36U
NOTE-TAKING GUIDES
2024-2025

TABLE OF CONTENTS

READING

SCIENCE

36U PACING GUIDE BY TOPIC

Semester pacing (18 weeks) = 1 unit per week   Crash Course pacing (6 weeks) = 3 units per week
Feel free to rearrange topic order to fit your needs.

Unit 1 (ACT Math)	ACT Math Introduction
	Right Triangles
	Distance and Midpoint
Unit 2 (ACT Math)	Substitution
	Linear Relationships
Unit 3 (ACT Math)	Perimeter and Area
	Angles
Unit 4 (ACT Math)	Right Triangle Trigonometry
	Laws of Sines and Cosines
	Circle Trigonometry
Unit 5 (ACT Math)	Measures of Central Tendency
	Probability Video with Note-taking Guide
Unit 6 (ACT Math)	Solving Equations
	Systems of Equations
	Rational Expressions
	Exponential Expressions and Equations
	Logarithmic Expressions and Equations
Unit 7 (ACT Math)	Numbers and Arithmetic Less Frequently-Tested Topics
	Statistics and Probability Less Frequently-Tested Topics
	Algebra Less Frequently-Tested Topics
	Geometry Less Frequently-Tested Topics
Unit 8 (ACT Math)	Math Final Quizzes
Unit 9 (ACT English)	ACT English Introduction
	Subject-Verb Agreement
	Punctuation
Unit 10 (ACT English)	Commas
	Transitions
Unit 11 (ACT English)	Redundancy
	Misplaced Modifiers
Unit 12 (ACT English)	Pronoun-Antecedent Agreement
	Possessive Forms
	Adjectives and Adverbs
Unit 13 (ACT English)	English – Global Items
	English Final Quizzes
Unit 14 (ACT Reading)	ACT Reading Introduction
	Direct from Text
	Meaning from Context
	Inferences
	Point of View
	Summary Items
	Writing Techniques Content
Unit 15 (ACT Reading)	Prose Fiction

	Social Science
	Humanities
	Natural Science
	Double Passages
Unit 16 (ACT Science)	ACT Science Introduction
	Reading Tables
	Reading Graphs
	Data in Different Forms
	Identifying Maxima and Minima
	Analyzing Experiments
Unit 17 (ACT Science)	Evaluating Hypotheses
	Multiple Y-Axes
	Vertical Axis Input Values
	Utilizing Multiple Data Sources
	ACT Science Final Quizzes
Unit 18 (Practice Tests)	2021-2022 Preparing for the ACT Guide (See "Getting Started" Section)

36U PACING GUIDE BY QUIZ

If you would rather pace your course by quiz than by topic, you can divide the total number of quizzes by the number of days, weeks, or months you'll be using our program. The program has approximately 170 quizzes, so the pace is almost 10 quizzes per week over an 18-week semester.
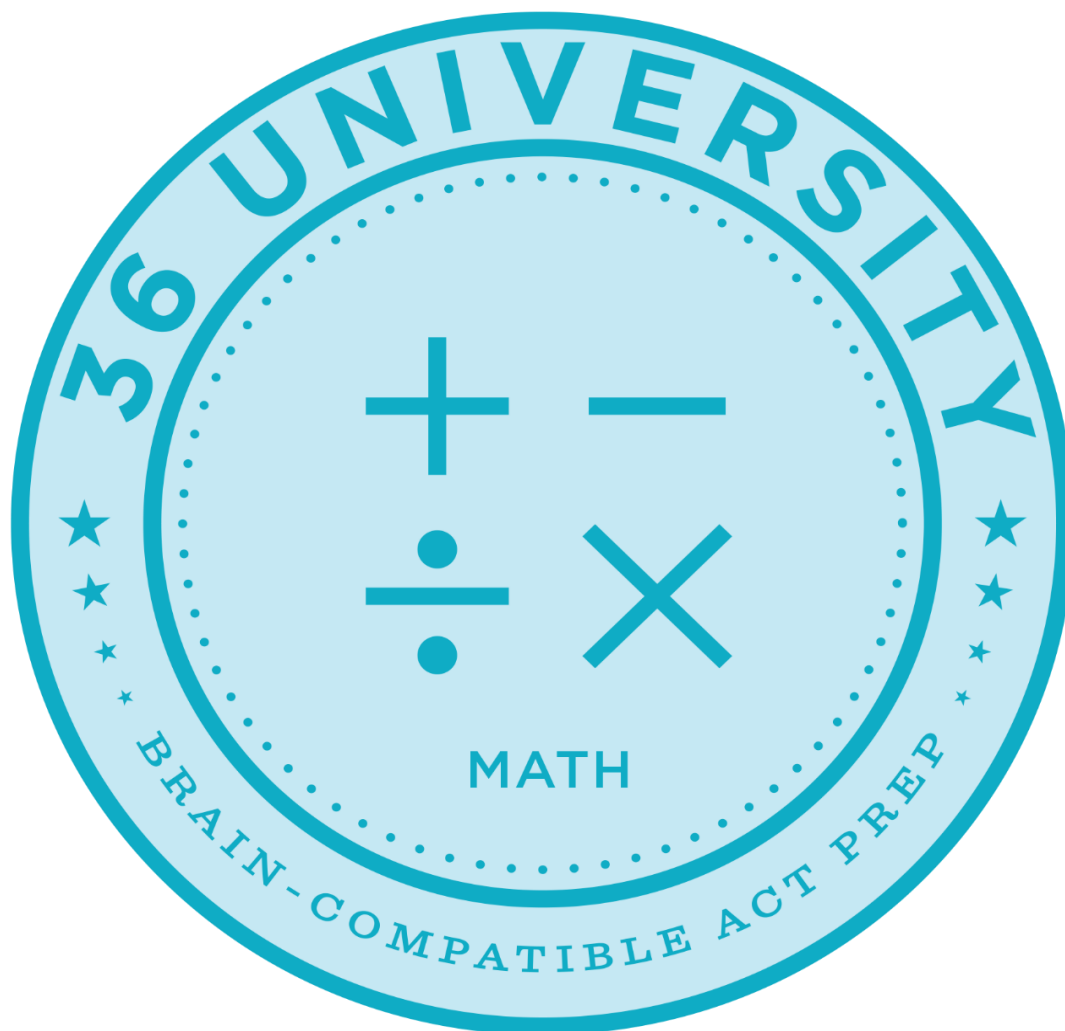
ACT MATH INTRODUCTION

I.   The Setup

_____ questions ⇔ _____ minutes

Generally, questions get _____ _____ as your progress through the test.

II.   The Pace

____ _____ per minute

(20 items ⇔ ____ minutes;

10 items ⇔ ____ minutes; ...)

Try to _____ _____ on early items so you'll have more time for difficult items toward the end of the test.

III.   Suggested Calculators

#1 – The one with which you're used to using. _____ is key.

Other greats: Casio fx-115ES Plus, TI-83s, TI-84s, TI-30s

Outlawed: TI-89, TI-92

Time-saving tip: Only use calculator when needed or if the calculations are cumbersome.

Pro Tips

Math items are _____!

→ If needed, _____ ____ _____ first so you'll know what information you'll need.

→ Sometimes, you can work from the _____.

→ Focus on _____ and _____ within the questions.

Answer all items. Never leave any _____.

THE PYTHAGOREAN THEOREM

Frequency: ⭐ ⭐ ⭐

I. The Pythagorean Theorem

$$\_\_\_ + \_\_\_ = c^2$$

Setup: $x^2 = $ _____

$x^2 = $ _____

$x = $ ____

Setup: $10^2 + y^2 = $ ____

$y^2 = $ _____

$y = $ ____
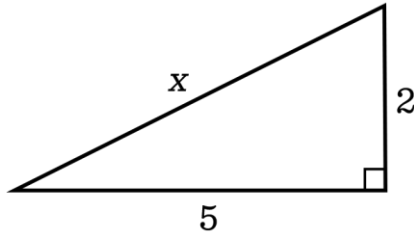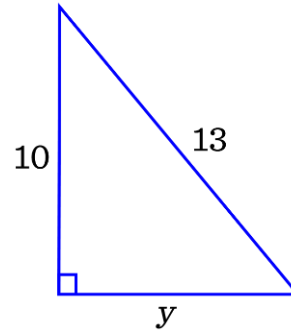
II. The Pythagorean Theorem Simplified

To find the hypotenuse (longest side), you'll want to square the leg lengths and ADD!

To find a leg length, you'll want to square the hypotenuse length, square the leg length, and SUBTRACT!

$x = \sqrt{2^2 \quad 5^2}$

$x = $ ____

$y = \sqrt{13^2 \quad 10^2}$

$y = $ ____
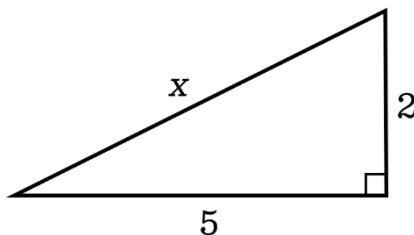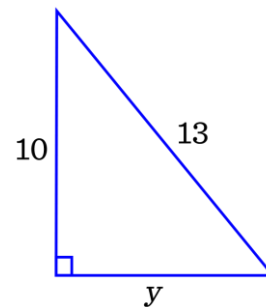
III.   Common Pythagorean Triples

Often, you won't need to use the Pythagorean Theorem to find a missing side in a right triangle! Commit these Pythagorean triples to memory.

Look for common Pythagorean triples to be scaled up! Let's scale up a 3:4:5.
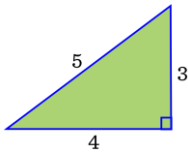
| 3:4:5 | 3:4:5 x 2 | 3:4:5 x 3 | 3:4:5 x 10 |
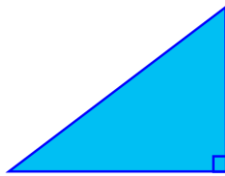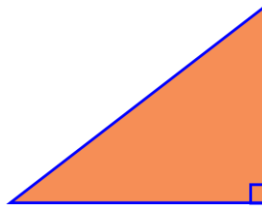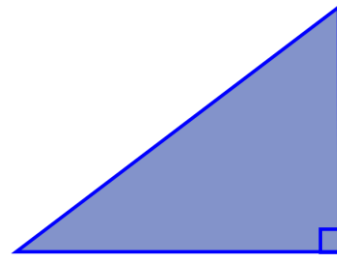
5   3
4

HOW WILL THIS LOOK ON THE ACT?

3

6

diagonal =

$\sqrt{\underline{\quad} + \underline{\quad}}$

= _____

= _____

radius = _____

3

8

C = 2πr

C = _____

Area = πr²

A = _____

j = _____

sin θ = _____

j   24

θ
7

sin θ = _____
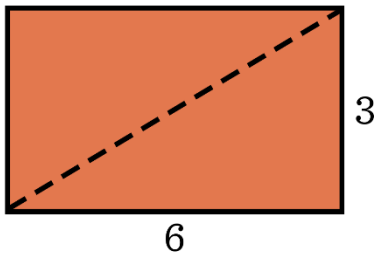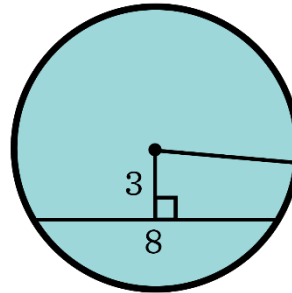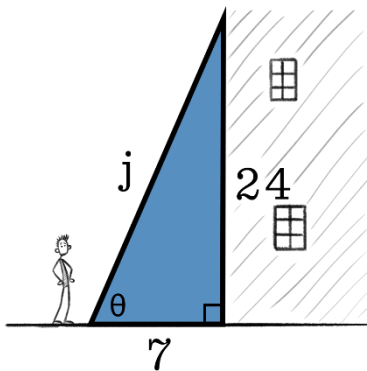
45º-45º-90º & 30º-60º-90º TRIANGLES   *Frequency:* ⭐

Save time when working with right triangles by memorizing the ratios between sides in 45-45-90 and 30-60-90 triangles.

