



## Time Savers on the ACT / SAT

Mastery of content is the strategy that leads to success on the college entrance tests. Yet, another strategy – using shorter methods when approaching some questions – assists as well.

### MATH

- **Memorize the formulas! (ACT)**
- **The questions become more difficult, so pacing is important.**
- **Use your calculator sparingly, only when necessary.**
- **Don't spend too much time on any one problem; skip it and come back if time permits.**
- **Use meaningful variables**
  - A publishing company ships hard-cover textbooks in boxes that weigh 56 pounds each, and soft-cover workbooks in boxes that weigh 35 pounds each. A shipment going to several schools weighs 2604 pounds total and contains 60 boxes. How many boxes of soft-cover workbooks are in the shipment? (ACT Form 70G #25)

$$h = \text{hard-cover}$$

$$s = \text{soft-cover}$$

- Susan makes holiday wreaths for 4 hours every Saturday. It takes her 20 minutes to make a small wreath and 30 minutes to make a large wreath. This Saturday, Susan will make twice as many large wreaths as small wreaths. How many of the large wreaths will she make this Saturday? (ACT Form 73G #8)

$$s = \# \text{ small wreaths}$$

$$2s = \# \text{ large wreaths}$$

- **Don't distribute when solving for a variable if the variable already has a coefficient of 1.**

- If  $\frac{12(x - 11)}{12} = \frac{-15}{12}$ , then  $x = ?$  (ACT Form 66F #9)

$$x - 11 = \frac{-15}{12}$$

- **When asked to solve for one variable, given two equations, add or subtract – even sometimes multiply or divide – to eliminate the other variable. Substitution works but could take longer. Save yourself steps by thinking ahead.**

- What is the value of y in the solution of the system of equations below? (ACT Form 70G #49)

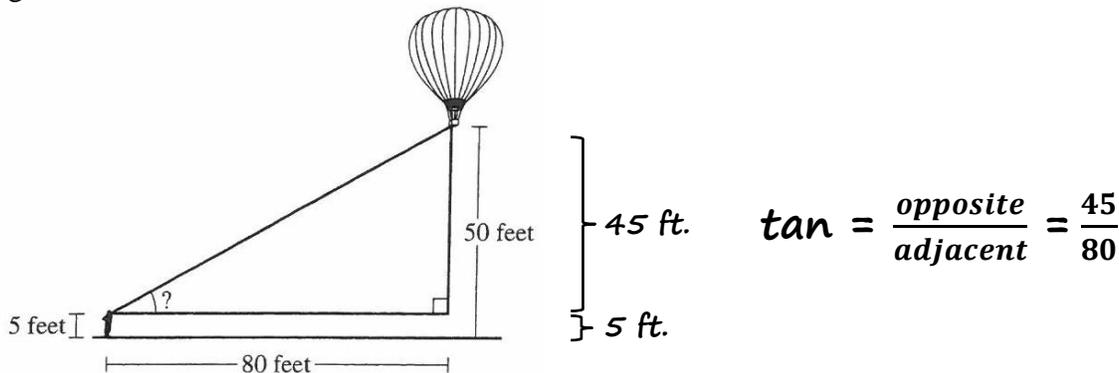
$$\begin{array}{r} x + y = -a \\ -(x - y = b) \\ \hline 2y = -a - b \end{array} \quad \text{Solving for y, so get rid of x}$$

- Which ordered pair (x, y) satisfies the system of equations shown below? (PSAT Oct. 14, 2015 #5)

$$\begin{array}{r} 2(2x - y) = 12 \rightarrow 4x - 2y = 12 \\ x + 2y = -2 \rightarrow \quad \quad \quad + x + 2y = -2 \\ \hline 5x = 10 \end{array}$$

• **See if a figure is labeled before reading the entire question. (ACT only)**

- Melanie is standing 80 feet from the launch site of a hot-air balloon when the balloon lifts off from the ground and rises vertically. Melanie's horizontal line of sight is 5 feet above the ground. When the bottom of the balloon is 50 feet above the ground, as shown below, which of the following expressions gives the angle that Melanie's horizontal line of sight makes with her line of sight to the bottom of the balloon? (ACT Form 72E #51)



