pointing to the text: "memorizing, they found that they were activating entirely different circuitry. According to the functional MRIs [fMRIs], regions of the brain that were less active in the control subjects seemed to be
- New Findings** written in the margin next to a vertical line, with a bracket pointing to the text: "But there was one telling difference between the brains of the mental athletes and the control subjects: When the researchers looked at which parts of the brain were lighting up when the mental athletes were
- ???** written in the margin next to a vertical line, with a bracket pointing to the text: "enlarged with all their daily way-finding. At first glance, this wouldn't seem to make any sense. Why would mental athletes be conjuring images in their mind's eye when they were trying to learn
- Ans** (Answer) written in the margin next to a vertical line, with a bracket pointing to the text: "minds as they memorized. The mental athletes said they were consciously converting the information they were being asked to memorize into images, and distributing those images along familiar spatial

reading markup examples

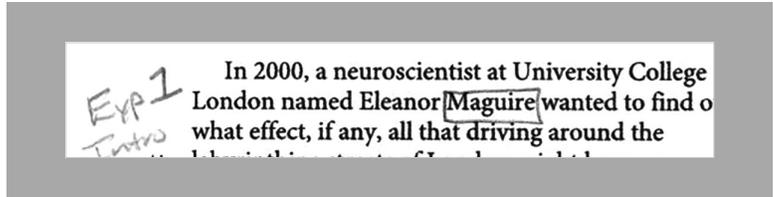
# 1 | INITIAL READ | **ADD: BRIEF NOTES** (*Practice Only*)

During Your First Practice Passages, Add Notes

Practice finding the Topic, Main Idea, Author's Purpose, and Structure of the Passage while using the markup strategies.

The benefit of doing this is:

- To get faster and more comfortable with this technique.
- To help you determine
- To help you determine what you should be marking up and annotating.



reading markup examples

**HOMEWORK NOTE** During your first few practice passages, practice writing down BRIEF notes for each of the reading goals (see previous pages) after the first read through of the passage (allow an extra couple of minutes to do this).

After grading and reviewing the passage, check those initial notes on the goals FOR ACCURACY.

You may wish to consider what parts of the text you should have paid more or less attention to when making those initial notes. Accuracy should improve with practice.

At that point, stop taking notes for each **GOAL** since you will not have time for those notes on the actual SAT. Instead, figuring out the reading goals as you go through the initial read will allow you to either recall important information or make short, abbreviated notes in the margins.

# 1 | INITIAL READ | **SAMPLE NOTATION** | *Demonstration*

This passage is adapted from Joshua Foer, *Moonwalking with Einstein: The Art and Science of Remembering Everything*.  
©2011 by Joshua Foer

EXP 1  
INTRO  
TO  
BRAINS

In 2000, a neuroscientist at University College London named Eleanor Maguire wanted to find out what effect, if any, all that driving around the labyrinthine streets of London might have on cabbies' brains. When she brought sixteen taxi drivers into her lab and examined their brains in an MRI scanner, she found one surprising and important difference. The right posterior hippocampus, a part of the brain known to be involved in spatial navigation, was 7 percent larger than normal in the cabbies—a small but very significant difference. Maguire concluded that all of that way-finding around London had physically altered the gross structure of their brains. The more years a cabbie had been on the road, the more pronounced the effect.

EXP 1  
CONCLU  
DIFF  
& NEW!

The brain is a mutable organ, capable—within limits—of reorganizing itself and readapting to new kinds of sensory input, a phenomenon known as neuroplasticity. It had long been thought that the adult brain was incapable of spawning new neurons—that while learning caused synapses to rearrange themselves and new links between brain cells to form, the brain's basic anatomical structure was more or less static. Maguire's study suggested the old inherited wisdom was simply not true.

EXP 2  
INTRO  
& Q

After her groundbreaking study of London cabbies, Maguire decided to turn her attention to mental athletes. She teamed up with Elizabeth Valentine and John Wilding, authors of the academic monograph *Superior Memory*, to study ten individuals who had finished near the top of the World Memory Championship. They wanted to find out if the memorizers' brains were—like the London cabbies'—structurally different from the rest of ours, or if they were somehow just making better use of memory abilities that we all possess.

HYP

The researchers put both the mental athletes and a group of matched control subjects into MRI scanners and asked them to memorize three-digit numbers, black-and-white photographs of people's faces, and magnified images of snowflakes, while their brains were being scanned. Maguire and her team thought it was possible that they might discover anatomical differences in

HYP

# 1 | INITIAL READ | **SAMPLE NOTATION** | *Demonstration*

HYP

the brains of the memory champs, evidence that their brains had somehow reorganized themselves in the process of doing all that intensive remembering.

HYP  
WRONG

But when the researchers reviewed the imaging data, not a single significant structural difference turned up. The brains of the mental athletes appeared to be indistinguishable from those of the control subjects. What's more, on every single test of general cognitive ability, the mental athletes' scores came back well within the normal range. The memory champs weren't smarter, and they didn't have special brains.

NEW  
FINDINGS

But there was one telling difference between the brains of the mental athletes and the control subjects: When the researchers looked at which parts of the brain were lighting up when the mental athletes were memorizing, they found that they were activating entirely different circuitry. According to the functional

MA  
✓  
CS

MRI's [fMRIs], regions of the brain that were less active in the control subjects seemed to be working in overdrive for the mental athletes.

MA  
USE  
DIFF  
AREAS

Surprisingly, when the mental athletes were learning new information, they were engaging several regions of the brain known to be involved in two specific tasks: visual memory and spacial navigation, including the same right posterior hippocampal region that the London cabbies had enlarged with all their daily way-finding. At first glance, this wouldn't seem to make any sense. Why would mental athletes be conjuring images in their mind's eye when they were trying to learn three-digit numbers? Why should they be navigating like London cabbies when they're supposed to be remembering the shapes of snowflakes?

???

???

ANS.

Maguire and her team asked the mental athletes to describe exactly what was going through their minds as they memorized. The mental athletes said they were consciously converting the information they were being asked to memorize into images, and distributing those images along familiar spatial journeys. They weren't doing this automatically, or because it was an inborn talent they'd nurtured since childhood. Rather, the unexpected patterns of neural activity that Maguire's fMRIs turned up were the result of training and practice.

# 1 | INITIAL READ | **CHALLENGE:** *"I don't know what I just read."*

Many have had that feeling of "I don't know what I just read" when reading a passage on a test, reading material for school, or reading for pleasure.

Almost everyone experiences this feeling at some point, particularly on standardized tests because the passages are often on a topic that is boring, unfamiliar, or difficult to comprehend because of the vocabulary and sentence structure.

To combat this, here are some common practices that can help you overcome these challenges.

## Develop Interest / Ask Questions

BE INTERESTED	ASK QUESTIONS
<p><b>TRY TO FORCE GENUINE INTEREST</b> in whatever you are reading. If you can actually get interested in what you are reading, it will improve not only comprehension but also timing.</p>	<p><b>ASK QUESTIONS AS YOU READ</b> such as:</p> <ul style="list-style-type: none"> <li>• What is the topic?</li> <li>• What does the author seem to think is important about this?</li> <li>• What is the point of this paragraph in the passage overall?</li> <li>• Is this an argument or just informative?</li> <li>• Does the author seem positive, negative, or neutral about this idea?</li> </ul>

## 2 | TIMING | STRATEGIES: READING THE PASSAGE

### **READ THE ENTIRE PASSAGE FIRST**

Strive to complete your initial read in under 5 minutes. Move on to the questions only after completing the entire passage.

### **DO NOT REREAD SENTENCES ON THE INITIAL READ**

At this stage, you are reading for the overall structure of the passage. Do not get caught up in the details!

You will be going back into the passage to research the answers to questions, allowing you to then delve in further (if necessary). Also, answering questions helps improve your understanding of the passage.

### **THERE IS ONE EXCEPTION TO THE RULE OF NOT REREADING ON THE INITIAL READ:**

When you know that a specific sentence is important (**TOPIC SENTENCE**, **AUTHOR'S OPINION**, or **MAIN IDEA**), then you may reread it once but only once!