I.   45º-45º-90º Triangles

The ratios between sides in a 45º-45º-90º triangle are _____.
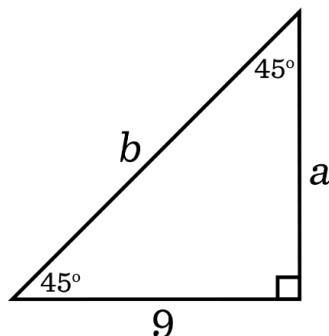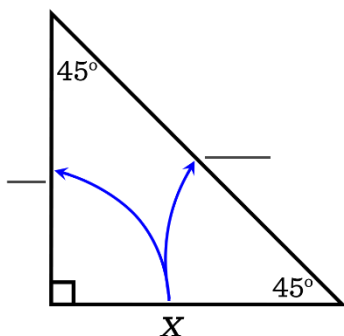
45º

____

____

45º

x

45º

b

a

45º

9

$a =$ _____

$b =$ _____

II.   30º-60º-90º Triangles

The ratios between sides in a 30º-60º-90º triangle are _____.

30º

____

____

60º

x

60º

y

8

30º

z

$y =$ _____

$z =$ _____

HOW WILL THIS LOOK ON THE ACT?

30° *angle of depression*

60°

____

____

8,000 ft

9
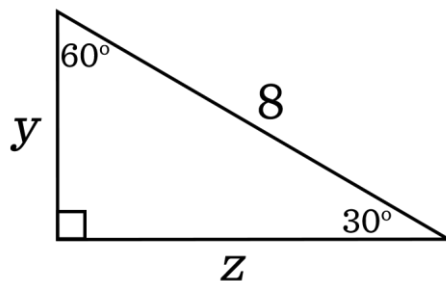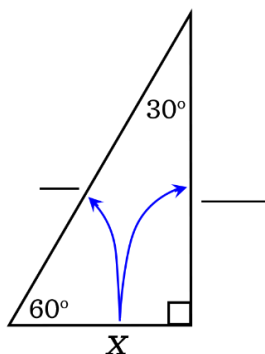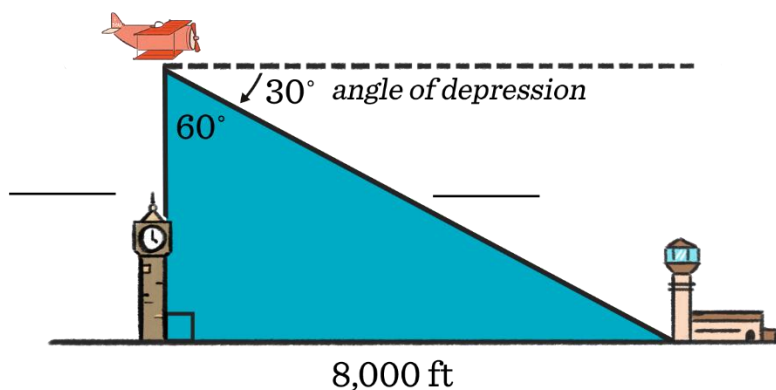
DISTANCE AND MIDPOINT

Frequency: ⭐⭐

I. Finding the Distance Between Two Points

A. Number Line

To find the distance between two points on a number line, you can _____ between the points or you can _____.

B. Coordinate Plane
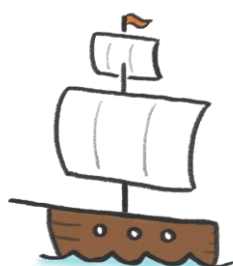
Find the distance between

(-2, 1) and (3, 7).

$\Delta x = $ ___ $\Delta y = $ ___
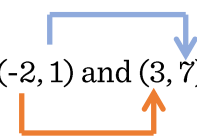
$distance = \sqrt{(\Delta x)^2 + (\Delta y)^2}$

$distance = \sqrt{\underline{}^2 + \underline{}^2}$

$distance = \sqrt{\underline{} + \underline{}}$

$distance = \sqrt{\underline{}}$

$distance \approx$ ___ (Use your calculator.)

II. The Midpoint Formula

A. Number Line

To find the midpoint between two points on a number line, you add the points and _____ by _____ . (Average!)

B. Coordinate Plane

To find the midpoint between two points on a coordinate plane, _____ the x-coordinates and _____ the y-coordinates.

$$midpoint = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right)$$

HOW WILL THIS LOOK ON THE ACT?

1. Find the distance between (2, -4) and (-5, 1).

$d = \sqrt{ + }$

$d = \sqrt{ + }$

$d = $ _____ or _____

2. Find the midpoint of (2, -4) and (-5, 1).

$$midpoint = \left(\frac{}{2}, \frac{}{2}\right)$$

$midpoint = $

SUBSTITUTION

Frequency: ★★★

I. Simple Substitution

$$f(x) = |3x^2 - 2x + 1|$$

$$f(-2) = |3(\underline{\hspace{1cm}})^2 - 2(\underline{\hspace{1cm}}) + 1|$$

$$f(-2) = |\underline{\hspace{1cm}} + \underline{\hspace{1cm}} + \underline{\hspace{1cm}}|$$

$$f(-2) = \underline{\hspace{1.5cm}}$$

II. Substituting into Different Types of Functions

Linear Function	Quadratic Function	Rational Function	Exponential Function
$f(x) = 5x - 7$ $f(2) =$	$g(x) = 5x^2 + 2x - 7$ $g(2) =$	$h(x) = \dfrac{x^2 - 2}{3x + 1}$ $h(0) =$	$j(x) = 3^x - 5$ $j(2) =$

III. Substituting into Functions of Two Variables

$$f(x, y) = 2x + 3y \qquad f(-3,5) =$$

HOW WILL THIS LOOK ON THE ACT?

Ex. 1 $y = \dfrac{x^2 - 2}{3x + 1}$

When x = -3, $y =$

Ex. 2 $f(x) = x^2 + 3x + 1$

$$f(2x + 1) = (\underline{\hspace{2cm}})^2 + 3(\underline{\hspace{2cm}}) + 1$$

$$f(2x + 1) =$$

$$f(2x + 1) =$$

$$f(2x + 1) =$$

Ex. 3 Thirty degrees Celsius is equivalent to what Fahrenheit temperature?

$$C = \frac{5}{9}(F - 32)$$

LINEAR RELATIONSHIPS

Frequency: ⭐⭐

I.   Lines and Constant Rates of Change

Linear relationships have _____ rates of change.

x	y
-2	-5
-1	-2
0	1
1	4
2	7

The relationship between x and y in this table is linear. For each increase of x, y increases by _____.

II.   Writing Equations of Lines

Slope-intercept form: _____.

The relationship in the table above can be represented by the linear equation, y = _____ . (Substitute the rate of change for the slope.)

HOW WILL THIS LOOK ON THE ACT?

1. Find the slope of the linear equation $2x - 3y = 6$.

Rearranged: Slope =

2. Write a linear equation of the following graph. The line passes through (-4, 1) and (0,-3).
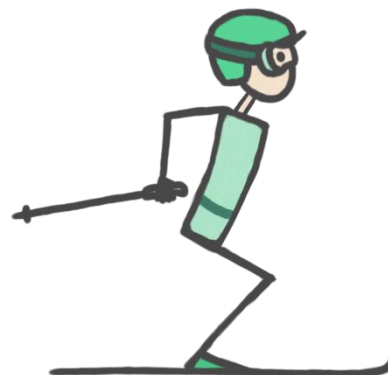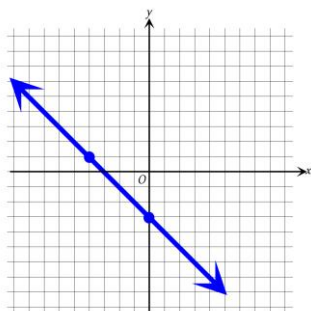
3. Write a linear equation that expresses the relationship between x and y.

x	y
-2	9
-1	7
0	5
1	3
2	1

PERIMETER AND AREA

I.   Perimeter and Circumference
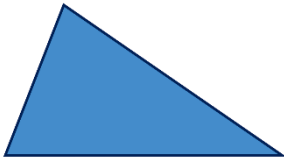
$P =$ _____ $P =$ _____ $P =$ _____ $C =$ _____
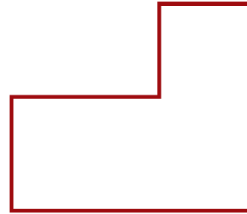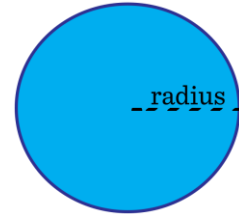
radius

$C =$ _____

II.   Area

height

base

height

base

height

base

radius

$A =$ _____ $A =$ _____ $A =$ _____ $A =$ _____

HOW WILL THIS LOOK ON THE ACT?

7

10

$P =$ _____

$P =$ _____
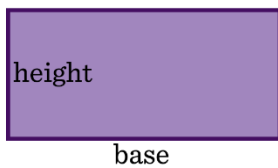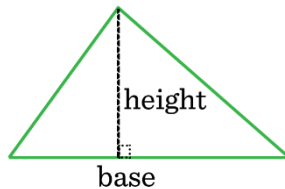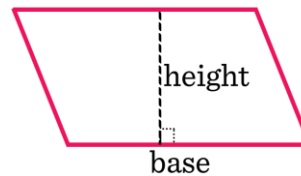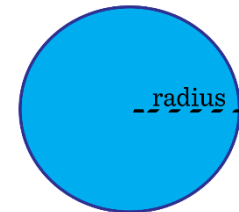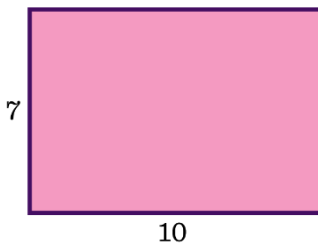
A = 48

P = 32   Dimensions: _____

(2, 4)   (9, 4)

(0, 0)   (7, 0)

Area = _____

Area = _____

5

3

7

13

$A =$ _____

$P =$ _____

    13
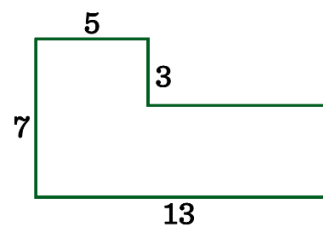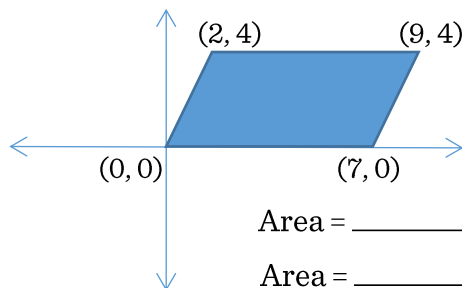
ANGLE RELATIONSHIPS

Frequency: ⭐⭐

I. Interior Angle Sums for Polygons
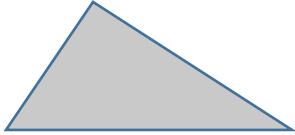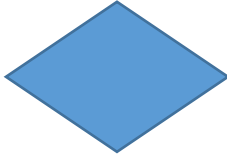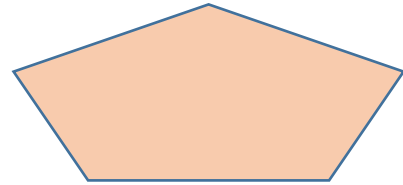
Interior Angle Sum = _____   Interior Angle Sum = _____   Interior Angle Sum = _____