• **Keep an eye on the answers. Don't do more work than needed.**

- In the standard  $(x, y)$  coordinate plane, what is the midpoint of the line segment with endpoints  $(1, 9)$  and  $(7, -3)$ ? (ACT Form 70G #13)
  - A.  $(-3, -6)$
  - B.  $(-1, 8)$
  - C.  $(4, 3)$
  - D.  $(5, 2)$
  - E.  $(8, 6)$

*Eyeball the answers, and see that they are all different, so you only need to find x OR y  
(If some x's were the same, you would want to find y)*

• **Eliminate answers that cannot be correct, especially when using the answers to solve.**

- What is the largest 2-digit integer that is divisible by 7 and is a multiple of 3? (ACT Form 70G #44)
  - F. 21
  - G. 42
  - H. 84
  - J. 98
  - ~~K. 105~~

• **If the question lends itself to using the answers, plug them in logically to solve (i.e. If it's asking for the biggest, start there; otherwise, start with the easiest "looking" answer choice.)**

- The least common multiple (LCM) of 2 numbers is 108. The greater of the 2 numbers is 54. What is the maximum value of the other number? (ACT Form 70G #25)
  - A. 2
  - B. 6
  - C. 18
  - D. 27
  - E. 36

*Start with the greatest answer choice.*

$$\frac{108}{36} = 3 \quad \text{yes!}$$

- The product of 2 numbers is 25. If 1 of the numbers is the complex number  $4 + 3i$ , what is the other number? (ACT Form 71H #53)
  - A.  $21 - 3i$
  - B.  $\frac{4}{25} + \frac{3}{25}i$
  - C.  $4 - 3i$
  - D.  $100 + 75i$
  - E.  $\frac{100}{7} + \frac{75}{7}i$

*Translate first.*

$$xy = 25 \text{ or } (4 + 3i)(y) = 25$$

*Start with the easiest "looking" answer choice!*

$$(4+3i)(4-3i) = 16 - 12i + 12i - 9i^2 = 16 - 9(-1) = 16 + 9 = 25 \quad \checkmark$$

• **Once you get equality, move on. Don't try every answer.**

- The equation  $\sqrt{x} + \sqrt{x-16} = 8$  is true for what real value of  $x$ ? (ACT Form 63D #26)
  - ~~F.~~ 9  $\sqrt{9-16} \rightarrow$  *can't have negative under square root*
  - ~~G.~~ 16  $\sqrt{16} + \sqrt{16-16} = 4 + 0 \neq 8$
  - H.** 25  $\sqrt{25} + \sqrt{25-16} = 5 + \sqrt{9} = 5 + 3 = 8 \checkmark$
  - J. 36
  - K. 64

*H works; don't try J and K.*

- What is the midpoint of the line segment with endpoints (3, 5) and (-1, 3) in the standard (x, y) coordinate plane? (ACT Form 63C #23)
 

A. (0, 6)	$\frac{x_1 + x_2}{2}$	$\frac{y_1 + y_2}{2}$
<b>B.</b> (1, 4)	$\frac{3 + (-1)}{2}$	$=$
C. (2, 1)		
D. (2, 8)		
E. (4, 2)	$\frac{2}{2}$	$= 1$

*Check the answer choices – no more work!*

• **To be less likely to make a mistake, when given a choice, use the information in a way that will make the math easier. Most problems are missed due to careless errors.**

- Two numbers have a product of -48 and a sum of 0. What is the lesser of the 2 numbers? (ACT Form 72E #57)

*Translate!*

$$\begin{array}{l} xy = -48 \rightarrow y = \frac{-48}{x} \\ x + y = 0 \rightarrow y = -x \end{array} \quad \left. \begin{array}{l} \\ \end{array} \right\} \begin{array}{l} \text{With which would} \\ \text{you rather work?} \end{array}$$

- What is the distance, in coordinate units, from (3, 4) to (6, 9) in the standard (x, y) coordinate plane? (ACT Form 63C #43)

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

*Plug (6, 9) in for  $x_2$  and  $y_2$  so you don't have to work with negatives*

$$d = \sqrt{(6 - 3)^2 + (9 - 4)^2}$$

• **Choose numbers that make the math easy; for example, 100 when dealing with %**

