





Power Up: Math ACT Prep, Week 9

Story Problems and Formulas



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L•E•A•R•N

Bell Ringer



In the standard (x, y) coordinate plane, a line intersects the y -axis at $(0, -3)$ and contains the point $(-2, 2)$. What is the slope of the line?

(A) $-\frac{5}{2}$

(C) $-\frac{2}{5}$

(E) 2

(B) $-\frac{1}{2}$

(D) $\frac{4}{3}$

Bell Ringer (Solution)



In the standard (x, y) coordinate plane, a line intersects the y -axis at $(0, -3)$ and contains the point $(-2, 2)$. **What is the slope** of the line?

$$(0, -3)$$

$$m = ?$$

$$(-2, 2)$$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{(2) - (-3)}{(-2) - (0)} = \frac{5}{-2} = \boxed{-\frac{5}{2}}$$

Recall: Steps to Solving Story Problems

- 1) Draw a Quick Sketch?
- 2) Label the Known.
- 3) Label the Unknown.
- 4) Write an Equation.

What might be helpful for writing equations?



Essential Question

How can I increase my ACT score?



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Learning Objectives

- Identify and algebraically represent critical information from a story problem.
- Apply formulas and problem-solving skills to story problems.

Formulas

- There are a lot of formulas that you need to know for the ACT.
- There are a lot of formulas that you already know!
- How do you know which one to use?



Formulas: Check Your Work

- Use your handout to check your work.
- On your handout, highlight the part of the story problem that prompted you to use a specific formula.
 - Did you already know that formula?



Forgot a Formula?



Since the ACT is a timed exam, if you do not remember a formula:

- 1) Guess and select an answer choice.
- 2) Mark (bookmark) the question to return to later; maybe a later question will remind you of the needed formula.
- 3) Move on to the next question.

Exit Ticket

Leave your paper face down until the timer starts.



5-Minute Timer

Exit Ticket (Answers)

- 1) B
- 2) G
- 3) B
- 4) J
- 5) D

How well did you do?

Remember, it is 100% okay to not get 100% of the questions right on the ACT.



Forgot a Formula?

- Use the empty space at the bottom of your handout to write any formulas or math facts that you struggle to remember.

Other Formulas:

The sum of the interior angles of a quadrilateral is 360° .

Exit Ticket (Solution 1)

- The parallelogram below has consecutive angles with measures a° and 124° . What is the value of a ?



Math Fact: *Opposite angles of a parallelogram are congruent.*

$$360^\circ - 2(124^\circ) = 2a^\circ$$

$$112^\circ = 2a^\circ$$

$$56^\circ = a^\circ$$

Or $180^\circ - 124^\circ = a^\circ$

Exit Ticket (Solution 2)

- ... her car's odometer read **30 miles**. After Karla drove **4 hours**, the odometer read **210 miles**. ... **average driving speed**, in miles per hour, during those 4 hours?

Math Facts:

Average speed = rate

rate of change = slope

$$\begin{array}{ll} t_1 = 0 & d_1 = 30 \\ t_2 = 4 & d_2 = 210 \end{array}$$
$$d = ?$$
$$d = rt$$
$$r = \frac{d}{t} = \frac{210 - 30}{4 - 0} = \boxed{45\text{mph}}$$

Exit Ticket (Solution 3)

- ... only one parabola ... has **x-intercepts** of **-2** and **6**.

Which of the following **equations** represents the **axis of symmetry** ...?

Math Facts & Formulas: *The axis of symmetry is in the middle (midpoint or average) of the two x-intercepts of a parabola.*

$$x = ?$$

$$x_1 = -2$$

$$x = \frac{x_1 + x_2}{2}$$

$$x_2 = 6$$

$$x = \frac{(-2) + (6)}{2} = 2$$

Exit Ticket (Solution 3)

- ... only one parabola ... has **x-intercepts** of **-2** and **6**.

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Exit Ticket (Solution 4)

- ... there are **3 mannequins for 1 costume each**. ... Lan has **8 costumes to select from**, ... **how many possible display arrangements** ...? (Note: The positions of the unselected costumes do not matter.)

Formulas: *The order of the chosen costumes matters, so this is a permutation.*

$$n = 8$$

$$r = 3$$

$${}_8P_3 = ?$$

$${}_8P_3 = 336$$

Exit Ticket (Solution 5)

- The list of numbers **11, A, B, 22, 31, and 33** has a **median of 20**. The **mode** of the list of numbers is **11**. To the nearest whole number, **what is the mean** of the list?

$$\text{median} = 20$$

$$\text{mode} = 11$$

$$\text{mean} = ?$$

Formulas:

- The **median** is the value in the middle; when there are an even number of values, find the average of the middle two values.
- The **mode** is the most common value.
- The **mean** is the average.

Exit Ticket (Solution 5...continued)

- Since the **mode** is 11, 11 must be listed more than once.
 - A or B could be 11; it does not matter which.
- Since the **median** is 20, then 22, 31, and 33 are in the second-half of the list.

11, 11, B , 22, 31, 33

$median = 20 = \frac{B + 22}{2}$

$B = 18$

11, 11, 18, 22, 31, 33

$mean = 21$



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Ready for the Real Test



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