II. Equilateral and Isosceles Triangles

Isosceles Triangle   Equilateral Triangle

36°
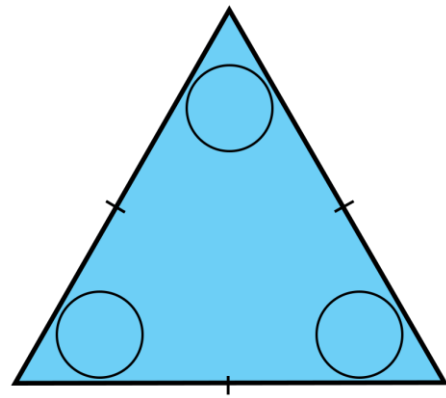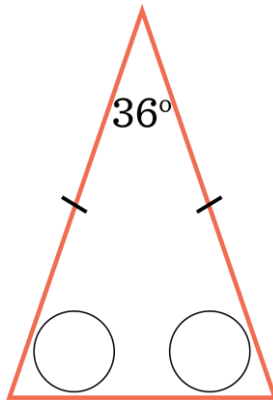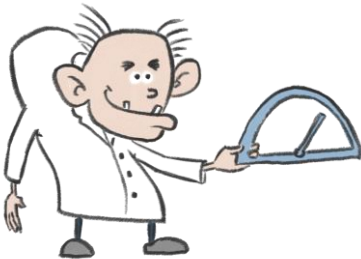
III. Vertical Angles and Supplementary Angles

Vertical Angles   Supplementary Angles

x y
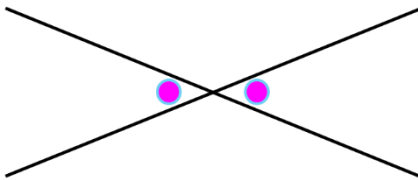
Vertical angles have the _____ _____ . $x + y =$ _____

HOW WILL THIS LOOK ON THE ACT?

106°   115°

110°   107°

60°

56°
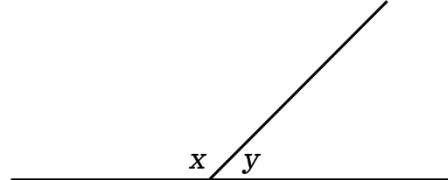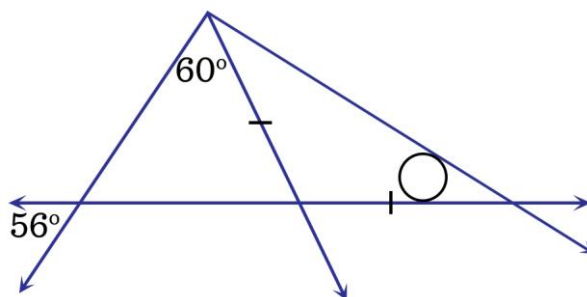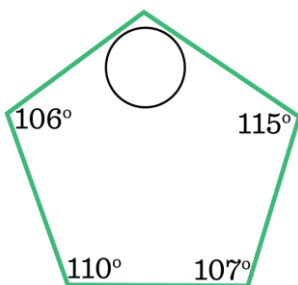
RIGHT TRIANGLE TRIGONOMETRY

Frequency: ⭐⭐

I.   The Concept of Trig

When angles in a triangle are determined, the shape of the triangle is set. This allows us to set up trig ratios for right triangles because ratios between side lengths are constant.

II.   The Three Main Trig Ratios

SOHCAHTOA

$$sin\ \theta = \frac{opposite\ leg}{hypotenuse}$$

or

$$cos\ \theta = \underline{\hspace{3cm}}$$

$$S\frac{O}{H}\ C\frac{A}{H}\ T\frac{O}{A}$$

$$tan\ \theta = \underline{\hspace{3cm}}$$

III.   The Three Secondary Trig Ratios

$$cos\ \theta = \frac{adjacent\ leg}{hypotenuse} \implies sec\ \theta = \underline{\hspace{3cm}}$$

$$sin\ \theta = \frac{opposite\ leg}{hypotenuse} \implies csc\ \theta = \underline{\hspace{3cm}}$$

$$tan\ \theta = \frac{opposite\ leg}{adjacent\ leg} \implies cot\ \theta = \underline{\hspace{3cm}}$$

HOW WILL THIS LOOK ON THE ACT?

Find $\tan A$.

$AC =$

$tan\ A = \underline{\hspace{2cm}}$

Find x.

150'

x

23°
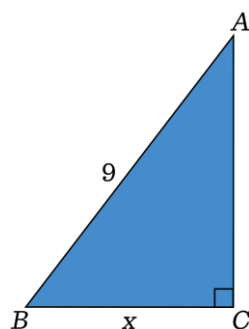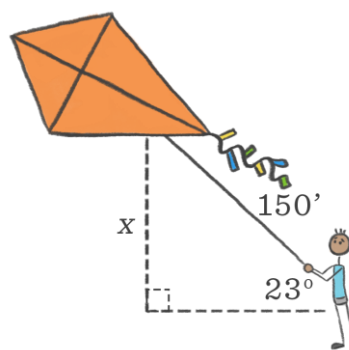
THE LAWS OF SINES AND COSINES

Frequency: ⭐

Use the Law of Sines or Cosines when your triangle doesn't have a _____ _____.

I. Which Law Do I Use?

Use the **Law of Sines** when you are given an angle measure and the _____ _____

_____.

$$\frac{\sin \angle A}{a} = \underline{\quad\quad} = \underline{\quad\quad}$$
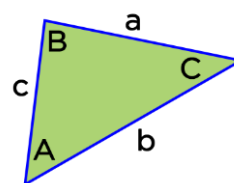
Use the **Law of Cosines** when you are given

1) two sides and the _____ _____

or

2) all _____ _____ _____.

$$c^2 = \underline{\hspace{4cm}}$$

HOW WILL THIS LOOK ON THE ACT?

II. Using the Law of Sines

6 miles

48°

X

97°
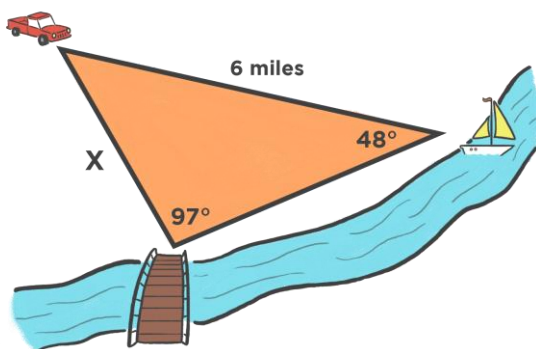
Setup:

Solve:

$x \approx$ ___ miles

III. Using the Law of Cosines

175 yds

123°

150 yds

X
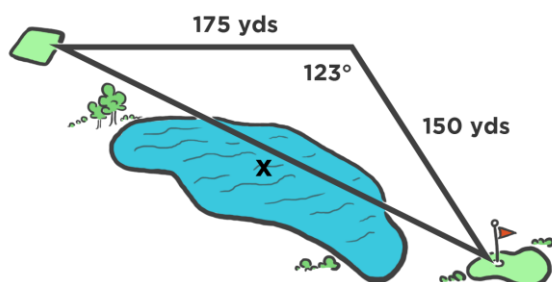
Setup:

Solve:

$x \approx$ _____ yards

CIRCLE TRIGONOMETRY

Frequency: ⭐

Circular trigonometry is not all that different from triangle trigonometry. You need to understand angle rotation, positive and negative values on a coordinate plane, and transfer your understanding of triangle trig concepts.

I.   Angle Rotation and Angle Measures

Angle rotation is measured from

1) the positive _____   and   2) with a _____ rotation.

Label angle rotations in degrees and radians.
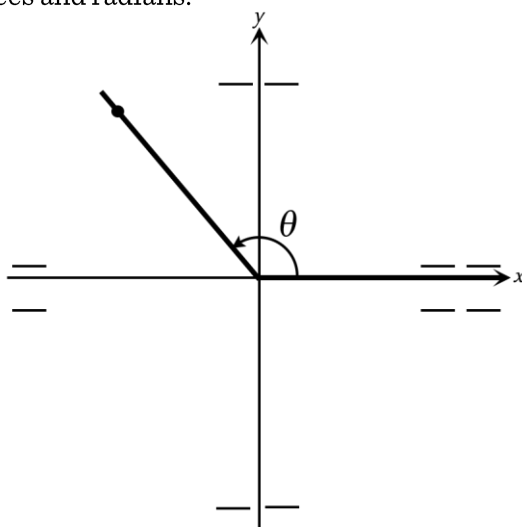
II.   From Triangle Trigonometry to Circle Trigonometry

If cos θ = -3/5 and 90° < θ < 180°, then sin θ = ?, tan θ = ?

sin θ = _____

tan θ = _____
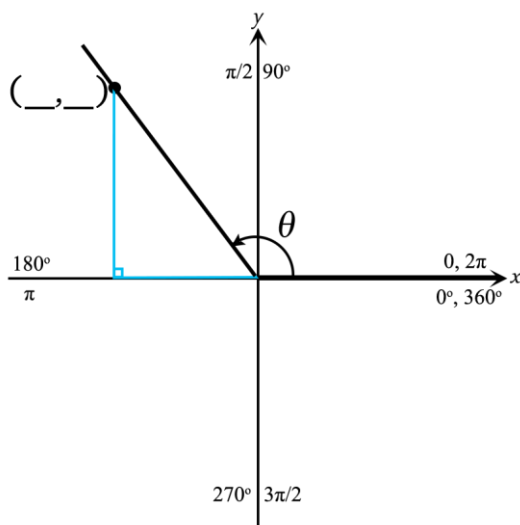
HOW WILL THIS LOOK ON THE ACT?
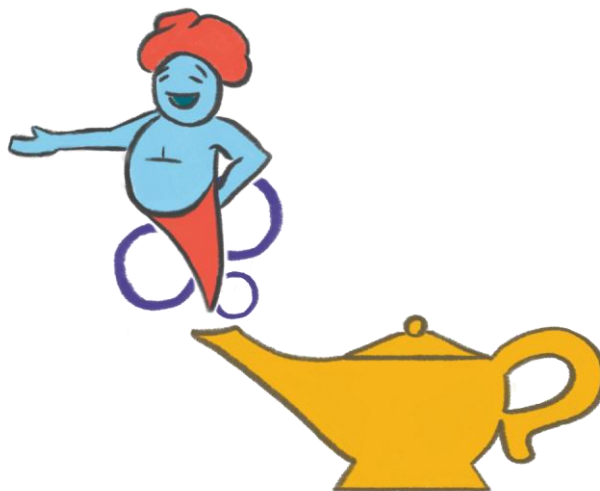
If $\tan\theta = 12/5$ and $180° < \theta < 270°$,

then $\cos\theta = ?$
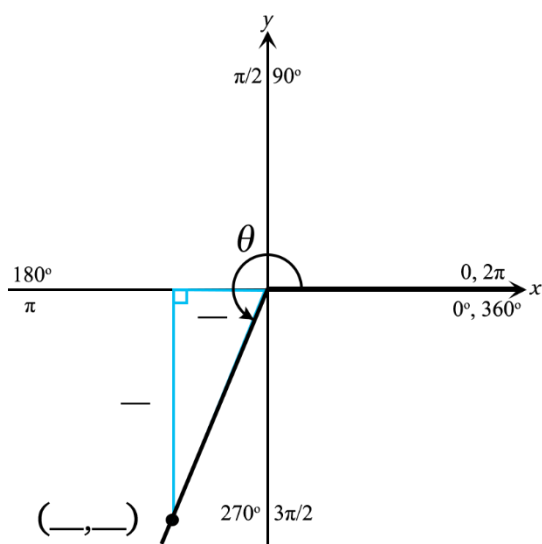
Step 1: Use the angle inequality to determine that the angle terminates in the 3rd quadrant.

