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Power Up: Math ACT Prep, Week 9

Story Problems and Formulas

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

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

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

(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?

$(0, -3)$

$(-2, 2)$

$m = ?$

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

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)

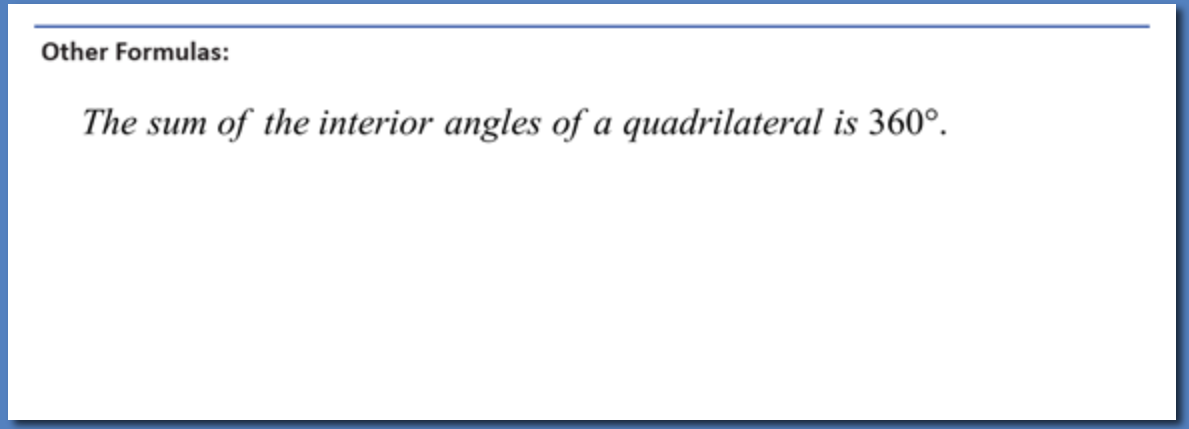
1) B
2) F
3) B
4) H
5) C

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.



Exit Ticket (Solution 1)

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

$$360° - 2(124°) = 2a°$$

$$112° = 2a°$$

$$\boxed{56° = a°}$$

Or $180° - 124° = a°$

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

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

$d = ?$

$d = rt$

$t_1 = 0 \qquad d_1 = 30$

$t_2 = 4 \qquad d_2 = 210$

$$r = \frac{d}{t} = \frac{210 - 30}{4 - 0} = 45mph$$

Exit Ticket (Solution 3)

- … only one parabola … has ***x*-intercepts** of **–2** and **6**. **Which** of the following **equation**s 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.*

$$x = ?$$

$$x_1 = -2$$

$$x_2 = 6$$

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

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

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Exit Ticket (Solution 3)

- … only one parabola … has ***x*-intercepts** of **–2** and **6**. **Which** of the following **equation**s represents the **axis of symmetry** …?

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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?

$$median = 20$$

$$mode = 11$$

$$mean = ?$$

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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