

# Grade 9 Mini Form 1

Explanations and

Printable Online Practice Test

Which of the following expressions is **negative** in value?

A.  $4 - \pi$

B.  $3\pi - 9$

C.  $12 - 4\pi$

D.  $36 - 9\pi$

**(C)** Substitute the approximation  $\pi = 3.14$  into each expression, and solve to determine the expression results in a negative value:

$$4 - \pi = 0.86$$

$$3\pi - 9 = 0.42$$

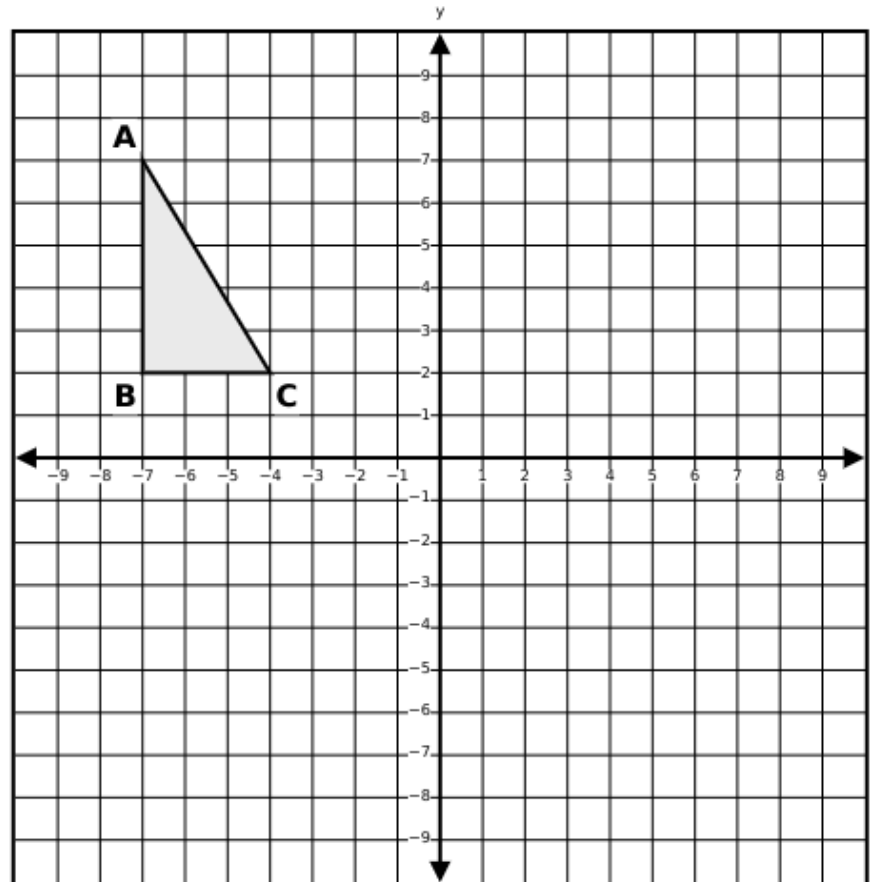
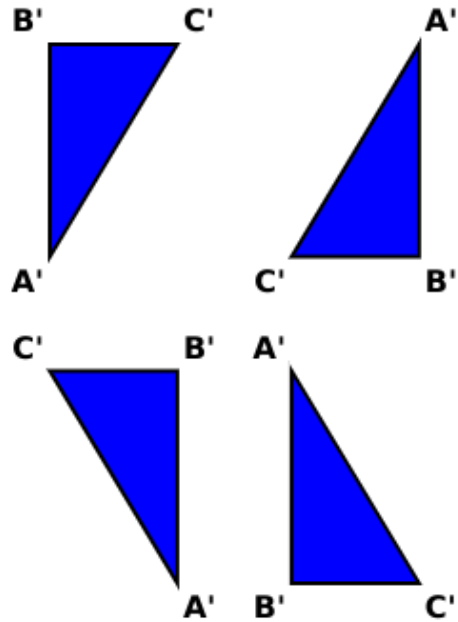
$$12 - 4\pi = -0.56$$

$$36 - 9\pi = 7.74$$

So, the answer is  $12 - 4\pi$ .

Triangle ABC is graphed on the coordinate plane. Triangle ABC is reflected across the line  $y = -1$  to create image  $A'B'C'$ . Graph triangle  $A'B'C'$  on the coordinate plane.

Select the correct orientation of the triangle and position it correctly in the coordinate plane.



After the triangle is reflected across the line  $y = -1$ :

A' is at  $(-7, -9)$

B' is at  $(-7, -4)$

C' is at  $(-4, -4)$

The symbol  $\langle x, y, z \rangle$  means  $\frac{xz + xy}{2} + zy$ . What is the value of  $\langle 3, 4, 8 \rangle$ ?