Step 2: Draw in the triangle that sits on the x-axis. Use $\tan\theta = $ (opposite leg)/(adjacent leg) to draw 12/5 into the coordinate plane. Be sure to remember that both coordinates are negative in the 3rd quadrant.

Step 3: Recognize the 5:12:13 triangle to find the length of the hypotenuse.

Step 4: Find the cosine θ.

$$\cos\theta = \frac{\text{adjacent leg}}{\text{hypotenuse}}$$

$\cos\theta = $ _____

CENTRAL TENDENCY

Frequency Rating: ⭐⭐

I.   Basic Average

Scores: 82, 71, and 92.   Average = _____   Average ≈

II.   Finding Average Given Frequency

Scores: five 82s, six 71s, and three 92s.   Average = _____   Average ≈

III.   Median

The median is the _____ data value after arranging in order.

$102,000, $105,990, $107,300, $108,000, $112,500   Median =

$102,000, $105,000, $105,990, $107,300, $108,000, $112,500   Median = _____

Median =

IV.   Mode

The mode is the data value that occurs _____ _____.

$102,000, $105,000, $105,990, $107,300, $108,000, $112,500   Mode:

$102,000, $103,500, $103,500 $105,000, $105,990, $107,300, $108,000, $108,000, $112,500   Modes:

HOW WILL THIS LOOK ON THE ACT?

(Simple Average) Disc golf scores: 54, 52, 50, and 48

Average = _____   Average =

(Missing Score) Disc golf scores: 54, 52, 50, and 48. Dolly needs an average of 50.

$$50 = \frac{}{5}$$ Dolly needs to score a _____ on her 5th round.
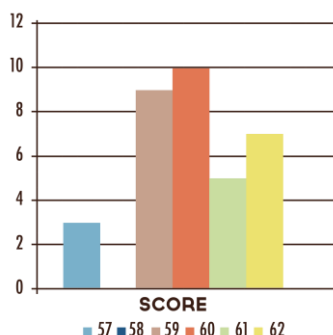
$$\text{Average} = \frac{3() + 9() + 10() + 5() + 7()}{34}$$

$$\text{Average} \approx \underline{}$$

PROBABILITY

If all outcomes are equally likely,...

$$Probability\ of\ event\ A = \underline{\hspace{6cm}}$$

I.   Simple Probability

Diana rolls two dice. What is the probability she rolls a sum of 5?

Possible Outcomes:

1,1	1,2	1,3	1,4	1,5	1,6
2,1	2,2	2,3	2,4	2,5	2,6
3,1	3,2	3,3	3,4	3,5	3,6
4,1	4,2	4,3	4,4	4,5	4,6
5,1	5,2	5,3	5,4	5,5	5,6
6,1	6,2	6,3	6,4	6,5	6,6

How many outcomes have a sum of 5?

P(sum of 5) =

II.   Probability of Multiple Events

Based on past performances, what is the probability Victor birdies both holes 17 and 18?
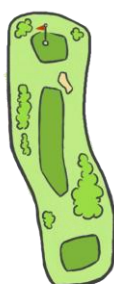
HOLE 17   HOLE 18

P(birdie on both holes) =

HOW WILL THIS LOOK ON THE ACT?
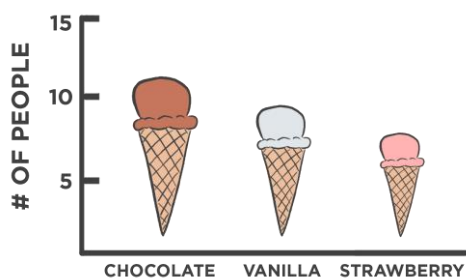
P(vanilla or chocolate) =

SOLVING LINEAR EQUATIONS

Frequency: ⭐⭐

Solutions of linear equations, when graphed on the coordinate plane, form _____.

I.   Linear Equations in One Variable

Solve for x.

$$6x - 10 = x + 5$$

Step 1: Get the variable on _____ _____ of the equal sign.

Step 2: Get the variable _____ _____.

II.   Linear Equations in Two Variables

For these items, you're going to need to rearrange the equation to solve for the indicated variable.

Solve for A.

$$5V - 2 = 4(3A + 1)$$

Distribute the 4.

Subtract 4 from both sides.

Divide by 12 on both sides.

SOLVING POLYNOMIAL EQUATIONS   *Frequency*: ⭐

The degree of an equation tells you how many _____ you can find for that equation.

Perfect Squares and Perfect Cubes to Solve Equations

Save time when solving polynomial equations by knowing common perfect squares and perfect cubes.

Perfect squares		Perfect cubes
$1^2 =$	$7^2 =$	$1^3 =$
$2^2 =$	$8^2 =$	$2^3 =$
$3^2 =$	$9^2 =$	$3^3 =$
$4^2 =$	$10^2 =$	$4^3 =$
$5^2 =$	$11^2 =$	$5^3 =$
$6^2 =$	$12^2 =$	$6^3 =$

I.   Solving by Isolating the Variable

Solve for x. $5x^2 = 45$

Solve for x. $2x^3 + 7 = 23$

$x =$ or

*Don't expect to need the imaginary solutions.

II.   Solving by Factoring

Solve for x. $x^3 - 2x^2 = 3x$
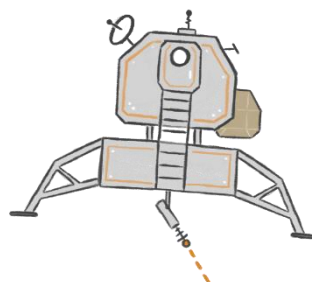
$x =$,   , or

III.   Solving by Using the Quadratic Formula

Solve for x. $3x^2 + 4x = 1$

← Set equal to 0.

$a =$, $b =$, $c =$ ← Identify a, b, and c.

$$x = \frac{\pm\sqrt{(\quad)^2 - 4(\quad)(\quad)}}{2(\quad)}$$ ← Substitute into the quadratic formula.

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$x = \frac{\pm \sqrt{\quad}}{}$$

$x =$ or $x =$ ← Simplify.

SOLVING ABSOLUTE VALUE EQUATIONS   *Frequency*: ⭐

To solve absolute value equations, you need to be able to:

_____ absolute value equations into a corresponding pair of equations.

AND

_____ possible solutions to see if they make the equation true.

I.   Isolating and Solving

Solve for x. $2|3x + 6| - 4 = 2$

← Isolate absolute value by adding 4 and then dividing by 2.

← Split into 2 equations.
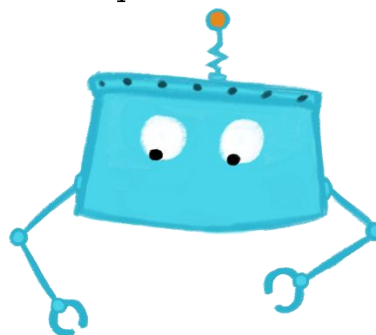
Solve for x. $|x^2 - 11| = 7$

or

II.   No Solutions

$|4x - 1| = -8$ $3|4x - 1| + 12 = 3$ ⟶ $|4x - 1| = -3$

Absolute value equations that result in an absolute value expression equal to a negative number do not have any _____!

III.   Substituting Solutions

If it will save you time, don't hesitate to _____ answers to find a solution.

FACTORING

Frequency: ⭐⭐

I. Common Factors

Start your factoring efforts by looking for a greatest common factor.

$$5x^4 + 10x^2 - 20x$$ ➡ _____

II. Difference of Squares

$$x^2 - 36$$ ➡ _____

Check your answer:

$$(x + 6)(x - 6)$$

→ _____

→ _____

III. Trinomials

Ex. 1 Factor $x^2 - 7x + 12$.

→ $(x \qquad)(x \qquad)$

Check your answer:

$$(x - 3)(x - 4)$$

→ _____

→ _____

Ex. 2 Factor $3x^2 + 20x - 7$.   (Attempt #1)

→ $(3x \qquad)(x \qquad)$

Check your answer:

$$(3x - 7)(x + 1)$$

→ _____

→ _____ ✖

Ex. 2 Factor $3x^2 + 20x - 7$.   (Attempt #2)

→ $(\qquad)(\qquad)$

Check your answer:

$$(3x - 1)(x + 7)$$

→ _____

→ _____ ✔

RATIONAL EXPRESSIONS

Frequency: ⭐⭐

I.   Domain of Rational Functions

Input values that result in a denominator equal to zero are excluded from the domain.

$$f(x) = \frac{3}{(x-5)(x+2)}$$

Values excluded from domain: $x = $ _____, _____

x can be any value but _____ or _____.

II.   Simplifying Rational Expressions

$$\frac{x^2 - 4x + 3}{(x-3)(x+1)}$$

➔ $\dfrac{(\quad\quad)(\quad\quad)}{(x-3)(x+1)}$

➔ $\underline{\quad\quad\quad}$

III.   Finding a Common Denominator

$$\frac{3}{x} - \frac{2}{x+5}$$

➔ $\dfrac{3(\quad\quad)}{x(\quad\quad)} - \dfrac{2(\quad)}{(x+5)(\quad)}$

➔ $\dfrac{\quad\quad\quad}{x(x+5)}$

➔ $\dfrac{\quad\quad\quad}{x(x+5)}$

➔ $\dfrac{\quad\quad\quad}{x(x+5)}$
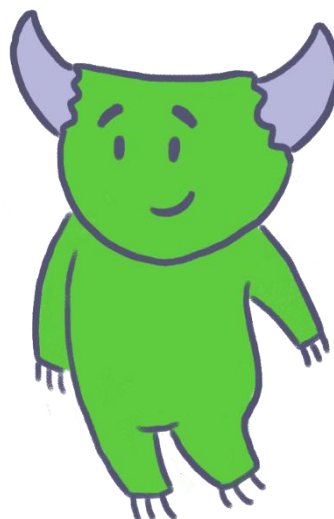
HOW WILL THIS LOOK ON THE ACT?

$$\frac{5x^2 - 20}{3(x-2)}$$

➔ $\dfrac{5(\quad\quad\quad)}{3(x-2)}$

➔ $\dfrac{5(\quad\quad\quad)(\quad\quad\quad)}{3(x-2)}$

➔ $\underline{\quad\quad\quad}$

PROPERTIES OF EXPONENTS

Frequency: ⭐

I. Multiplying with the Same Base

When multiplying with the same base, add the exponents:

$x^a x^b \Leftrightarrow$ _____

$x^3 x^4 \rightarrow$ (_____)•(_____) $\rightarrow$ _____

II. Dividing with the Same Base

When dividing with the same base, subtract the exponents:

$\dfrac{x^a}{x^b} \Leftrightarrow$ _____ (x cannot equal 0)

$\dfrac{x^5}{x^3} = \dfrac{x \cdot x \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}} =$ _____ (because there are 2 more x's in the numerator)

$\dfrac{x^3}{x^5} = \dfrac{\cancel{x} \cdot \cancel{x} \cdot \cancel{x}}{x \cdot x \cdot \cancel{x} \cdot \cancel{x} \cdot \cancel{x}} =$ _____ (because there are 2 more x's in the denominator)

III. Base and a Power to a Power

When you have a base and power to a power, multiply the exponents:

$(x^a)^b \Leftrightarrow$ _____

$(x^3)^4 \rightarrow$ (_____)•(_____)•(_____)•(_____) $\rightarrow$ _____

IV. Distributing Exponents

$(xy)^a =$ _____
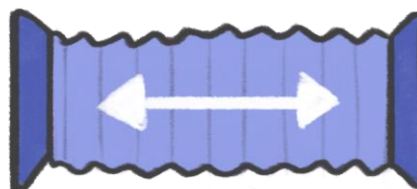
$\left(\dfrac{x}{y}\right)^a =$ —— (y cannot equal 0)

V. The Zero Power

$x^0 =$ _____ (x cannot equal 0)

SOLVING EXPONENTIAL EQUATIONS   *Frequency:* ⭐

Common Exponential Values

$2^0 =$ ____	$3^0 =$ ____	$4^0 =$ ____	$5^0 =$ ____	$6^0 =$ ____	$7^0 =$ ____	$8^0 =$ ____	$9^0 =$ ____
$2^1 =$ ____	$3^1 =$ ____	$4^1 =$ ____	$5^1 =$ ____	$6^1 =$ ____	$7^1 =$ ____	$8^1 =$ ____	$9^1 =$ ____
$2^2 =$ ____	$3^2 =$ ____	$4^2 =$ ____	$5^2 =$ ____	$6^2 =$ ____	$7^2 =$ ____	$8^2 =$ ____	$9^2 =$ ____
$2^3 =$ ____	$3^3 =$ ____	$4^3 =$ ____	$5^3 =$ ____	$6^3 =$ ____	$7^3 =$ ____		
$2^4 =$ ____	$3^4 =$ ____	$4^4 =$ ____	$5^4 =$ ____				
$2^5 =$ ____	$3^5 =$ ____						
$2^6 =$ ____							

Negative Exponents

You can rewrite exponential expressions with negative exponents by moving them across the fraction line:

$$8^{-3} = \text{____}$$ and $$\frac{1}{8^{-3}} = \text{____}$$

The tricky part is recognizing when to use these properties.