- In an Italian class, 65 percent of the students were women. At the end of the class, 52 percent of the men and 44 percent of the women received a certificate. What percentage of the class received a certificate? (PSAT Oct. 14, 2015 #30)

*100 students*

$$\begin{array}{l} 65 \text{ women} \quad 44\% = 28.6 \\ 35 \text{ men} \quad 52\% = 18.2 \end{array} \quad + \quad 46.8\%$$

- Let  $a$  be a prime number greater than 10,000 and let  $x = \sqrt{a}$ . Which of the following expressions represents a rational number? (ACT Form 72E #50)

$$X = \sqrt{10,001}$$

- For every negative real value of  $x$ , all of the following statements are true EXCEPT: (ACT Form 72E #48)

F. $ x  > 0$	<i>Use -1 as "negative real value of x":</i>		
G. $2x < 0$	F. $ -1  > 0$	$1 > 0$	T
H. $x^5 < 0$	G. $2(-1) < 0$	$-2 < 0$	T
J. $x - x^2 < 0$	H. $(-1) < 0$	$-1 < 0$	T
K. $ x  - x = 0$	J. $-1 - (-1)^2 < 0$	$-1 - 1 < 0$	T
	K. $ -1  - (-1) = 0$	$1 + 1 = 0$	F

- What is  $\frac{1}{3}$  % of  $\frac{6}{7}$ ? (ACT Form 72E #59)

$$\frac{1}{3} \% = \frac{1/3}{100} = \frac{1}{300}$$

- Know the Pythagorean triplets for right triangles (faster than  $a^2 + b^2 = c^2$ )

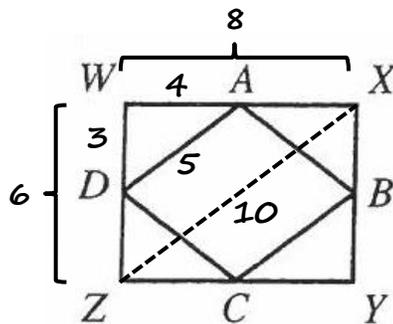
Can reduce to:

3-4-5    ∴    6-8-10  
 5-12-13  
 7-24-25  
 8-15-17

- Which of the following sets of 3 numbers could be the side lengths, in meters, of a right triangle? (ACT Form 70G #25)
  - A. 1, 1, 1
  - B. 2, 3, 5
  - C. 3, 4, 7
  - D. 4, 9, 13
  - E. 6, 8, 10

*6-8-10 reduces to triplet 3-4-5*

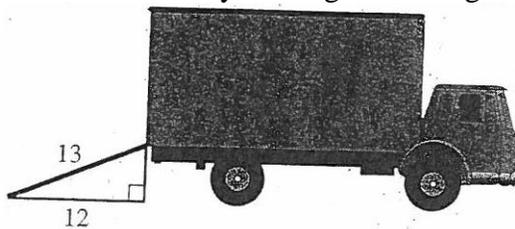
- The midpoints of the sides of rectangle WXYZ are the vertices of rhombus ABCD. The dimensions of rectangle WXYZ are 6 cm by 8 cm. What is the perimeter, in centimeters, of rhombus ABCD? (ACT Form 72E #37)



*Pythagorean triplets: 6-8-10 and 3-4-5*

$5 \times 4 = 20$

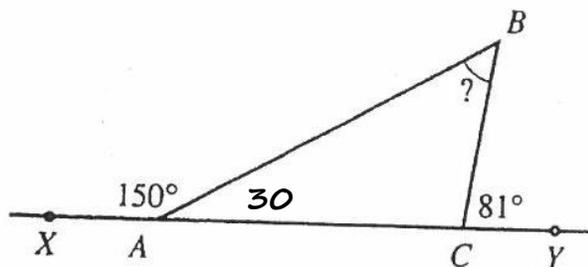
- A ramp for loading trucks is 13 feet long and covers 12 feet along the level ground, as shown below. How many feet high is the highest point on the ramp? (ACT Form 66F #20)



*Pythagorean triplet: ⑤-12-13*

- Know the exterior angle theorem: An exterior angle of a triangle equals the sum of the two opposite, interior angles.