- A. 15
- B. 34
- C. 50
- D. 56

**(C)**  $x = 3$ ,  $y = 4$ , and  $z = 8$ . Substitute those values into the equation and simplify.

$$\frac{(3 \cdot 8) + (3 \cdot 4)}{2} + (8 \cdot 4) =$$

$$\frac{24 + 12}{2} + 32 =$$

$$\frac{36}{2} + 32 =$$

$$18 + 32 = 50$$

Simplify:

$$\frac{p^{12} \cdot p^0}{p^{-4}}$$

- A. 0
- B.  $p^{-3}$
- C.  $p^8$
- D.  $p^{16}$

**(D)**

$$\frac{p^{12} \cdot p^0}{p^{-4}} = (p^{12} \cdot p^0) \frac{p^4}{1} = p^{(12+0+4)} = p^{(12+4)} = p^{16}$$

A container initially contains  $n$  gallons of water. A student adds 15 gallons of water, making the container 60% full. After the student adds 10 more gallons of water, the container is 80% full.

Select the correct answers from each drop-down to complete the sentences.

Let  $x$  represent the total number of gallons the container can hold.

The equation that represents the situation immediately after the student adds 15 gallons of water is  $n + 15 =$

.

The equation that represents the situation after the student adds 10 gallons of water is  $n + 25 =$   .

The number of gallons,  $n$ , in the container initially is  gallons.

| RESPONSE_A1 | RESPONSE_A2 | RESPONSE_A3 |
|-------------|-------------|-------------|
| 0.50x       | 0.60x       | 15          |
| 0.60x       | 0.70x       | 25          |
| 0.80x       | 0.80x       | 35          |
|             |             | 50          |

Solution:

First drop-down answer:  $0.60x$

Second drop-down answer:  $0.80x$

Third drop-down answer: 15

Let  $x$  represent the total number of gallons the container can hold.

Immediately after the student adds 15 gallons of water, the container is 60% full. Multiply 60% or 0.60 by the total number of gallons the container can hold,  $x$ , and set it equal to the number of gallons in the container (initial amount,  $n$ , plus 15 gallons).

So, the equation is:  $n + 15 = 0.60x$

After the student adds 10 more gallons of water, the container is now 80% full. Multiply 80% or 0.80 by the total number of gallons the container can hold,  $x$ , and set it equal to the number of gallons in the container (initial amount,  $n$ , plus 15 gallons plus 10 gallons).

So, the equation is:  $n + 25 = 0.80x$ .

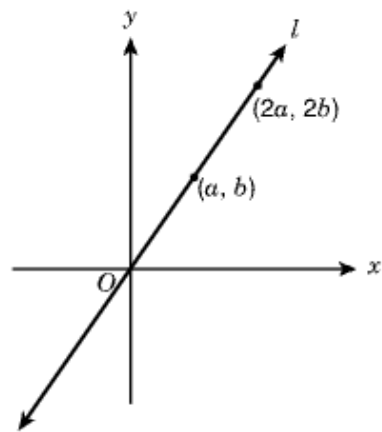
To solve these two equations for  $x$ , the total number of gallons the container can hold, and  $n$ , the number of gallons in the container initially, subtract the first equation from the second to eliminate the variable  $n$ :

$$(n + 25) - (n + 15) = 0.80x - 0.60x$$

Then distribute the negative and combine like terms to solve for  $x$ :  $n + 25 - n - 15 = 0.2x$ ;  $10 = 0.2x$ ;  $x = \frac{10}{0.2}$ ;  $x = 50$

Then substitute 50 into the first equation for  $x$  and solve for  $n$ , the number of gallons in the container initially:

$$n + 15 = 0.60(50); n + 15 = 30; n = 15$$



Straight line  $l$  passes through the origin, as shown in the figure above. What is the slope of line  $l$  in terms of  $a$  and  $b$ ?

- A.  $\frac{a}{b}$
- B.  $\frac{2b}{a}$
- C.  $\frac{2a}{b}$
- D.  $\frac{b}{a}$

**(D)** Use the slope formula to determine the slope of line  $l$ .

$$\text{Slope of line } l = \frac{y_2 - y_1}{x_2 - x_1} = \frac{2b - b}{2a - a} = \frac{b}{a}$$

A scatter plot displays the number of cars sold each month at a car dealership over the past year. A student has drawn a line of best fit to model the data and wants to determine whether the line accurately represents the data. What are two characteristics of an accurate line of best fit for a scatter plot?

Select the **two** correct answers.

- A. The line of best fit is accurate if it passes through at least one of the data points.
- B. The line of best fit is accurate if about half of the data points are above the line and half are below the line.
- C. The line of best fit is accurate if it touches every single data point on the scatter plot.
- D. The line of best fit should always pass through the origin  $(0, 0)$ .
- E. The line of best fit should capture the overall trend of the data.

Solution:

The line of best fit is accurate if about half of the data points are above the line and half are below the line.

The line of best fit should capture the overall trend of the data.

A correct feature of an accurate line of best fit is that approximately half of the data points should be above the line, and half should be below the line.

One of the main purposes of a line of best fit is to model the general direction or trend of the data, even if it does not pass through any of the specific data points.