I.   Reducing to the Same Base

Solve for x.

$3^{5x-2} = 27$

Solve for x.

$5^{2x} = 1/25$

II.   Setting the Exponent Equal to 0

When an exponential equation equals 1, you know the exponent must equal 0.

Solve for x. $5^{3x-6} = 1$

PROPERTIES OF LOGARITHMS

Frequency: ⭐

Logarithms were developed to assist in computing with LARGE numbers by allowing mathematicians to work with addition instead of multiplication, subtraction instead of division, and multiplication instead of exponents. The invention of the modern computer has decreased their usefulness.

I.   Logarithms and Exponents

$\log_7 49 \rightarrow$　　　　　　$\log_5 5 \rightarrow$　　　　　　$\log 1000 \rightarrow$

II.   Properties of Logarithms

Here are the logarithmic conversions you will need to know for the ACT:

Converting Multiplication into Addition

$\log_b(AC) \Leftrightarrow$ _____ + _____

Converting Division into Subtraction

$\log_b(A/C) \Leftrightarrow$ _____ - _____

Converting Exponents into Multiplication

$\log_b A^C \Leftrightarrow$ _____
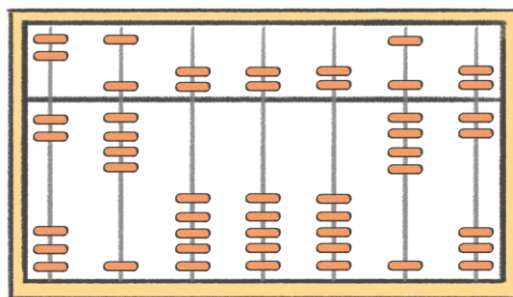
HOW WILL THIS LOOK ON THE ACT?

Simplify $5\log_6 6^{3/5}$.

_____ • $5\log_6 6$

_____

_____

_____

　　　　　　　　28

SOLVING LOGARITHMIC EQUATIONS

Converting Between Exponential and Logarithmic Forms

$x = \log_b A$ is equivalent to _____

This property defined where A, C, b > 0 and b ≠ 1.
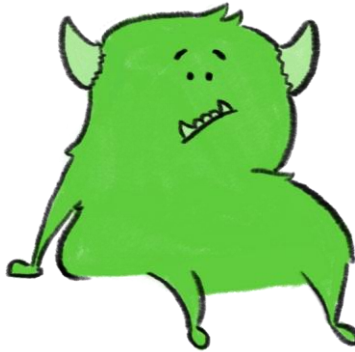
HOW WILL THIS LOOK ON THE ACT?

Solve for x.

$$\log_4 2x = 3$$

Solve for x.

$$\log_3 x + \log_3 5 = 2$$

36 UNIVERSITY

BRAIN-COMPATIBLE ACT PREP

ENGLISH

ACT ENGLISH INTRODUCTION

I.   The Setup

You'll read a passage and simultaneously answer 15 items. You'll need to do that 5 times in the 45 minutes.

_____ passages • _____ questions ➔ _____ questions

II.   The Pace

75 items ⇔ _____ minutes

Pace by passage: _____ minutes per passage

(2 passages ⇔ _____ minutes;
1 passage ⇔ _____ minutes;...)

9:00

45:00

Quickest pace of any section: _____ seconds per item

Pacing tip: Round pace to _____ seconds

(20 items ⇔ _____ minutes; 10 items ⇔ _____ minutes;...)

III.   The Juggling Act: Local and Global Questions

_____ Questions ➔ Can be answered by reading a single sentence or a few sentences

_____ Questions ➔ Require you to understand full paragraphs and the entire passage (often found at end of question set)

Juggling Act ➔ You'll be reading a passage and answering _____ _____—all the while you need to be aware of the _____ and _____ of the passage.

Pro Tips

Distractor choices ➔ _____ _____ and _____ _____

If you have to guess ➔ _____ _____ with _____ _____

is often right!

SUBJECT-VERB AGREEMENT

Frequency: ★★★★★★★

I.   Basic Subject-Verb Agreement

> plural

> ☐

Even though Sam is scared of heights, <u>rollercoasters and the freefall</u> <u>are</u> his favorite amusement park rides.

II.   Subject-Verb Separation

Checking subject-verb agreement can be a challenge when the ACT puts _____ between the subject and the verb.

> subject

> verb

Fly fishing, though one of my dad's favorite pastimes, ____ too slow for my taste.

If needed, _____ the nonessential side comment to make checking for subject-verb agreement easier.

Checking for subject-verb agreement becomes more difficult when the phrase between the subject and the verb is essential because essential phrases aren't framed with commas.
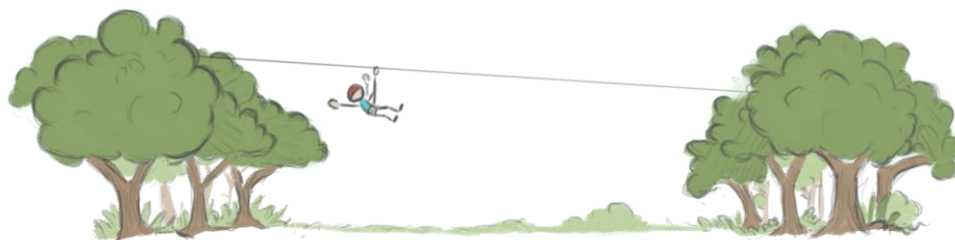
Zip lining through the trees in Costa Rica ____ on my bucket list.

III.   Matching Tense

The introductory element tells us we're in past tense. Choose a past tense verb.

On October 1st, 1901, Annie Taylor successfully _____ over Niagara Falls in a barrel.

You'll also be expected to match the tense of verbs used elsewhere in the sentence.

The black hole _____ the stars, and the supernova threatens nearby systems.

PUNCTUATION

Frequency: ⭐⭐⭐⭐⭐⭐⭐

Punctuation Part I

The purpose of punctuation is to make written communication clearer by providing a way to communicate _____ _____ and to _____ _____.
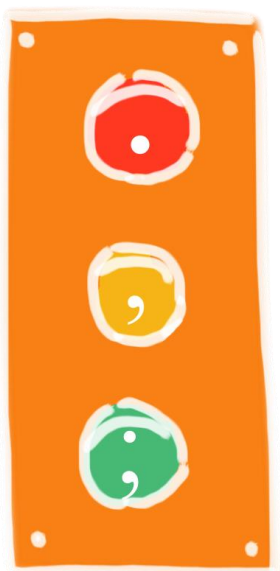
I.   The Period

A period is used to indicate a _____ _____, or a separation between ideas.

II.   The Comma

A comma is used to _____ ___ _____ and allows you to show a small degree of separation between ideas.

When you connect two independent clauses with a comma, make sure to include a _____!

III.   The Semicolon

When you want to show that two complete statements are _____ _____, you can use the semicolon. Be careful: this connection is similar to connecting with a comma, but you won't use a _____ here.

Punctuation Part II

IV.   The Colon

Colons communicate that you should look for more information _____. On the ACT, a colon is often introducing a _____.

Extraneous Punctuation

On the ACT, it is critical that you are able to spot overuse of punctuation. Look for the ACT to place extraneous punctuation in the following places:

1) Between a subject and its _____.

2) Before a _____ _____.

3) Between an adjective and its _____.

COMMA USAGE   *Frequency*: ★★★★★★★★

I.   Introductory Elements

Introductory elements _____ _____ _____ for the rest of the sentence and should be set apart with commas.

==After my twitter account got hacked,== all of my followers had DMs asking them to visit a shady site.

II.   Interrupters: Essential and Nonessential

Nonessential interrupters (or side comments) identify or restrict the noun they are describing. _____ interrupters can be removed from the sentence, and the sentence still works. Communicate that the comment is nonessential by _____ it with commas.

The new Gone Bananas album==, which will be released this year,== is sure to sell a billion songs.

_____ interrupters should not be separated from the rest of the sentence with commas.

The new album ==by the artist Gone Bananas== will be released this year!

III.   Series of Adjectives

To communicate that the order of the adjectives is _____ _____, separate the adjectives with commas.

If the order of the adjectives is _____, then the adjectives do not need to be separated by commas.

IV.   The Comma Splice

To avoid a comma splice when connecting two independent clauses (complete statements), use either a comma with a _____ _____ or use a _____.

TRANSITIONS

Frequency: ★ ★ ★ ★ ★

I.   Examining the Ideas Before and After the Transition

The first step towards finding the right transition is to determine how the _____ are _____ to each other.

<u>Connections Examples</u>

_____: My brother is a soccer fanatic, _____ I, _____, have a real passion for the sport.

_____: Many people in the south enjoy watching football on Sunday afternoon. _____ _____, I find myself searching the channels for an exciting soccer match.

_____ _____ _____ My friend studied in Holland; _____, he is a fan of the Dutch national team.

<u>MORE</u> <u>INFO</u>: If you become a fan of soccer now, you can watch the English Premier League now. _____, the World Cup is right around the corner!

II.   Sorting Transitions

Place the transition words in the correct column!

Contrasting	Similar	Cause/Effect	Additional Information

HOW WILL THIS LOOK ON THE ACT?

The astronaut hooked up his propulsion pack for the <u>spacewalk so</u> the cargo bay doors were jammed.

A. NO CHANGE
B. spacewalk, however,
C. spacewalk, but
D. spacewalk; therefore
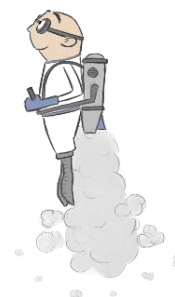
REDUNDANCY   *Frequency*: ⭐⭐⭐⭐⭐

The ACT will expect you to identify redundancy, or _____ _____, and correct it.

I.   Given a Word and Its Definition

Redundant: Because Repeat wouldn't leave Pete alone, Pete was left in a quandary, which was puzzling.

Better: Because Repeat wouldn't leave Pete alone, Pete was left in a _____.

II.   Given Two Synonyms

Or similarly, the ACT may give you two words that have the _____ _____, as we have here.

Redundant: At heart, Pete yearns and longs for the opportunity to explore the cosmos.

Better: At heart, Pete _____ for the opportunity to explore the cosmos.

III.   Redundancy With Comparatives and Superlatives

You probably already know that when an adjective is supersized with "er" or "est" (like hungry changed to hungrier or hungriest), you don't need _____ or _____.

Redundant: During the summer, the shark population in the Gulf is far more busier than in the winter months.

Better: During the summer, the shark population in the Gulf is far _____ than it is in the winter months.

HOW WILL THIS LOOK ON THE ACT?