- In the figure below, the measure of  $\angle XAB$  is  $150^\circ$ ; the measure of  $\angle YCB$  is  $81^\circ$ ; and X, A, C, and Y are collinear. What is the measure of  $\angle B$ ? (ACT Form 70G #31)



$? + 30^\circ = 81^\circ$

$? = 51^\circ$

• **When possible, avoid rewriting the problem.** Either mark on the given problem or write the next step.

- What is the solution for x of the equation  $3x + 6 = 7x - 9$ ? (ACT Form 63C #4)

$$\begin{array}{r} \cancel{3x} + 6 = 7x - \cancel{9} \\ -\cancel{3x} + 9 \quad -\cancel{3x} + 9 \end{array}$$

$$15 = 4x$$

- For  $x > 0$ , which of the following is equivalent to  $\frac{1}{(x+2)^{4x} + \frac{1}{x+2}}$ ? (PSAT Oct. 14, 2015 #10)

$$\frac{1}{(x+2)^{4x} + \frac{1}{x+2}} \stackrel{?}{=} \frac{1}{(x+2)^{4x} + 4x} = \frac{1}{4x(x+2)}$$

- Whenever x and y are nonzero,  $\frac{(8x^5y^4)(8x^{13}y^3)}{16x^6y^{14}}$ ? (ACT Form 73G #36)

$$\begin{array}{r} \frac{1}{8}x^5y^4 \cdot \frac{3}{8}x^{13}y^3 \\ \frac{16x^6y^{14}}{2} \\ \frac{3x^{18}y^7}{x^6y^{14}} \\ y^7 \end{array}$$

- $|3(-2) + 4| = ?$  (ACT Form 73G #1)

A. -2       $|-6 + 4|$

B. 2

C. 5

D. 9

E. 10

- If  $x + y = 32$  and  $x - y = 12$ , then  $y = ?$  (ACT Form 66F #22)

F. 6       $\frac{-(x+y=32)}{-2y=-20}$

G. 10

H. 20

J. 22

K. 44

## SCIENCE (ACT only)

- Read only the explanations of the experiments that are in paragraph form or skip straight to the questions. Don't look at the charts until told to in the questions.
- Underline italicized words.
- Recognize the passage with conflicting viewpoints; it will have more writing and fewer or no graphs.
- Underline what the question tells you to use: Figure 1, Table 2, Student 3, Experiment 4, additional information, description, etc.
- Look for differences between parallel answers to help eliminate which ones are wrong. (a. No ..., b. No..., c. Yes..., d. Yes...)
- Use the answers to figure out where to look and how to answer the question.

## ENGLISH

- Do NOT read the entire passage before answering the associated questions!
- Circle the title – if a question asks for a line or a paragraph to be added, see if the addition relates to the title.
- Eliminate similar answers; you can't have more than one right answer.
- If unessential, an appositive – a noun or noun phrase that describes another noun – must be surrounded by 2 commas or 2 dashes.
- Never mix and match a comma and a dash.
  - Ex. “Michael Jordan, the greatest basketball player of all time...”
- Eliminate choices that are redundant.
- Possession = its; it's = it is; its' is NOT a word – eliminate it
- For the grammar questions – not the rhetorical ones – the shortest answer is correct 50% of the time. “Delete” is the shortest – start there.
- Learn to recognize what is being tested.
  - For questions testing punctuation, start with the answer that has a period.
  - For questions testing commas, most of the time the answer is the one without the commas – start there.
  - Seeing an answer choice containing a verb ending with an s and an answer choice containing a verb without an s, like “walks” and “walk”, the question is testing subject/verb agreement. Find the subject – cross out prepositional phrases – and make the verb match.
  - Verb tense – should match in tense other verbs in the sentence or paragraph
  - Transition words must show the correct relationship between two sentences; read that sentence and the sentence before to see the relationship.

## READING

- Treat the paragraphs as “chunks.” As you read, mark up the paragraphs or make short notes in the margins.
- Underline strong words, proper nouns, negative statements and sentences beginning with “And,” “But” or another coordinating conjunction.
- Underline specific words – adjectives, adverbs, proper nouns – in the questions that may help you find the answer in the passage.
- Make certain you give yourself enough time to look at every passage. You don't want to miss the easy questions in the last passage because you ran out of time.
- Cross out answer choices containing words, phrases and ideas not in line with those of the passage.
- SAT – answers can be found in order of the passage; ACT – answers are in no particular order