Focusing on structure and purposes and noticing transitions throughout the passage often helps you to make sense of difficult sentences or parts of the passage you did not initially understand.

Be brave—you do NOT need to understand everything on the initial read to do well on the questions!

### **HISTORICAL DOCUMENTS**

The rule about NOT rereading during the initial read is DOUBLY important when you are reading passages that are historical documents. The writing style in many of those documents is difficult, wordy, and meandering.

No one reasonably expects you to be able to thoroughly understand everything discussed in one of those documents within the time limits set by the SAT.

Instead, let the more confusing details/sentences slip by while constantly trying to figure out the bigger-picture goals of the passage: Topic, Main Point, Author's Purpose, and Structure.

### **COMPARATIVE PASSAGE: PLAN TO ATTACK ONE PASSAGE AT A TIME**

Read the first passage and then, before reading the second passage, answer the questions that are only about the first passage (these questions will be provided in order of the passages).

Next, read the second passage, and then move on to answer the remaining questions, which will ask about the second passage and then both passages. Picture goals of the passage: Topic, Main Point, Purpose, and Structure.

## 2 | TIMING | FINISHING IN TIME

Finishing the Reading section comfortably within the time limit is aided by particular strategies to consider and apply.

**IF YOU ARE STRUGGLING** to get through 4–5 passages, try to determine why.

**COMMON ERRORS ARE: TAKING TOO LONG ON THE INITIAL READ, GETTING CAUGHT UP IN DETAILS**

If this is the case, REMEMBER not to allow yourself to reread things. Focus on the reading goals, not every detail.

**TAKING TOO LONG ON CERTAIN QUESTIONS**

Get comfortable guessing on more difficult questions sooner (within 30 seconds).

**IF YOU HAVEN'T MADE PROGRESS ON A QUESTION AFTER A MINUTE, SKIP IT** (always guess) and keep moving!

The questions are all worth the same, so it is imperative to get to as many as possible (with time to answer correctly), as future questions are likely to be easier than whatever question you are stuck on.

You must know when to guess and move on from questions. DO THIS DURING PRACTICE, NOT just during the official test!

**YOU DO NOT NEED TO DO THE PASSAGES (OR THE QUESTIONS) IN ORDER.**

If you are somewhere between not comfortably finishing the section and barely getting through four passages, you need to **DETERMINE WHICH PASSAGE SUBJECT GENERALLY GIVES YOU THE MOST TROUBLE.**

*The number one answer we hear on this is the Historical Documents Passage because of the archaic language and writing style; the second most frequent is one of the Science Passages because science is generally confusing for everyone. However, sometimes students report that it's the Literature Passage, because it's not the type of Literature they are used to reading. Or maybe it's not the subject matter of the passage, but the Comparative Passage.*

Regardless of the subject matter, find out which one gives YOU the most trouble. To figure this out, complete multiple practice passages.

**ONCE YOU HAVE DETERMINED WHICH PASSAGE IS LIKELY TO BE MOST DIFFICULT, ATTACK THAT PASSAGE LAST.**

## 2 | TIMING | STRATEGIES: THE LAST 5 TO 7 MINUTES

### **HIERARCHY OF QUESTIONS TO ATTACK IF YOU ARE RUNNING OUT OF TIME OR NOT ABLE TO FINISH A PASSAGE:**

#### **VOCABULARY**

Often you can answer these questions by focusing on only the sentence that contains the Vocabulary Word. (See *Vocabulary Questions...*)

#### **GRAPH**

Often you can answer these questions or make a reasonable guess without having to read the passage and by examining just the graph given to you. (See *Graph Questions...*)

#### **EVIDENCE-BASED**

Two questions for the price of one in most cases! Note that these questions will take time, and reading the entire passage (not just the referenced lines) truly helps you to get these questions correct. However, some strategies can help improve the odds, even when you have not read the entire passage. (See *Evidence Questions...*)

**YOU CAN LEAVE THE COMPARATIVE PASSAGE FOR LAST WHEN YOU HAVE AT LEAST 7 MINUTES** when getting to the last passage. You may be able to read one of the passages (SELECT the one with the most individual questions about it) and attack the questions that deal with that passage only. Then you can attempt any Vocabulary or Evidence-based questions about Passage 2 or both passages.

**YOU CAN LEAVE ONE OF THE PASSAGES THAT CONTAIN GRAPHS FOR LAST WHEN YOU HAVE LESS THAN 5 MINUTES** because many Graph questions can be answered without reading the passage by only looking at the graphs. Move on to Vocabulary questions if time permits.

**YOU CAN LEAVE THE HARDEST PASSAGE FOR LAST** if you have reliably determined which passage will be the most difficult and where you will likely get the most questions wrong. Work through the Vocabulary, then Graph, then Evidence-based questions with your remaining time. It is better not to waste time on a passage you perform poorly on. Instead, use that time to do better with easier passages, and plan to do the last passage with less time.

## 3 QUESTION TYPES

# KNOW THE SIGNAL AND RESPONSE BY QUESTION TYPE

Improving your approach to the *Initial Read* of the passage as well as your ability to determine the **PURPOSE**, **MAIN POINT**, and **STRUCTURE OF THE PASSAGE** will also improve your accuracy (answering questions correctly) and timing.

However, mastering the approach to the Initial Read will not guarantee that you will get all the questions correct. Work must also be put into how you respond to the questions.

As mentioned in the introduction, on every section of the SAT, when encountering any question, the goal is to look for the **SIGNAL** and know the appropriate **RESPONSE**.

In Reading, the only way to know the best **RESPONSE** to a question is to know the **SIGNAL**. The only way to know the **SIGNAL** is to know what kind of Question Type you are given.

## 3 | SEVEN QUESTION TYPES

- Global/Overall Structure
- Vocabulary
- “Why” Questions (Purpose)
- Specific Detail
- Inference
- Best Evidence/Tag Team
- Graph

# 3 QUESTION TYPE | GLOBAL/OVERALL STRUCTURE

## THE ENTIRE PASSAGE

PASSAGE	SAMPLE QUESTIONS
A passage	<p>“Over the course of the passage, the primary focus shifts from...”</p> <p>“The main purpose of the passage is to...”</p> <p>“The passage is written from the point of view of...”</p> <p>“Which choice best describes a major theme of the passage...”</p>
SIGNAL	RESPONSE
<p><b>QUESTIONS</b> indicate the question will focus on the entire passage.</p>	<p><b>IDEALLY</b>, you have identified the Topic, Main Idea or Central Claim, Author’s Purpose, and the overall structure of the passage during the initial read. With those in mind, predict an answer choice if possible and eliminate answers that are false.</p> <p>If stuck between two choices, pick the choice that touches or focuses on more of the passage as a whole.</p>

# 3 QUESTION TYPE | VOCABULARY

Usually 10 total Vocabulary Questions (2 per Passage)

WHAT WORD OR PHRASE...

PASSAGE	SAMPLE QUESTIONS
<p>A passage</p>	<p>"Over the course of the passage, the primary focus shifts from..."</p> <p>"The main purpose of the passage is to..."</p> <p>"The passage is written from the point of view of..."</p> <p>"Which choice best describes a major theme of the passage..."</p>
SIGNAL	RESPONSE
<p><b>QUESTIONS</b> ask what a word or phrase shown "in quotes" most nearly means.</p>	<p><b>GET THE CONTEXT OF THE SENTENCE</b> on a smaller scale! Determine who/what the word relates to, describes, or refers to (if it's an adjective, who/what the word describes; if it's a verb, who/what is performing the action; if it's a noun, who/what is describing or referring to it).</p>
<p><b>BE CONFIDENT</b> in what you know and aware of what you don't know. Examine the words in the answer choices and place them into one of three categories:</p> <ol style="list-style-type: none"> <li>1) Confidently know the meaning and how to use it properly</li> <li>2) Somewhat know the meaning and how to use it properly, or</li> <li>3) Don't know the meaning of the word.</li> </ol>	<p><b>FIGURE OUT</b> who or what the word is describing OR who or what is performing the action.</p> <p>This will help eliminate answer choices that would not be used to describe a person (if the word relates to a person) or an object or idea (if the word relates to an object or idea).</p>
<p><b>READ</b> the entire sentence. Engage in the meaning and context of the sentence. Some answer choices may "sound" obviously wrong based on that meaning or context. If that is so, eliminate them.</p>	<p><b>FOCUS ON</b> familiar words first.</p> <p>If the familiar word does not fit precisely or if "it kind of fits," eliminate it as an answer!</p> <p>Continue that process with all the words from category 1. If none of those words work, choose an answer from category 2 or 3.</p>
<p><b>NOTE</b> If none of the words you are familiar with work in the context of the sentence, then select a word you don't know. Do not eliminate words because you do not know their meaning.</p>	<p><b>FINAL CHECK</b></p> <p>Read the chosen answer into the entire sentence.</p>

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# 3 QUESTION TYPE | “WHY” QUESTIONS (PURPOSE)

WHY THE AUTHOR USES...