Though Pete is occasionally annoyed by <u>Repeat every now and then</u>, they are still brothers and best friends!

A. NO CHANGE
B. Repeat from time to time,
C. Repeat sometimes,
D. Repeat,

MISPLACED MODIFIERS

I.   Logical Placement

Just as adjectives are placed right beside the nouns they describe, other modifiers are also best placed _____ _____ _____ they are describing.

INCORRECT: The tourists snapped pictures of the large rhino in the jeep.

CORRECT: The tourists _____ _____ _____ snapped pictures of the large rhino.

II.   Dangling Modifiers

When sentences begin with a description, be careful not to leave a _____ _____. Identify the _____ immediately after the introduction.

INCORRECT: Floating in the river, the zebra watched for crocodiles.

CORRECT: Floating in the river, _____ _____ watched for prey.

37

PRONOUN-ANTECEDENT AGREEMENT

Frequency Rating: ⭐⭐⭐

Pronouns must agree with their _____, just like verbs must agree with their subjects!
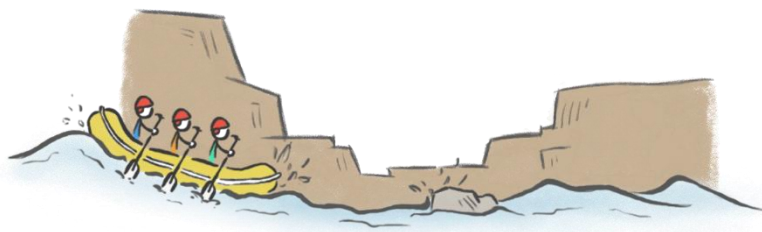
Rafting the Colorado River is fun. _____ swift water makes for quite an adventure.

Keep in mind these three key differentiators when determining pronoun-antecedent agreement...

I.   Is the Antecedent _____ or _____?

My friends enjoy hang gliding. _____ have spent years honing their skills.

II.   Is the Antecedent a _____ or an _____?

Yosemite's El Capitan is a mecca for **rock climbers,** _____ _____ _____ sleep on its steep face during the long ascent.
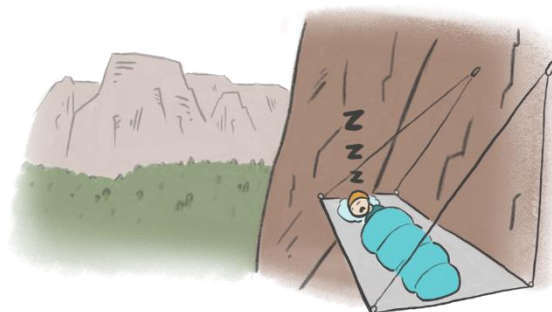
 (Be careful to refer to people as a _____, not a *which* or a *that*!)

III.   Should the Pronoun be _____?

Louise enjoys climbing, but rappelling is _____ favorite.

POSSESSIVE FORMS

Frequency Rating: ⭐ ⭐ ⭐

I.   Possessive Form Basics
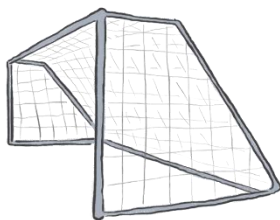
For most terms, the possessive form is formed by adding an ***apostrophe*** and an ***s***.

Ex. In this season, Spanish sides have been some of _____ best teams.

II.   Plural Possessive Forms

For most plural nouns, show possession by adding an _____ after the _____.

Ex. In the Premier League, _____ salaries average over two million pounds per year.

III.   The ACT's Favorites

The ACT likes to test the following. Be ready!

The possessive form of ***it*** is _____.   ***Be careful: ***it's*** = _____ _____.

The possessive form of ***they*** is _____.   ***Be careful: ***they're*** = _____ _____.

The possessive form of ***who*** is _____.   ***Be careful: ***who's*** = _____ _____.

HOW WILL THIS LOOK ON THE ACT?

Messi and Ronaldo will be remembered as two of the _____ most gifted and accomplished _____.

ADJECTIVES AND ADVERBS

Frequency: ⭐⭐

I.   Adjectives

What is an adjective?

Adjectives describe _____ and _____.

Example:

Meet my _____, _____, _____

friend Bob.

II.   Adverbs

What is an adverb?

Adverbs describe _____, _____, and

other _____.

Adverbs often end in "____."

Example:

Minnie _____ jumps _____ over the

_____ blue moon.

HOW WILL THIS LOOK ON THE ACT?

At the reception, Bob brought out his <u>wild popular</u> dance move.

A. NO CHANGE
B. wildly popular
C. wildly popularly
D. wild popularly

Frequency: ⭐ x 16

I.   Deletion Items

The ACT will test you on the effect of ＿＿＿＿＿＿＿ a phrase or a full sentence from a passage. Ask yourself how the message ＿＿＿＿＿ ＿＿＿＿＿ as a result of the deletion.

II.   Addition Items

Addition items focus on the structure and meaning of a passage. It is critical that you can identify a paragraph's ＿＿＿＿＿ ＿＿＿＿＿＿ in order to find the best introduction, transition, or conclusion.

III.   Split into Two Paragraphs Items

Don't be surprised if the ACT ＿＿＿＿＿＿＿ ＿＿＿＿ ＿＿＿＿＿＿＿ and asks you where they should be ＿＿＿＿. Often, the ACT tells you which details they want separated. Use their specifications to determine your answer.

IV.   Placement Items

Placement and order are key pieces of written communication. And the ACT will expect you to zero in on appropriate ＿＿＿＿＿＿＿. Expect to choose best placement for phrases within sentences, sentences within paragraphs, and possibly paragraphs within essays.

V.   Writer's Purpose Items

The ACT will tell you the writer's purpose for the passage and ask you to evaluate whether the essay's message fulfills that purpose.

1. ＿＿＿＿＿＿ the Yes or No answers immediately by answering their specific question.

2. Decide between the remaining two choices by determining the ＿＿＿＿＿＿ of the ＿＿＿＿＿.

41

36 UNIVERSITY

BRAIN-COMPATIBLE ACT PREP

READING

ACT READING INTRODUCTION

I.   The Setup

The ACT Reading test consists of _____ passages.

With each passage, you'll need to answer _____ questions, for a total of _____ items.

You'll be given _____ minutes to complete this section.

II.   The Pace

40 items ⇔ 35 minutes

Pace by passage:

____ minutes ____ seconds per passage

Pace by item: _____ seconds per item
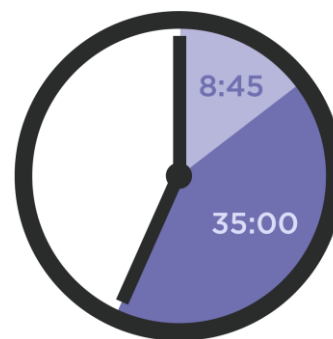
Pacing Tip: Round pace to ____ _____

(15 items ⇔ ____ min; 10 items ⇔ ____ min; etc.)

III.   The Passages

Passage 1: _____ _____

Passage 2: _____ _____

Passage 3: _____

Passage 4: _____ _____

IV.   Question Types

Level 1: _____ _____ _____ ← Answers are **recall** from specific part of passage

Level 2: _____, _____ _____ _____ ← Need to

understand what is **implied** in local part of passage

Level 3: _____ ____ _____, _____, _____

_____ ← Need to understand **full paragraphs** and **passage**

Pro Tips

Make sure your answer choice is based on what is _____ ___ _____ _____.

Do not _____ through the passage so quickly that you have to _____ large portions

of the text.

Never leave any _____!

DIRECT FROM TEXT ITEMS

Frequency per passage: ★ ★ ★ ★

The "direct from text" items are the easiest ACT Reading items. The answers come

_____ from the text!

I.   What Do These Items Look Like?

_____ to the narrator, which of the

following...?

The passage _____ that...?

The narrator _____ that...?

II.   How to Handle These Items

When you come across a "direct from text" question, you will need to _____ the

needed information... or quickly _____ the relevant text.

The correct answer choice will be a _____, though not necessarily with the

exact same words, of what is written in the passage.

44

MEANING FROM CONTEXT ITEMS

Frequency per passage: ⭐

The ACT will ask you to use _____ _____ to define particular words,

phrases, or statements.

I.   What Do These Items Look Like?

As used in line 23, the word "real" refers to:

The narrator's statement in lines 45 - 46 _____

_____ _____ :
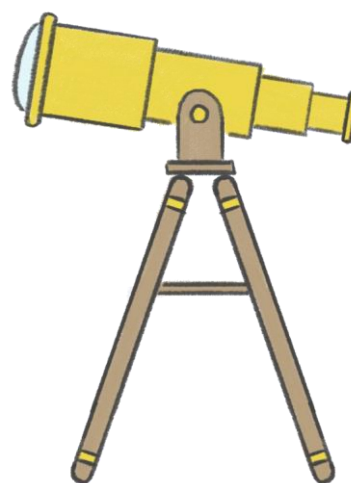
II.   How To Handle These Items

The identified text will often be a commonly used statement that can have

_____ _____ .

Use the _____ to discern the author's intended meaning within the passage.

INFERENCE ITEMS

Frequency per passage: ★ ★ ★

Inference items are slightly more difficult than the "direct from text" items because the correct answer choice will be _____, but not stated explicitly.

I.   What Do These Items Look Like?

The passage most strongly _____ ...

It can reasonably be _____ ...

The character would most _____ _____ with...

WHAT IS SUGGESTED

II.   How to Handle These Items

Inference items require you to understand what is _____ in the text, but isn't stated explicitly. The text will have built a case for one of the given answers.

If needed, _____ the specified text to identify the supported conclusion.

POINT OF VIEW ITEMS

Frequency per passage: ½ ⭐

Point of view items require you to identify the author's or narrator's _____

or _____ as revealed in the text.

I.   What Do These Items Look Like?

At the time of the events of the story, the

narrator is:

The point of view from which the passage is

told is...

II.   How to Handle These Items

Point of view items expect you to _____ _____ _____ to

see a cohesive perspective of the writer or narrator.

As you read, make sure you pick up on details about the narrator or author— _____,

_____ to other characters, _____, _____, and so forth.

Determine whether the narrator is speaking in _____ or _____ person.

Does the narrator have a _____ perspective, or is she _____,

knowing everything?

Be prepared to zoom out from the details to see the _____ _____.

SUMMARY ITEMS

Frequency per passage: ⭐ ⭐

The "summary" items require you to find a _____ _____ of a paragraph or full

passage, identify the _____ of a sentence or paragraph, or _____

about specific characters.

I.   What Do These Items Look Like?

The primary purpose of the last paragraph is to:

Which of the following best describes the

purpose of the 3rd paragraph?
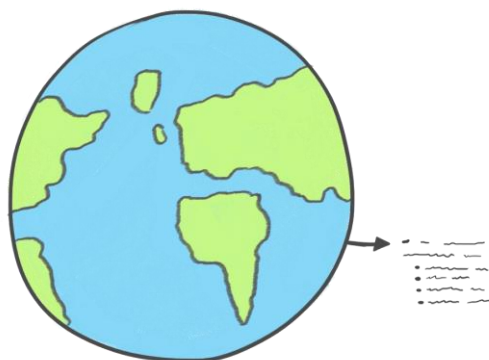
II.   How to Handle These Items

Give yourself enough _____ from the passage's _____ long enough
to determine how all the details fit together.

_____ _____ from the details to see the full landscape presented in the text.

If you _____ all the _____, what is their message?

What is the _____ _____ painted by a paragraph or about a character?

What _____ does the indicated text serve in the passage?

Hints for handling global or summary items:

1.   Quickly scan the indicated text to _____ _____ _____ _____
     in order to see the big picture.

2.   Try to _____ all the details in _____ _____ or less.

PROSE FICTION PASSAGE   *Frequency*: 1 passage

ACT calls the first passage either Prose Fiction or Literary Narrative. Do not expect differences in passages types.

The Prose Fiction passage is the only _____ passage on the ACT reading test.

Expect the author to explain the _____, _____, and _____ of the characters.

I.   How Should You Read the Passage?

Specifically, pay attention to what the characters _____, _____, and _____.

_____ _____ is key.

Look for recurring _____ and main ideas.

II.   What Questions Will They Ask?

On average, you can expect...

_____ **Direct from Text** items

_____ **Inference** items

_____ **Meaning from Context** item

_____ **Point of View** item

_____ **Summary** item

_____ **Writing Technique** item

ACT Reading Tip

All answers must be based on what is written in the _____.

SOCIAL SCIENCE PASSAGE   *Frequency*: 1 passage

The Social Science passage will likely deal with topics in the following fields:

_____, _____, _____ _____,

_____, and _____.

Look for the passage to present historical figures, _____ _____,

or _____ _____.

I.   How Should You Read the Passage?

As you read, pay special attention to the author's viewpoints and _____ .

Try not to get so caught up in the details that you don't see the _____ _____ .

II.   What Questions Will They Ask?

The Social Science passage content is different from what you will encounter on the Prose Fiction passage, but the question types are very _____.

On average, you can expect...

_____ **Direct from Text** items

_____ **Inference** items

_____ **Meaning from Context** item

_____ **Point of View** item

_____ **Summary** item

_____ **Writing Technique** item

ACT Reading Tip

If you are running low on time, you can attempt to answer items that refer to specific _____.

HUMANITIES PASSAGE   *Frequency*: 1 passage

The Humanities passage is often about _____ or _____

topics, sometimes from a _____ _____, and often with

a _____ touch.

Often the humanities passage has _____ _____—two smaller,

related texts.

I.   How Should You Read the Passage?

As you read, try to _____ the events.

Take mental note of the sequence of _____.

Tune in to the narrator's beliefs, _____, and _____.

Note the writer's or narrator's place within the story.

Step back from the details to see the main _____ and _____ of the passage.

II.   What Questions Will They Ask?

On average, you can expect...

_____ **Direct from Text** items

_____ **Inference** items

_____ **Meaning from Context** item

_____ **Point of View** item

_____ **Summary** item

_____ **Writing Technique** item

NATURAL SCIENCE PASSAGE   *Frequency*: 1 passage

The Natural Science passage is the last passage before the ACT science test.

The Natural Science passage could delve into any science topic in a variety of science fields including _____, _____, _____ _____, and _____.

I.   How Should You Read the Passage?

The Natural Science passage tends to be _____-_____, so close reading is required.

Pay attention to the _____!

II.   What Questions Will They Ask?

On average, you can expect...

_____ **Direct from Text** items

The other five items are a mix of:

Meaning from Context items

Inference items

Summary items

Writing Technique items
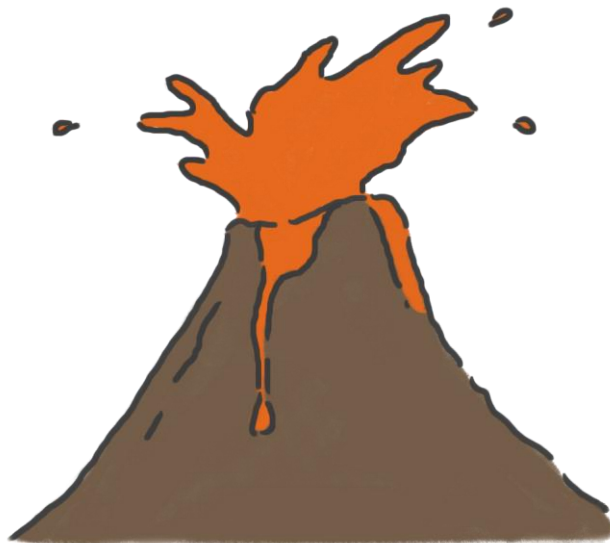
Expect to see more Direct from Text items on the Natural Science passage because the passage is dense with facts.

DOUBLE PASSAGES   *Frequency*: 1 passage

Expect one of the four reading sets to have _____ _____ _____ instead of one larger passage.

I.   Dealing with the Passages Separately

The questions accompanying the texts will be divided into _____ sets.

The first set will ask questions about the _____ _____; the second set will ask questions about the _____ _____, and the third set of questions will ask you about _____ between the passages.

You may want to read the _____ _____ and answer the first set of questions before reading the second passage and answering the second and third question sets.

II.   Connections Between the Passages

The last set of questions consists of a few items that will ask you to synthesize information from both texts.

Look for the _____ between the passages...

Do the texts have the same _____? If so, expect to be asked about the _____ _____ displayed in the texts.

Do the passages cover the _____ _____ ?

Is there a _____ that appears in both passages?

36 UNIVERSITY

SCIENCE

BRAIN-COMPATIBLE ACT PREP

ACT SCIENCE INTRODUCTION

I.   The Setup

Scenarios: _____ or _____

Items per scenario: _____ to _____

Total items: _____

All but one scenario will have a combination of diagrams, tables, and graphs.

II.   The Pace

_____ items ⇔ _____ minutes

Pace by scenario: _____ _____ per scenario (if 7 scenarios)

Pace by item: _____ seconds per item
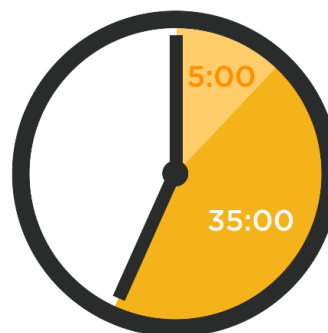
Pacing Tip: Round pace to ___ minute per item

 (10 items ⇔ _____ minutes;   5 items ⇔ _____ minutes; ...)

III.   Plan of Attack

Read the text carefully to determine the scenario's _____, paying special attention to the experimental design and noting _____ and _____.

In tables, scan _____ and _____ labels.

In graphs, scan _____ labels and the _____.

Let the questions tell you where you should _____ further!

The Conflicting Viewpoints passage will consist almost entirely of text. Underline _____ between hypotheses to ensure you are ready for the questions.

Pro Tips

If you are a slower reader, consider saving the conflicting viewpoints passage for _____.

If you are struggling to finish the science test, try _____ with the _____ and read the scenario only when the questions require it.

READING TABLES

Frequency: ⭐⭐⭐⭐⭐

I.   Identify the WHOs and the WHATs

The first column, and sometimes the first two columns, indicates _____ the table is

about. The remaining columns are _____ the table is going to tell you about each WHO.

TABLE 1			
	AVG DAILY TEMPERATURE ^0C	$_pH$	DISSOLVED O_2 (MG/L)
MARCH	7	5.8	11.7
APRIL	9	6.1	10.5
MAY	12	5.9	9.6
JUNE	15	5.7	7.5
JULY	19	5.8	6.2
AUGUST	24	5.8	5.4

II.   Identify Relationships Between Variables

Scan the _____ values to determine if there are relationships between the

variables.

In the example above, note that as the temperature increases, the dissolved oxygen

_____.

READING GRAPHS

**_Frequency_**: ⭐⭐⭐⭐⭐

Strategy:

First, quickly identify big picture information from the graphs. Then, the questions will guide you to specific parts of the graphs to mine the details!

I.   Use the Key and Labels

Scan the _____ on the horizontal and vertical axes. Check for a _____.

II.   Given Input Value → Read Output Value

Can you find the average temperature for the month of June? (Trace from the horizontal axis up to the temperature line and across to the vertical axis.)
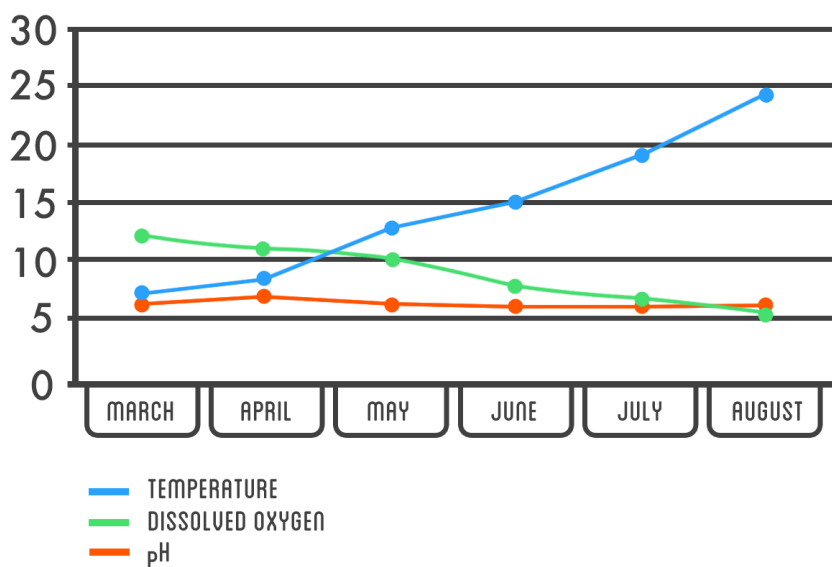
The average daily temperature for June is _____ degrees Celsius.

The temperature reading of 20°C was likely taken in _____.

III.   Find Trends in the Data. Increasing? Decreasing?

(Label the graph above with arrows as in the video.)

As temperature increases, dissolved oxygen _____.

The largest decrease in dissolved oxygen is between _____ and _____.

DATA IN DIFFERENT FORMS

Frequency: ⭐ ⭐

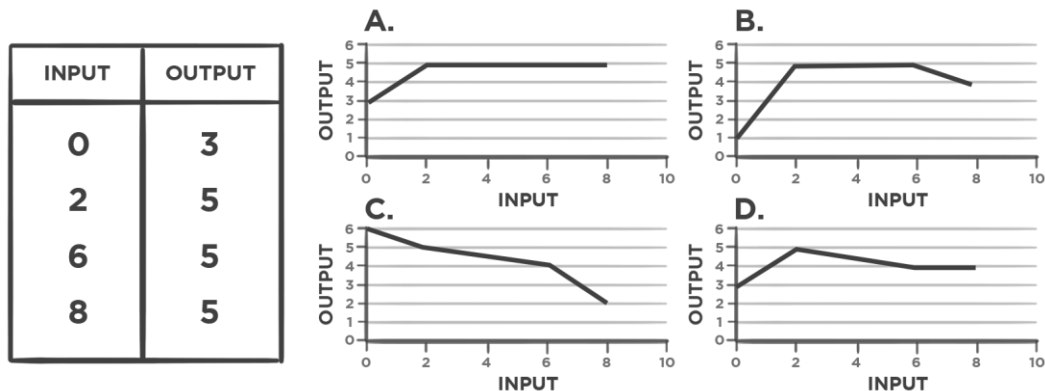Data can be displayed in many different forms like _____, _____, and _____ .

You need to be able to match data from tables with their corresponding graphs...

I.   From Table to Points to Graph

Match the data from the following table with the corresponding graph.

Step 1: Recognize the values as _____ _____ .

Step 2: Plot the ordered pairs to _____ graphs that don't match the data.

INPUT	OUTPUT
0	3
2	5
6	5
8	5

A.

B.

C.

D.

II.   From Categorical Data to Bar Graphs

Practice making a bar graph from the categorical data.