PASSAGE	SAMPLE QUESTIONS
<p>A passage</p>	<p>“The references to...primarily serve to...”</p> <p>“The author uses the phrase...to...”</p> <p>“The main purpose of the fifth paragraph is...”</p>
SIGNAL	RESPONSE
<p><b>QUESTIONS</b> ask about why the author includes or uses something or about the purpose or function (not the same as a question asking about the main idea of a specific paragraph) of a specific paragraph or phrase.</p>	<p><b>SOMETIMES</b> the question is focused on a small part of the passage, but often this type of question requires a shift—think big picture—to think about the overall purpose of the passage or how that part of the passage fits into the overall structure of the passage.</p> <p><b>KEEP IN MIND THAT</b> this type of question requires asking how that paragraph or phrase helps the author achieve his or her overall purpose of that paragraph or of the passage.</p>

## 3 QUESTION TYPE | **SPECIFIC DETAIL**

THE WORD STATES OR INDICATES...

PASSAGE	SAMPLE QUESTIONS
A passage	<p>"According to the passage..."</p> <p>"The passage states..."</p> <p>"The author states..."</p>
SIGNAL	RESPONSE
<p><b>QUESTIONS</b> use the phrase "according to the passage" or the words "states" or "indicates."</p>	<p><b>LOCATE</b> and review the line or lines in the passage that refer to that specific detail. The correct answer will usually be a restatement of the information provided in that line(s).</p>

# 3 QUESTION TYPE | INFERENCE

THE WORDS SUCH AS...

PASSAGE	SAMPLE QUESTIONS
A passage	<p>"The passage implies..."</p> <p>"It can be inferred from the passage..."</p> <p>"The author most strongly implies..."</p> <p>"It is reasonable to conclude..."</p>
SIGNAL	RESPONSE
<p><b>QUESTIONS</b> use words such as "infer," "inference," "conclude," or "implies."</p>	<p><b>LOCATE</b> the lines in the passage (often Best Evidence questions—see Best Evidence question type—next page) that directly support that inference—the inference will not be directly stated in the passage, but strong evidence will be given for it. Often it will be necessary to tie parts of the passage together (synthesis).</p>
<p><b>NOTE</b> What "infer" means on the SAT: The word "infer" on the SAT Reading Comp section may have a different meaning than the one you are used to.</p>	<p>On the SAT, to be able to "infer" something requires direct evidence that strongly supports the inference.</p> <p>For example, I tell you that my friend is attending Stanford University. You may "infer" that he likely scored in the 99th percentile on the SAT. However, to "infer" something on the SAT requires an additional statement to support the inference—"Almost every student who attends Stanford University scores in the 99th percentile on the SAT."</p> <p>That additional statement provides direct support for the inference or conclusion that my friend probably scored in the 99th percentile on the SAT.</p>

# 3 QUESTION TYPE | **BEST EVIDENCE AND BEST EVIDENCE/TAG-TEAM QUESTION TYPE**

Overall there are usually:

9 Pairs of Evidence Questions (about 2 Pairs per Passage) and 1 Stand-Alone Evidence Question.

The SAT will take a **SINGLE QUESTION** and ask for “evidence” or “which choice supports a claim” by referring to the passage.

The SAT will also take a **PAIR OF QUESTIONS** and use one that asks for “evidence” or “which choice supports a claim” by referring to the previous question. We are calling this a Best Evidence/Tag-Team question type.

For both of them, the majority of the time the correct answer will relate to one of the larger themes or topics of the passage (especially when the question itself relates to one of the larger topics or claims).

**NOTE** It’s important to keep the central claim and purpose of the passage in mind for almost all questions!

SAMPLE OF...	SIGNAL	RESPONSE
<p>...a <b>BEST EVIDENCE</b> Stand-Alone question prompt:</p>	<p><b><u>“WHICH CHOICE BEST SUPPORTS THE CLAIM THAT...”</u></b></p>	<p><b><u>READ EACH LINE OF EVIDENCE</u></b> to decide which one correctly answers the question.</p>
<p>...a <b>BEST EVIDENCE/Tag-Team</b> question prompt paired with another question type:</p>	<p><b><u>“WHICH CHOICE PROVIDES THE BEST EVIDENCE FOR THE ANSWER TO THE PREVIOUS QUESTION?”</u></b></p>	<p><b><u>READ PROMPT</u></b> on question before the <b><u>BEST EVIDENCE</u></b> question first. Then move to the <b><u>BEST EVIDENCE</u></b> answer choices, reading each line to determine which ones could be used as evidence to answer the previous question's prompt.</p>

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### 3 QUESTION TYPE

## BEST EVIDENCE/TAG-TEAM QUESTION TYPE | Markup!

### Best Evidence Tag-Team Markup: Example

For Tag-Team question pairs, an arrow drawn between the **(BEST EVIDENCE)** and the **(INFERENCE, SPECIFIC DETAIL, ETC.)** is a very helpful step. See example below.

Jack's primary impression of the "biota varies substantially" (line 24) is that land-surfaces

- A) are noisy and distracting.
- B) are mostly covered with water.
- C) have many animals.
- D) vary widely according to their location.

Which choice provides the best evidence for the answer to the previous question?

- A) Lines 36-46 ("some ice-free areas . . . while others")
- B) Lines 52-55 ("The Antarctic . . . exposed.")
- C) Lines 57-59 ("The later . . . together with...")
- D) Line 63 ("These islands . . . are more remote.")

# 3 QUESTION TYPE | **GRAPH**

2 passages will contain graphs or tables at the end of the passage. The last 2 or 3 questions will then be about those graphs or tables.

ACCORDING TO THE GRAPH...

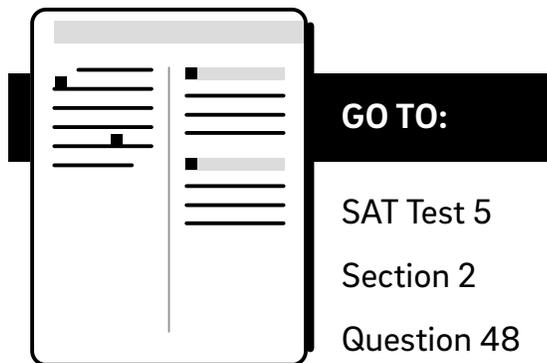
PASSAGE	SAMPLE QUESTIONS
<p>A passage</p>	<p>"According to the graph..."</p> <p>"According to the table..."</p> <p>"Which claim from the passage is most directly supported by the data given in the table?"</p> <p>"Which statement best summarizes the information presented in the graph?"</p>
SIGNAL	RESPONSE
<p><b>QUESTIONS</b> ask about a graph or table.</p>	<p><b>DETERMINE</b> what topic and relationship are represented on the graph or table.</p> <p><b>LOCATE</b> the relevant part of the graph(s) or table(s) the question or answer choices are referring to.</p> <p>Does the graph or table actually represent or address what the answer choice claims or focuses on?</p> <p>On some questions, some answer choices will be blatantly false based on the information in the graph or table.</p> <p><b>ELIMINATE</b> false answer choices.</p>

## TEST EXAMPLES | **QUESTIONS/SOLUTIONS**

Some example questions in this section are taken directly from the Official SAT practice exams.