VEGGIE	HARVEST (lbs.)
OKRA	15
CORN	75
BELL PEPPERS	22

OKRA   CORN   BELL PEPPERS
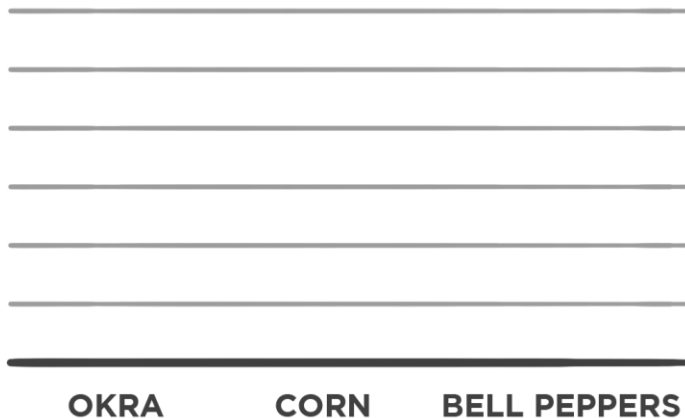
MAXIMUMS AND MINIMUMS   *Frequency*: ⭐⭐

Identifying maximums and minimums, or _____ and _____ values, are often some of the easier items you'll encounter on the ACT science section.

I.   Tables: Max and Min

Be prepared to find maximum and minimum values from tables. The most difficult part is often _____ the correct table and finding the correct

_____.

*For help identifying the correct table and finding the important information, check out the Reading Tables video.

II.   Graphs: Max and Min

Sketch in arrows to find the corresponding input and output values for both the maximum and the minimum.
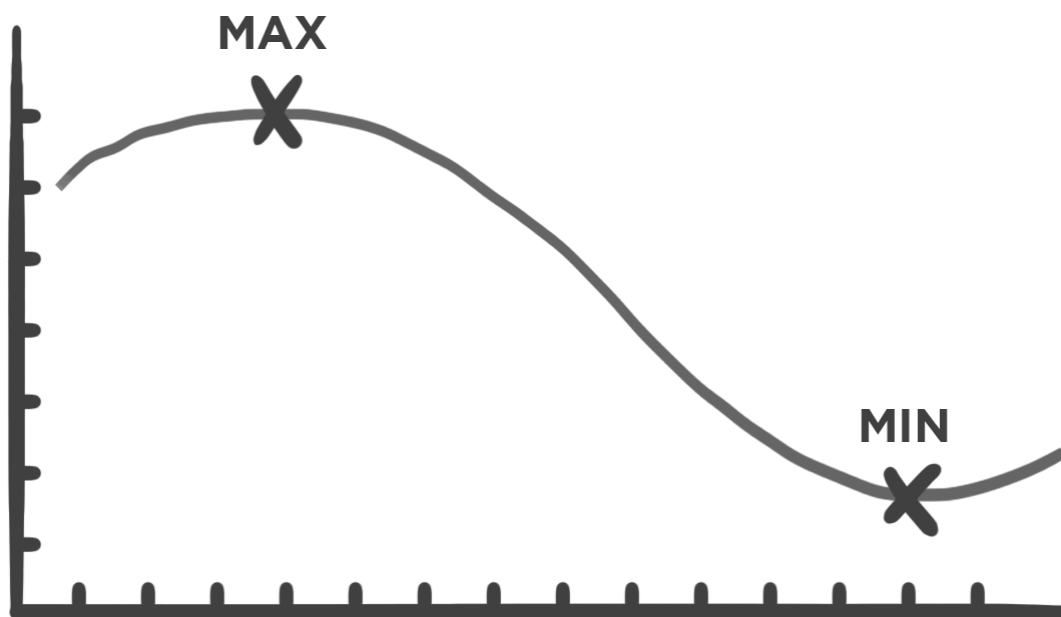
ANALYZING EXPERIMENTS
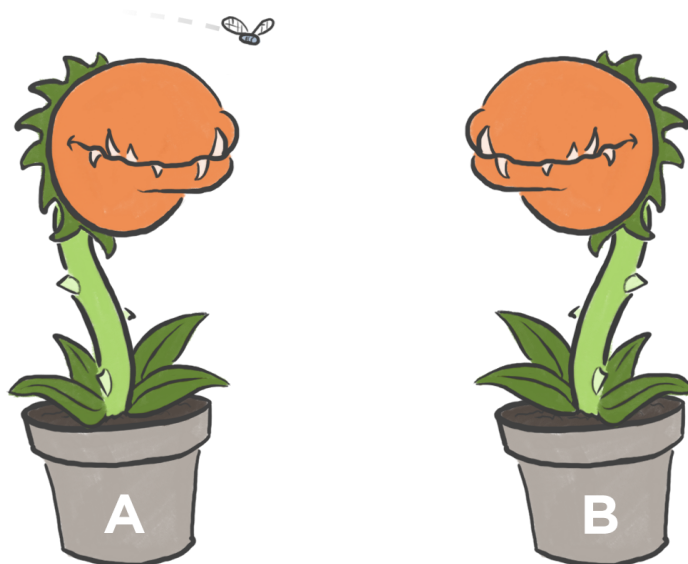
Frequency: ⭐⭐

I.   Identifying Elements in Experiments

Controls:

Variables:

Independent Variable:

Dependent Variable:

Identify the controls in this experiment.

Identify the independent variable in this experiment.

Identify the dependent variable in this experiment.

II.   Interpreting Results

Correlation:

When an increase in one variable corresponds with an increase in another variable, there is a _____ correlation between the variables.

When an increase in one variable corresponds with a decrease in another variable, there is a _____ correlation between the variables.

When an increase in one variable doesn't correspond with a change in another variable, there is little to _____ correlation between the variables.

60

EVALUATING HYPOTHESES

Frequency: ⭐ ⭐ ⭐

A hypothesis is an explanation that is based on _____ _____. This explanation, or hypothesis, describes _____ _____ and is used to predict _____ _____.

I. Evaluating Hypotheses Items Look Like…

Given a new hypothesis… "Do the data in the scenario support this claim?"

Given new information… "Which of the following hypotheses is most likely to be true?"

II. Do the Data Support the Hypothesis?

When you are presented with a hypothesis and asked to evaluate the merit of the hypothesis, analyze the appropriate _____ and _____ to determine whether the hypothesis fits the data.

DATA SUPPORT HYPOTHESIS?

HYPOTHESIS

When you are provided with details of a new outcome and asked to identify a hypothesis that fits with the new scenario, _____ the new outcome with the data presented previously, and then choose the correct hypothesis.

DATA SUPPORT HYPOTHESIS?

NEW OUTCOME DATA FROM SCENARIO → **HYPOTHESIS**

MULTIPLE Y-AXES

Frequency: ⭐⭐

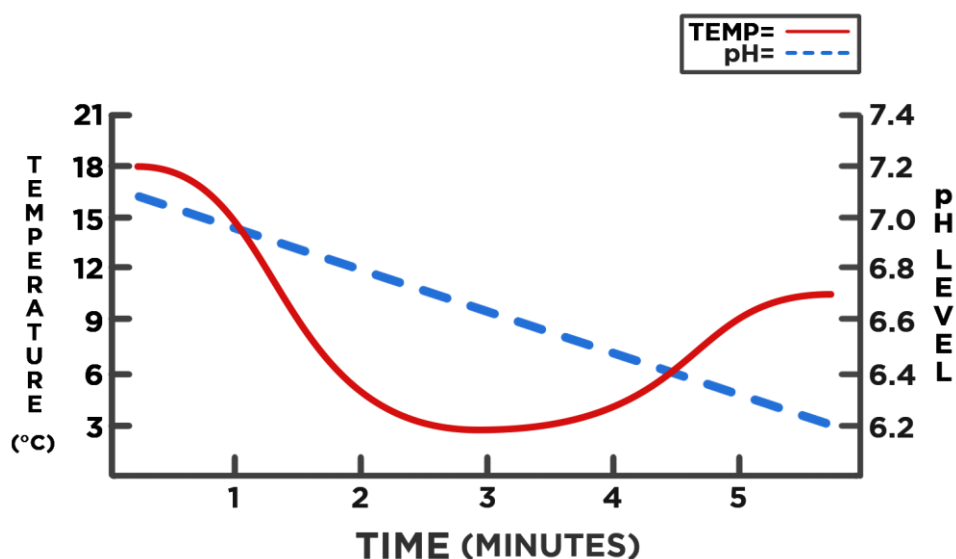Often, one set of input values is paired with more than one set of _____

_____ .

Instead of making separate graphs for each of those sets of outputs, it is often more efficient to plot the data on the same graph and use _____ _____ .

How Should You Handle Multiple Y-Axes Graphs?

Step 1: Utilize the Key

Use the key to match the graphs with their _____ _____ .

Step 2: Read Data Values

Can you find the pH reading at the two-minute mark? (Draw in arrows to find the pH value!)

At the 2-minute mark, the pH reads _____ .

The temperature was 6 degrees Celsius at what time(s)?

The temperature was 6 °C between _____ and _____ minutes and between _____ and _____

minutes.

VERTICAL AXIS INPUT VALUES

Frequency: ⭐⭐

When the ACT gives data about a _____ _____, like the atmosphere, a vertical slice of the earth's crust, or a water column, look for _____ _____ to be displayed on a vertical axis. _____ _____ will be displayed on a horizontal axis. If there is more than one set of output values, you will likely find two horizontal axes.
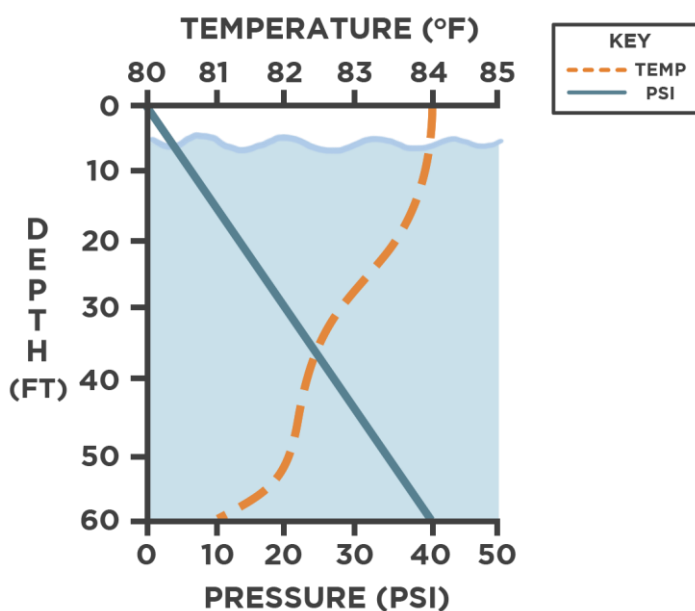
How Should You Handle Vertical Axis Input Values Graphs?

Tip 1: _____ _____ _____

Use the key to match the graphs with their corresponding axes.

Tip 2: Read Data Values

Can you find the water temperature at a depth of 30 feet? (Draw in arrows.)

The water temperature at 30 feet is between _____ and _____ F.

Tip 3: Turn the Graph _____

Turning the graph sideways is a great strategy for identifying _____ when working with input values displayed on the vertical axis.

MULTIPLE DATA SOURCES   *Frequency:* ⭐⭐⭐⭐⭐

Many of the more difficult items will require you to pull information from _____ _____ _____ _____ in the scenario.

## I.   Combining Text with Data

Though it may be tempting to save time by skipping the text, some of the more difficult items will require you to glean information from the _____ and use it in _____ with the _____ and _____.

Use your understanding of the setting to interpret the presented data correctly.

II.   Utilizing Multiple Data Sources

The most difficult items, which often show up in the final few questions of a scenario, will require you to synthesize information from _____ _____ _____ in order to answer correctly.

1. Be prepared to use the info from two or more _____ to answer a single question.
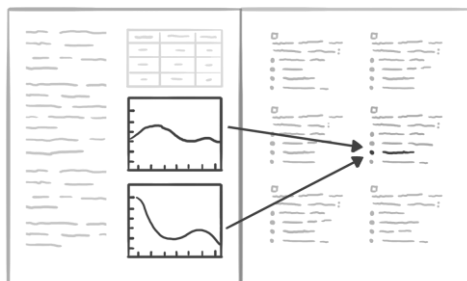
2. You may need to use the introductory _____ to understand a _____ to interpret a _____.