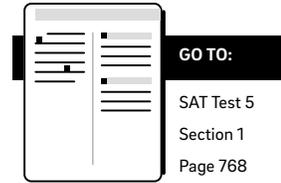
To indicate this kind of sample question, an icon similar to the following will appear at the top of the page:

The icon will tell you where to go to read the example question while still studying the Signal|Response in this book.



# TEST EXAMPLE

## SAMPLE PASSAGE & QUESTION



SAT 5 | sec 1 | page 768

SIGNAL	RESPONSE
<p><b>ON INITIAL READ MAKE</b> brief notes of Topic, Main Point, Purpose, and Structure of the passage</p>	<p><b>TOPIC</b>—memory and the brain</p> <p><b>MAIN POINT</b>—differences in memory ability NOT because of structural differences in the brain, but because of differences in areas/level used in brain when learning</p> <p><b>PURPOSE</b>—To discuss new brain research that challenges what we thought we knew AND is still puzzling us (Show we are still learning about our brains).</p> <p><b>STRUCTURE</b> (by paragraph)</p> <p>P1: Intro to Maguire’s Experiment 1</p> <p>P2: Why Experiment 1 is important</p> <p>P3: Intro to Experiment 2 &amp; Questions Experiment 2 will try to answer</p> <p>P4: Exp 2 Hypothesis; Hypothesis wrong (findings)</p> <p>P5: Unexpected finding from Experiment 2</p> <p>P6: Unexpected finding from P5 discussed &amp; puzzling nature emphasized!</p> <p>P7: Answer to puzzle presented in P6</p>

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# TEST EXAMPLE | "WHY" QUESTION

SAT 5 | sec 1 | q. 48



GO TO:

SAT Test 5

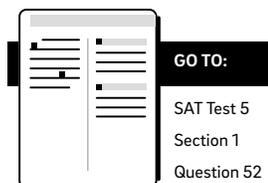
Section 1

Question 48

SIGNAL	RESPONSE
<p><b>QUESTION</b> asks for the main purpose of a specific paragraph, so you know it's a <b>WHY</b> question.</p>	<p><b>PURPOSE QUESTION</b>—A <b>WHY</b> question is a purpose question, so think about how the Paragraph fits into the overall structure or puzzle of the passage, and how it helps the author accomplish his or her overall purpose.</p>
<p><b>LOOKING AT THE BREAKDOWN</b> of the Structure of the Passage on p. 242, see the note next to Paragraph 5 (P5) that states, "Unexpected finding from Experiment 2," so we're most likely looking for an answer choice that states something similar.</p>	<p><b>Evaluate the Answer Choices</b></p> <p>A) Paragraph 5 does not match the type of answer needed and it never refers to the study about taxi drivers. <b>ELIMINATE</b></p> <p>B) Paragraph 6 speculates on the unexpected results—not this paragraph. This paragraph just states that there are some unexpected results. <b>ELIMINATE</b></p> <p>C) "Identify an important finding..." seems similar to the note in the outline of the Structure of the Passage. <b>CORRECT</b></p> <p>D) Paragraph 5 is not focused on her methods. <b>ELIMINATE</b></p>
	<p><b>ANSWER C</b></p>

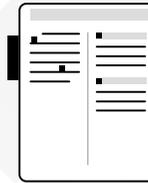
# TEST EXAMPLE | "WHY" QUESTION

SAT 5 | sec 1 | q. 52



SIGNAL	RESPONSE
<p><b>QUESTION</b> asks for the main purpose of a specific paragraph, so you know it's a <b>WHY</b> question.</p>	<p><b>PURPOSE QUESTION</b>—A <b>WHY</b> question is a purpose question, so think about how the referenced paragraph fits into the overall structure or puzzle of the passage, and how it helps the author accomplish his or her overall purpose. (Passage lines 74–78 are in Paragraph 6.)</p>
<p><b>LOOKING AT THE BREAKDOWN</b> of the Structure of the Passage (see p. 242), notice that the note next to Paragraph 6 (P6) states, "Unexpected finding from P5 discussed &amp; puzzling nature emphasized."</p> <p>Passage Lines 74-78 are at the end of the paragraph, where the author is emphasizing the puzzling nature of the findings from the experiment, so the answer choice will state something similar.</p>	<p><b>Evaluate the Answer Choices</b></p> <p>A) These questions are not addressing the reliability of her findings, but just the puzzling nature of them. <b>ELIMINATE</b></p> <p>B) "Emphasize and elaborate on an initially puzzling result..." seems similar to the note in our outline of the Structure of the Passage. <b>CORRECT</b></p> <p>C) These questions are not hinting that these results undermine any earlier studies. <b>ELIMINATE</b></p> <p>D) These questions do not introduce or explain any connection between her two studies and her earlier work. <b>ELIMINATE</b></p> <p><b>ANSWER B</b></p>

# TEST EXAMPLE | VOCABULARY QUESTION

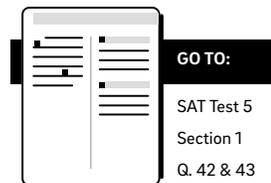


**GO TO:**  
SAT Test 5  
Section 1  
Question 44

SAT 5 | sec 1 | q. 44

SIGNAL	RESPONSE
<p><b>QUESTION PROMPT</b> asks for what a word most nearly means, so you know it's a <b>VOCABULARY</b> question</p>	<p><b>FIGURE OUT</b> the context of the sentence and who/what the word relates to. In the sentence, "basic" is being used as an adjective to describe the brain's anatomical structure</p>
<p><b>EVALUATE WORDS</b> that you know how to use confidently first, and if one doesn't fit precisely, then pick a less familiar one.</p>	<p><b>Evaluate the Answer Choices</b></p> <p>A) "initial"—Would the brain's initial structure be discussed? Maybe in the right context—<b>KEEP FOR NOW</b></p> <p>B) "simple"—Would the brain's structure be described as simple? No—<b>ELIMINATE</b></p> <p>C) "necessary"—Would the brain's necessary structure be discussed? No—<b>ELIMINATE</b></p> <p>D) "fundamental"—Does the brain have a fundamental structure? Maybe in the right context—<b>KEEP FOR NOW</b></p>
<p>That leaves "initial" or "fundamental."</p>	<p><b>GO TO</b> the full context of the sentence (and potentially paragraph). Think what the difference in context would have to be to use one word over the other. If referring to the brain's "initial" structure, the sentence would most likely have to be about a child. However, this sentence is about the adult brain, so "initial" doesn't make any sense, whereas "fundamental" does.</p>
<p>Final check—Read the chosen word into the entire sentence. If nothing seems to grate on your ear or sound awkward, be confident in your choice.</p>	<p>Based on the preceding evidence and reasoning, answer choice D) "fundamental" is the best choice.</p>
	<p><b>ANSWER D</b></p>

# TEST EXAMPLE | SPECIFIC DETAIL → BEST EVIDENCE QUESTION



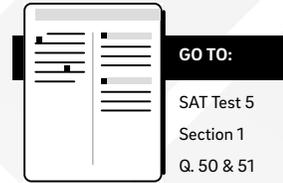
SAT 5 | sec 1 | q. 42 and 43

SIGNAL	RESPONSE
<p><b>QUESTION PROMPT</b> states “According to the passage,” so you know it’s a <b>SPECIFIC DETAIL</b> question, and the following question is a <b>BEST EVIDENCE</b> question (<i>draw an arrow next to question 42 to remind you, if you haven’t already</i>).</p>	<p><b>READ PROMPT</b> for a <b>SPECIFIC DETAIL</b> question.</p>
<p>With a <b>SPECIFIC DETAIL</b> question, the right answer will be a rephrasing of something stated directly in the passage.</p>	<p><b>SKIP TO THE EVIDENCE QUESTION</b> and ask, “What would any of the lines in the text most likely have to refer to or include to even be used as possible evidence to answer this question?” Most likely, the lines would have to mention Maguire’s study of taxi drivers and why those results were significant.</p> <p>Evaluate whether these referenced lines in the <b>EVIDENCE QUESTION ANSWER CHOICES</b> are related to what we’re looking for and whether those lines could be evidence to directly support an answer to the preceding Specific Detail question.</p>
<p>Now confident that only one choice is the possible evidence, D for 43 (<i>because it is a restatement of something from those lines</i>), Choice C is the only choice that restates something from those lines for 42.</p>	<p>A) Passage Lines 8-12 seem to just be Maguire’s findings in the study, but they do not address why her results are significant. <b>ELIMINATE</b></p> <p>B) Passage Lines 12-16 are Maguire’s conclusions from her study on taxi drivers but do not address why her results are significant. <b>ELIMINATE</b></p> <p>C) Passage Lines 17-20 are just facts about the brain. These lines do not reference Maguire’s study or why her results are significant. <b>ELIMINATE</b></p> <p>D) Passage Lines 20-26 state what had long been thought about the brain, and then go on to state that Maguire’s study suggests that this old inherited wisdom was not true. This choice is the only viable piece of evidence. <b>CORRECT</b></p> <p><b>ANSWER C</b> for question 42 and <b>ANSWER D</b> for question 43</p>

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# TEST EXAMPLE

## INFERENCE → BEST EVIDENCE QUESTION

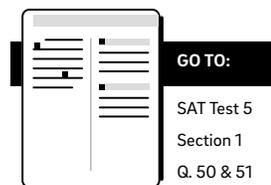


SAT 5 | sec 1 | q. 50 and 51

SIGNAL	RESPONSE
<p><b>QUESTION PROMPT</b> for 50 "most strongly suggests," so it's an <b>INFERENCE</b> question, and the following question, 51, is a <b>BEST EVIDENCE</b> question (<i>draw an arrow next to question 50 to remind you, if you haven't already</i>).</p>	<p><b>DECIDE WHICH EVIDENCE METHOD</b> you want to employ (<i>if confident use a hybrid approach; any hesitation, use Method 2</i>).</p> <p>On this question, and on many Evidence questions, using Method 2 narrows the Evidence down to 1 or 2 answer choices. This explanation will illustrate Method 2.</p>
<p>Because it is an Inference question, we need to find direct evidence from the passage to support that inference, which is why inference questions frequently have a <b>BEST EVIDENCE</b> question following them.</p> <p><b>REMEMBER</b> an inference will not be directly stated in the passage, but it will be something concluded from information or evidence in the passage.</p>	<p><b>SKIP TO 51, THE EVIDENCE QUESTION</b>, and ask, "What would any of these lines most likely have to refer to or include to even be used as possible evidence to answer this question?" Most likely, the lines would have to mention mental athletes and memorization.</p> <p><b>NEXT, GO TO THE ANSWER CHOICES FOR 51</b> to read the lines and evaluate whether these referenced lines are related to mental athletes and memorization and whether those lines could be evidence (something used to directly support an answer to this question) to answer Question 50.</p>
	<p>A) Passage Lines 66-72 mention mental athletes and how they were engaging their brains when they were learning. Seems relevant, so <b>KEEP IT</b></p> <p>B) Passage Lines 72-73 state, "...this wouldn't seem to make any sense." Determine what "this" refers to by looking at the previous sentence. "This" refers to the mental athletes engaging the same region of the brain as the cabbies. It doesn't provide evidence for a question about why mental athletes were successful at memorization. <b>ELIMINATE</b></p>
	<p><b>CONTINUED NEXT PAGE</b></p>

# TEST EXAMPLE

## INFERENCE → BEST EVIDENCE QUESTION



SAT 5 | sec 1 | q. 50 and 51

SIGNAL	RESPONSE
<p>Question 51, continued:</p> <p>C) Passage Lines 79-81 state that Maguire asked the mental athletes to describe what was going on in their brains as they memorized. This can't be used as evidence to support why mental athletes were successful at memorization. <b>ELIMINATE</b></p> <p>D) Passage Lines 85-87 state, "They weren't doing this automatically..."</p>	<p>This can't be used as evidence to support why mental athletes were successful at memorization. <b>ELIMINATE</b></p> <p>Look at the previous sentence to determine who "They" and what "this" are referring to. Here "They" refers to the mental athletes and "this" refers to the process in which the mental athletes converted information into images when memorizing something.</p> <p>These lines mention mental athletes and memorization, so they seem relevant, so <b>KEEP IT</b></p> <p>Try to tie the evidence lines left (answer choices A &amp; D from question 51) to a specific answer choice in question 50.</p> <p>The evidence lines do not seem to include anything about or related to numerical lists or puzzles, so: <b>ELIMINATE ANSWER CHOICES C &amp; D ON QUESTION 50</b></p>
<p>How to understand the inference in question 50:</p> <p>Passage Lines 66-72 do not explicitly mention that mental athletes were using part of the brain not normally used in routine memorization. But Passage Lines 66-72 do state that mental athletes were using parts of the brain known to be used in two specific tasks—visual memory and spatial navigation. <b>BECAUSE</b> neither of those two specific tasks is routine memorization, <b>IT CAN BE INFERRED</b> that the mental athletes were engaging parts of the brain not normally used in routine memorization, even though the passage does not directly state that.</p>	<p>Answer choice B from question 50 seems to be related to the evidence from answer choice D from question 51 because there is mention of converting information the mental athletes are trying to memorize.</p> <p>However, <b>THE PASSAGE STATES</b> that the mental athletes were converting the information into images and distributing those images along familiar spatial lines—not into abstract symbols as answer choice B states. This inference is not supported by the passage, so you want to <b>ELIMINATE</b>.</p> <p>A)—exploiting parts of the brain not normally used in routine memorization. Lines 66-72 support this inference.</p> <p><b>ANSWER A</b> for question 50 and <b>ANSWER A</b> for question 51</p>

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# TEST EXAMPLE | SPECIFIC DETAIL →BEST EVIDENCE QUESTION



GO TO:

SAT Test 5  
Section 1  
Q. 45 & 46

SAT 5 | sec 1 | q. 45 and 46

SIGNAL	RESPONSE
<p><b>QUESTION PROMPT</b> 45 wants to know which question a study was intended to answer, which is something that should be stated in the passage, so it's a <b>SPECIFIC DETAIL</b> question, and the following question is a <b>BEST EVIDENCE</b> question (<i>if you haven't already, draw an arrow next to question 46 to remind yourself of that fact</i>).</p>	<p><b>READ PROMPT</b> for a <b>SPECIFIC DETAIL</b> question (45).</p>
<p>Because it is a SPECIFIC DETAIL question, the right answer will just be a rephrasing of something stated directly in the passage.</p> <p>NOTE Going to the line references first forces rereading and rethinking about the relevant parts of the passage for the SPECIFIC DETAIL question. This can make answering the original question easier.</p>	<p><b>SKIP TO THE EVIDENCE QUESTION</b> (46) to read the lines and evaluate whether these referenced lines are related to what is needed and whether those lines could be evidence (something used to directly support an answer to this question) for an answer to this question:</p> <p>A) Lines 27-29 mention that Maguire decided to turn her attention to a new group but do not mention what she hopes to discover. ELIMINATE</p> <p>B) Lines 33-37 directly state what "they"—Maguire and her team—wanted to find out by conducting the experiment. KEEP IT</p> <p>C) Lines 38-43 describe how the experiment was conducted. ELIMINATE</p> <p>D) Lines 52-54 state some of the results of the experiment. ELIMINATE</p>
<p>The evidence lines indicate the experiment was designed to find out either whether the memorizers' brains were structurally different than most people's or whether the memorizers were using their brains differently.</p>	<p>Returning to the SPECIFIC DETAIL question (45), try to tie the evidence lines left (only answer choice B from question 46) to a specific answer choice in question 45.</p> <p>The only answer choice (45) that addresses something similar is C.</p> <p>A) is about using different brain structures.</p> <p>B) is about inheriting brain structures.</p> <p>D) is about the relationship between cognitive ability and brain structure.</p>
	<p><b>ANSWER</b> C for question 45 and <b>ANSWER</b> D for question 46</p>

# TEST EXAMPLE | VOCABULARY QUESTION



GO TO:

SAT Test 5  
Section 1  
Question 47

SAT 5 | sec 1 | q. 47

SIGNAL	RESPONSE
<p><b>QUESTION PROMPT</b> asks for what a word most nearly means, so you know it's a <b>VOCABULARY</b> question.</p>	<p><b>FIGURE OUT</b> the context of the sentence and who/what the word relates to: how the word is being used in the sentence and try to get a sense of the context of the sentence.</p>
<p>In the sentence, "matched" is being used as an adjective to describe a group of control subjects.</p> <p><b>NOTE</b> Evaluate words that you know how to use confidently first, and if one doesn't fit precisely, then pick a less familiar one.</p>	<p><b>EVALUATE THE ANSWER CHOICES</b> with the consideration that "matched" is being used as an adjective to describe a group of control subjects.</p>
<p>Because this sentence is about human control subjects being tested on their memorization ability, there won't be a problem distinguishing who is who, but it is important the control group is able to be compared to the experiment group.</p>	<p>A) comparable—Do you refer to control subjects as comparable? Yes, we use control subjects to compare to the experiment group—<b>KEEP FOR NOW</b>.</p> <p>B) identical—Are human control subjects going to be identical? Probably not—<b>ELIMINATE</b></p> <p>C) distinguishable—You do want to be able to distinguish your control subjects—<b>KEEP FOR NOW</b>.</p> <p>D) competing—Are the control subjects competing in this context? No—<b>ELIMINATE</b></p>
<p>Final check—Read the chosen word into the entire sentence. If nothing seems to grate on your ear or sound awkward, be confident in your choice.</p>	<p><b>ANSWER A</b></p>

# TEST EXAMPLE

## SPECIFIC DETAIL QUESTION



GO TO:

SAT Test 5  
Section 1  
Question 49

SAT 5 | sec 1 | q. 49

SIGNAL	RESPONSE
<p><b>QUESTION PROMPT</b> states “According to the passage,” so you know it’s a <b>SPECIFIC DETAIL</b> question.</p>	<p>Because it is a <b>SPECIFIC DETAIL</b> question, the right answer will just be a rephrasing of something stated directly in the passage.</p>
<p>There is no best evidence question following it.</p>	<p><b>LOCATE THE EVIDENCE YOURSELF.</b> Use knowledge of the structure of the passage to determine which part of the passage the answer is most likely to be in.</p>
<p>This question asks you to determine something about the control subjects when compared to the mental athletes, which likely means looking for the results of the second study.</p>	<p>Looking back at the structure of the passage, the end of Paragraph 4 and the beginning of Paragraph 5 discuss the findings of the second study.</p>
<p>The beginning of P5 mentions there was one telling difference between the two groups—that the mental athletes were activating different brain circuitry than the control subjects.</p>	<p>That sentence ties directly to answer choice C—that the two groups exhibited different brain activity—which is the correct answer.</p>
	<p><b>ANSWER C</b></p>

## WRONG ANSWER CHOICES | CHARACTERISTICS

Just because an answer choice contains one of these characteristics DOES NOT guarantee the answer choice is wrong. However, the majority of the time, these types of answer choices are incorrect.

### OUT OF SCOPE

**ANSWER CHOICE** is not mentioned or talked about in the passage or it expounds on a topic much further than the passage did. These are ALWAYS WRONG.

### EXTREME OR ASSUMES TOO MUCH

**ANSWER CHOICES** that contain words like *always* and *never* are obvious examples, but words such as *vitriolic*, *fascination*, *hostility*, etc. also indicate extreme language.

### CONTROVERSIAL POSITION

The SAT is NOT going to take a controversial position on a topic (e.g., treating the environment poorly is okay, oppressed groups of people deserve to be oppressed, etc.).

**NOTE** in the historical documents passage, often one side will take a position counter to present-day beliefs, such as men are superior to women in some manner. However, the position will not be entirely negative or oppressive—there will still be a positive spin on the passage somehow.

### POISONED APPLE

Most of the answer choice looks and sounds right, but one small part is contradictory or not true, which “poisons” the answer choice. You MUST read and understand the complete answer choice! The ENTIRE answer must be correct!

### TOO BROAD/TOO NARROW

#### **Main Point or Global Type Questions—**

True but does not answer the question

#### **Evidence Questions—**

Not actually evidence or evidence that doesn't support the answer

#### **All Questions—**

- Could pertain to another part of the passage (trying to distract you with familiarity and recognition).
- Could be true in the real world but not stated in the passage.
- True about the passage but not the correct answer to the question.

# PRACTICE TO IMPROVE | **RECOMMENDATIONS**

## **PRACTICE LABELING:**

As you practice reading, make sure to label:

- The **MAIN IDEAS**
- The **MAIN POINT** or **CENTRAL CLAIM**
- The **SUPPORTING EVIDENCE**  
(usually at least one piece of evidence per paragraph)
- **KEY WORDS**
- Any **OBJECTIONS** or **COUNTER-ARGUMENTS**
- Note each **POINT OF VIEW** (POV), whose POV it is, and what the author's opinion is (if he or she has one) on any POV that is not his or her own.
- (During practice only)  
**POINT OF VIEW** Brief notes on the Topic, Main Idea, Author's Purpose, and Structure of the passage

## **LOOK UP WORDS YOU DO NOT KNOW!**

Many students struggle to improve on the Reading section. To see improvement requires not only practicing but also thoroughly reviewing your work. A good review often takes as long as, if not longer than, the initial practice passage. Also, unless you are working on a full timed SAT practice test or are only working on your timing strategy, it is best to practice with one passage at a time and review at the end of each passage. This will allow you to recall what you were thinking during your initial read and the questions.

Do not simply review by looking at the correct answers for questions that you missed. Instead, plan on reviewing all questions from the passage unless you were 100% certain—before grading—that your answer was correct. Circle or note all questions where you are uncertain about the answer while you work to make them easier to identify and remember.

For these questions try to figure out:

- Where in the passage was the correct answer located?
- Did you misunderstand the passage? How and why?
- Should the markups and notes have focused on other issues? (Review 1) Initial Read section for ideas on what issues you should be focusing on. Ideally, you will see a good amount of overlap between your markups/annotations and the questions/correct answers.
- Did you fall for one of the wrong answer choice characteristics?
- Why were the wrong answers wrong?
- Did you successfully identify the Topic, Main Idea, Author's Purpose? If not re-do the question using the proper Response. What specific steps might you take during your initial read or response to the question to avoid making similar mistakes in the future?

# PRACTICE TO IMPROVE | **RESOURCES**

## SAT PASSAGE RESOURCES

### **KHAN ACADEMY**

(1) Reading: Science; (2) Reading: Literature;  
(3) Reading: History; (4) Reading: Social Studies

## RESOURCES OUTSIDE OF SAT PASSAGES

Practice the active reading techniques on everything you read for school or pleasure!

The Suggested Reading below will expose you to the types of writing and passages (at least in terms of level of difficulty) that may be encountered on the SAT, and the type of reading and material you WILL see in college.

YES, you will get better at the SAT by practicing actively and critically reading, while identifying the Topic, Main Point, Purpose, and Structure from articles on sites such as the following:

### **ARTS & LETTERS DAILY**

<http://www.alldaily.com/>

### **NY TIMES OP-ED PAGE**

<http://www.nytimes.com/pages/opinion/index.html>

### **THE ECONOMIST**

<http://www.economist.com/>

### **WALL STREET JOURNAL**

<http://www.wsj.com/>

# ESSAY

**UC SAN DIEGO** | SAT WORKBOOK

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# ESSAY

# On the SAT

## PROCESS/TEMPLATE/SAMPLE/RESOURCES

### General Instructions

There is a recommended order for reading the instruction prompts given by the SAT that will give you a good start.

### Template

Use this 5-part template to build your essay. Instructions for use are detailed.

### Essay Sample

The use of the essay template is shown in a sample essay using rhetorical devices that would result in a good score.

### Timing

You will have 50 minutes to write your essay. How to allocate your time is outlined for use in practice sessions and on the actual exam.

### Rhetorical Devices/Persuasive Elements

Common rhetorical devices you can use in your essay are described, giving you more ideas of what to discuss in your writing and analysis.

# ESSAY | THIS IS WHAT YOU WILL SEE

## Box 1 Prompt

**NOTE** The Box 1 instructions are identical to what you will see on the official test. Familiarize yourself with them now.

***As you read the passage below, consider how [the author] uses***

- Evidence, such as facts or examples, to support claims.
- Reasoning to develop ideas and to connect claims and evidence.
- Stylistic or persuasive elements, such as word choice or appeals to emotion, to add power to the ideas expressed.

***Some essay by John Golightly*** .....Vit, quid eatatiatem accatiusamus nimint peresse ntoreperrunt omnitam amet lam quibus dolupta quiatemperum eos inis es dipicitatur? Bitinis in non reptaquosam volore andere pratur accatem incto berrundi aliquiant is maximus. lbusand iscillantis ...

## Box 2 Prompt

**NOTE** Box 2 prompt describes ***THE AUTHOR'S MAIN POINT*** of the essay.

***Write an essay in which you explain how John Golightly builds an argument to persuade his audience that*** state and local governments should increase funding for public libraries. In your essay, analyze how Golightly uses one or more of the features listed above (or features of your own choice) to strengthen the logic and persuasiveness of his argument.

Be sure that your analysis focuses on the most relevant features of the passage.

Your essay should not explain whether you agree with Golightly 's claims, but rather explain how the author builds an argument to persuade his audience.

## ESSAY | **THIS IS WHAT TO DO**

Read Box 2 Prompt *First*

**NOTE** Read the Box 2 Prompt because it identifies **THE AUTHOR'S MAIN POINT**.

Read the Author's Essay *Next*

**NOTE** Knowing **THE AUTHOR'S MAIN POINT** before you read the essay will help you evaluate the persuasive elements in the essay as you read.

# ESSAY | **GENERAL INSTRUCTIONS**

For Your Essay *Explain/Analyze*

## *How the Author Builds [His/Her] Argument*

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DO NOT take a position (for or against) the argument made in the essay.

Instead, EXPLAIN/ANALYZE how the author builds his/her argument to persuade his/her readers.

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In order to do this effectively, identify persuasive elements (also called rhetorical devices) that the author employs in his/her essay. Select two or three of these persuasive elements in your essay.

Then, choose examples of the author using each of the persuasive elements you will discuss by either paraphrasing or quoting selectively from the text.

Next, discuss why the author is using the persuasive elements and what likely effect such elements will have on the reader; in other words, how the persuasive devices help build the author's argument. Paraphrases and quotations of examples (of persuasive elements discussed in your essay) can be used to flesh out the discussion of how the author is building his/her argument.

# 1. ESSAY TEMPLATE (FIRST) | NAME THE ISSUE

## Introduction Paragraph

**The issue of** [name issue being discussed] **has ramifications for** [name specific large group or multiple specific groups], **meriting serious consideration. In** [cite "article/essay name" in quotation marks], [provide author's full name] **argues** [rephrase author's main point—found in first sentence of box following the passage]. **To build his/her cogent argument and persuade the reader,** [last name of author—refer to author by last name only from now on] **effectively uses the following rhetorical elements:** [list three persuasive elements in the order in which they will be discussed].

Now write 6+ sentences for each of the three body paragraphs that follow using the suggestions outlined in the brackets and instructional text below each bracket.

## 2. ESSAY TEMPLATE (NEXT)

### DISCUSS PERSUASIVE ELEMENT 1

#### Body Paragraph 1

[Author's last name with 's for possessive] **adept use of** [name Persuasive Element 1] **helps to convince the reader of the importance of** [issue (outcome desired by author)].

For the second body paragraph (6+ sentences), try to have at least two sentences of explanation for EACH example.

First, provide examples of Persuasive Element 1 being used by the author in the context of the passage via quotations and/or paraphrases. *(Make sure to provide both short quotations and paraphrases as examples throughout your essay.)*

For each example, EXPLAIN how that persuasive element influences readers to agree with the author. Why did the author use that element?

How will readers be affected by that element *(think of human values, fears, desires—what matters to us)?*

How will the effect on readers help convince them of the author's argument?

**TIP** Weaving short quotes or info from the text into your explanations can help illustrate the points you are explaining.

Feel free to occasionally paraphrase the point the author is trying to make when using a persuasive element if it helps your explanation. You should layer your paragraph with examples and explanations.

### 3. ESSAY TEMPLATE (NEXT)

## DISCUSS PERSUASIVE ELEMENT 2

#### Body Paragraph 2

**While some readers may not be entirely swayed by [Persuasive Element 1], the author cleverly makes use of [Persuasive Element 2] to build upon his/her argument.**

Now write 6+ sentences for this body paragraph. Here again, try to have at least two sentences of explanation for EACH example.

First, provide examples of Persuasive Element 2 being used by the author in the context of the passage via quotations and/or paraphrases.

For each example, EXPLAIN how that persuasive element influences readers to agree with the author.

Why did the author use that element?

How will readers be affected by that element (think of human values, fears, desires—what matters to us)?

How will the effect on readers help convince them of the author’s argument?

**TIP** It is okay to use examples of persuasive elements that are not the SAME as Persuasive Element 2 so long as it is closely related to Persuasive Element 2 or your discussion of it. *(For example, Persuasive Element 2 might be an appeal to emotion, and one example you provide is how the author uses the pronoun “we” to make the reader feel that she and the author stand together on the same side.)*

Layer your paragraph with examples and explanations.

## 4. ESSAY TEMPLATE (NEXT)

### DISCUSS PERSUASIVE ELEMENT 3

#### Body Paragraph 3

Finally, [last name of author] **skillfully employs** [Persuasive Element 3] **to bolster his/her stance.**

Now write 6+ sentences for this body paragraph. Also, with this paragraph, try to have at least two sentences of explanation for EACH example.

First, provide examples of Persuasive Element 3 being used by the author in the context of the passage via quotations and/or paraphrases. *(Make sure to provide both quotations and paraphrases as examples throughout your essay.)*

For each example, EXPLAIN how that persuasive element influences readers to agree with the author.

Why did the author use that element? How will readers be affected by that element *(think of human values, fears, desires—what matters to us)?*

How will the effect on readers help convince them of the author's argument?

**TIP** Make sure to vary your sentence length and complexity. Some sentences should be short. On the other hand, some sentences should be longer, making use of transitions, comma phrases, and dependent clauses.

Layer your paragraph with examples and explanations.

## 5. ESSAY TEMPLATE (LAST) SUMMARY

Conclusion Paragraph

**In summary, [last name of author] constructs a compelling argument that [paraphrase author's main point], utilizing [Persuasive elements 1, 2, and 3] not only to convince the reader of the author's claim but also to spur the reader into action.**

## ESSAY SAMPLE | HOW THE TEMPLATE WORKS

**The issue of** whether to allow drilling and development in the Arctic National Wildlife Refuge (ANWR) **has ramifications for** many Americans, **meriting serious consideration**. In his foreword to "Arctic National Wildlife Refuge: Season of Life and Land," former President Jimmy Carter **[Author's name]** **argues** that there is inherent value and importance in leaving ANWR's wilderness undeveloped and untamed. **To build his cogent argument and convince his readers,** Carter **effectively uses the following rhetorical elements:** vivid language **[Element 1]** describing ANWR's natural beauty and both emotional **[Element 2]** and rational **[Element 3]** appeals to American patriotism.

Carter's **[Author's name]** **adept use of [Element 1]** powerful language **helps to convince the reader of** the importance of preserving ANWR's wilderness, beauty, and wildlife. When Carter describes his experiences in ANWR, he conjures mysterious and intriguing images, such as wolves howling "in the midnight sun" and a "brilliant mosaic of wildflowers, mosses and lichens" to make his readers see ANWR as a beautiful place instead of an abstract idea. Most readers have some appreciation of the beauty in nature from their own experiences, believing that it has inherent value. The vivid imagery provided by Carter will resonate strongly with those readers. In addition, his concrete descriptions of wildlife, such as witnessing the migration of tens of thousands of Porcupine caribou and their calves, will pique the interest of readers who are concerned about wildlife. By inspiring appreciation for the nature and wildlife of ANWR, Carter's descriptive language creates an emotional connection between his readers and ANWR. Readers who are emotionally invested in the natural beauty or wildlife of ANWR will not want to see it destroyed. Furthermore, Carter uses strong negative language in his fourth paragraph to juxtapose the beauty of ANWR in its untouched state to the ugliness and irreversible destruction that would be caused if we allowed industrial development. He describes the "great wilderness ... consumed by a web of roads and pipelines, drilling rigs and industrial facilities," which Carter emphasizes would "forever destroy" ANWR's natural beauty, impressing the irrevocability of allowing such development. This emphasis on the irreversible destructive nature of the proposed development will cause readers to view development with greater circumspection. By noting that the negative impacts of industrial development in ANWR are destructive and irreversible, Carter will likely draw many undecided people to his side, which unlike the alternative, can be reversed at any time.

**While some readers may not be entirely swayed by** Carter's **[Author's last name with 's for possessive]** powerful use of **[Persuasive Element 1]** imagery and contrast to describe ANWR's natural beauty and the destruction that industrial development would wreak on ANWR, Carter **[Author's name]** also cleverly uses **[Persuasive Element 2]** an appeal to American identity and values to **build upon his argument**.

## ESSAY SAMPLE | HOW THE TEMPLATE WORKS

Carter asserts that ANWR “stands alone as America’s last truly great wilderness,” and that it is “a symbol of our national heritage, a remnant of Frontier America [used by] our first settlers.” He notes that ANWR has been described as “America’s Serengeti,” placing it in competition with the proud landscape of the African Serengeti. These statements tap into Americans’ sense of national pride and the value we see in our country’s land and history. Every nation has places of great natural beauty and historical significance for which its citizens feel pride. Though Americans know that we have many beautiful and historical locations within our country, Carter elevates ANWR by emphasizing its uniqueness, its historical significance for America’s first settlers, and its competition with other famous sites. This helps to convince American readers that ANWR is important not just because it is beautiful, but also because it has national and historical value. Americans who feel patriotic pride regarding the presence of ANWR will want to preserve the historical, natural state of ANWR against development that would destroy it.

Finally, Carter **[Author’s last name] skillfully employs [Persuasive Element 3]** facts about American leaders establishing precedent in the U.S., since 1960, of passing legislation **to preserve ANWR**. In doing so, Carter **[Author’s last name] [Persuasive Element 3]** informs his readers that both Democratic and Republican presidents as well as members of Congress have all believed in the value of preserving ANWR. These facts provide a more rational appeal to patriotic readers by showing them that, in saving ANWR, they will be following in the footsteps of great Americans. In addition, Carter dismisses the idea that only one political party endorses the preservation of ANWR. This allows readers from both political parties to approach Carter’s arguments with an open mind instead of dismissing them outright because of Carter’s history in the Democratic Party. Furthermore, by showing a long history of American precedent in favor of preserving ANWR, Carter demonstrates that his call for ANWR’s continued preservation is not radical, but rather a continuation of American tradition. While many people regard arguments that advocate large change with doubt and concern about possible outcomes, a request to continue a stable tradition is easier to support. Changes always include some level of uncertainty regarding their consequences. Maintaining a status quo that has not caused damage, however, eliminates such uncertainty from the equation, making it an easier option to endorse.

**In summary**, Carter **constructs a compelling argument [Author’s main point]** in favor of saving ANWR from industrial development, **utilizing** a variety of persuasive devices, such as **[Persuasive elements 1, 2, and 3]** emotive language depicting ANWR’s beauty, descriptions of ANWR that evoke patriotism, and a factual discussion that establishes historical precedents when American politicians took action to preserve ANWR.

# ESSAY 50 MINUTES

## MANAGING THE FIRST 10-15 MINUTES

### General Information | Practice

You have 50 minutes to read the essay provided, take notes, pre-write/organize essay, write essay and spend a minute or two reviewing for any major mistakes.

Plan to practice using the template and the timeline provided with at least a couple of practice SAT essays, allowing you to become familiar with the structure, timeline, and types of topics to discuss.

Use the Khan Academy Essay Practice system to get feedback on how your essays might be scored and where you can strengthen your discussions.

### Allocating Your Prep Time

#### ***Read/Take Notes on the Essay—6 to 8 Minutes***

Read and take notes on the essay in 6 to 8 minutes, noting any persuasive elements or evidence used in the essay. Underline any part of the passage that provides a good example of the author using the noted element or evidence.

#### ***Identify and Select Three Major Persuasive Elements—4 to 5 Minutes***

After reading and taking notes, select three major persuasive elements that are used in the essay.

Underline portions of the text where those elements/evidence are used so you know what sections of the passage to paraphrase and/or quote when providing examples.

Once the three persuasive elements and their examples are noted in the passage, decide the most logical or useful order in which to discuss them.

# ESSAY 50 MINUTES

## APPROXIMATELY 40 MINUTES TO WRITE

### General Guidelines on Writing

Following the prep timing as described, you should have almost 40 minutes to write.

Plan on writing as much as possible on the topics in your essay following the template provided in this course.

Ideally, aim to fill at least two and a half pages with material. If you follow the advice in the template, that should be easy to accomplish.

Plan on writing quickly with letters in a normal size and using handwriting that most people can read.

### Allocating Your Writing Time

#### ***After Your Order of Content is***

Use the template provided when writing the essay.

#### ***Decided—35-38 Minutes to Write***

Begin writing by starting with the introduction that lists the three persuasive elements in the order in which they will be discussed in the passage.

At least one body paragraph should be devoted to each persuasive element listed.

Even if you are running out of time, always make sure to end the essay with a short conclusion.

#### ***Last 2-3 Minutes—Review***

Quickly review your essay for any major mistakes that can be corrected before time is called.

# SAT ESSAY

## COMMON RHETORICAL DEVICES/PERSUASIVE ELEMENTS

Use This Device	Because ....
<b>Appeal to Reader's Emotions</b> ( <i>compassion, fear, indignation, concern, love, despair, etc.</i> )	Emotions make people care; a reader who cares is more willing to act.
<b>Cite Well-Established or Respected Authority</b>	Using a respected authority provides support that is difficult to dismiss or disagree with.
<b>Form a Logical Argument</b>	A logical argument grounds an argument in reality. Many people prefer to be persuaded with logic and facts instead of less concrete arguments.
<b>Use a Personal Anecdote</b>	Allows the reader to vicariously connect with the author and makes the author relate-able.
<b>Provide Statistics &amp; Facts</b>	Facts or statistics ground the argument. It is difficult to disagree with sound numbers.
<b>Address a Counterargument</b>	Helps establish the author's credibility and knowledge, and makes the author seem more reasonable because he/she is willing to look at both sides.
<b>Appeal to Group Identity</b> <i>such as Patriotism, Community, Parents, Book Readers, Engineers &amp; Scientists, etc</i>	Readers are more likely to agree with the values and ideas encompassed in a group to which they have a sense of belonging.

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# SAT ESSAY

## COMMON RHETORICAL DEVICES/PERSUASIVE ELEMENTS

Use This Device	Because ....
<b>Argument by Analogy</b> <i>(Comparison)</i>	<ul style="list-style-type: none"> <li>• Simplifies a complex point, making it easier to understand.</li> <li>• An agreement with an analogous situation may be transferred to author's argument..</li> </ul>
<b>Argument by Contrast</b> <i>(Juxtaposition)</i>	Highlights a difference in such a way as to make one thing seem much worse/better/less important/etc. compared to the other thing.
<b>Focus on difference between nations or past vs. present to emphasize a problem.</b>	Emphasizing a problem gives support to your argument.
<b>Word Choice or Language</b> <i>(vivid, descriptive, positive, negative, impressive, unflattering, etc.)</i>	Well chosen use of language can evoke emotions, characterize situations, and add positive or negative connotations.
<b>Establish Precedent</b> <i>(something similar or the same done previously) so it can be done now.</i>	Subject will seem less radical and more in line with the status quo.
<b>Use of Pronouns "We" and "Our"</b>	Imply the author and reader stand together.
<b>Use a hypothetical situation or rhetorical question.</b>	These devices get the reader to imagine a specific situation and its possible outcomes or guide the reader to conclusions that support the author's argument.



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