Grade 9 Math Item 8

To determine the price of servicing a car, a mechanic charges a fixed fee plus an hourly rate for each hour he works. If his price for 4 hours of work is \$270, and his price for 7 hours of work is \$420, what is the fixed fee that the mechanic charges?

- A. \$50
- B. \$60
- C. \$70
- D. \$120

**(C)** Set up the two equations and subtract them from one another to find the price per hour:

$$(y + 7x = 420) - (y - 4x = 270)$$

$$3x = 150$$

$$x = 50$$

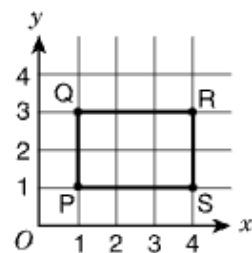
To find the fixed fee, use one of the equations ( $y + 7x = 420$  or  $y - 4x = 270$ ) and solve for  $y$  using  $x = 50$ .

$$y + 4x = 270$$

$$y + 4(50) = 270$$

$$y + 200 = 270$$

$$y = 70$$



Rectangle PQRS above is rotated  $180^\circ$  about the origin to form rectangle P'Q'R'S'. What are the coordinates of R'?

- A. (4, -3)
- B. (-4, 3)
- C. (-4, 1)
- D. (-4, -3)

**(D)** Point R is at (4, 3). If  $(x, y)$  is rotated  $180^\circ$  about the origin:  $R(x, y) \rightarrow (-x, -y)$ . Therefore,  $R(4, 3) \rightarrow (-4, -3)$ .

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$$\frac{15.3 \times 10^{-8}}{1.5 \times 10^4}$$

What is the quotient of the expression above, expressed in scientific notation?

- A.  $1.02 \times 10^{-13}$
- B.  $1.02 \times 10^{-11}$
- C.  $1.02 \times 10^{-4}$
- D.  $1.02 \times 10^{12}$

**(B)**

$$\frac{15.3 \times 10^{-8}}{1.5 \times 10^4} = \left( \frac{15.3}{1.5} \right) \times \frac{10^{-8}}{10^4} = 10.2 \times \frac{10^{-8}}{10^4}$$

Use the rule of exponents to simplify.

$$10.2 \times 10^{(-8-4)} = 10.2 \times 10^{-12}$$

Rewrite the answer so that it is standard scientific notation form.

$$1.02 \times 10^{-11}$$

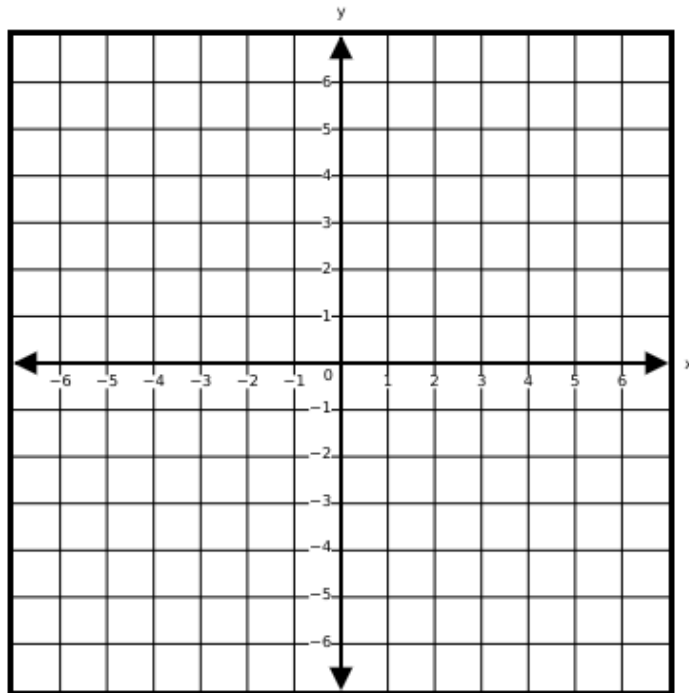
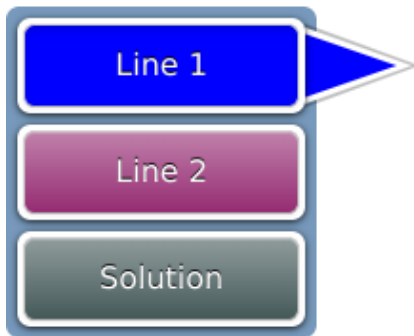
A system of linear equations is shown.

$$\begin{cases} 2x + y = 5 \\ x - y = 1 \end{cases}$$

Graph the solution to the system of linear equations.

Graph the system of equations and the solution using the following steps:

- Select the Line 1 button to graph line 1. Select two points on the coordinate plane. A line will be drawn through the two points.
- Select the Line 2 button to graph line 2. Select two points on the coordinate plane. A line will be drawn through the two points.
- Select the Solution button. Select a place on the coordinate plane to plot the point.



Graph line 1:  $y = -2x + 5$  with slope  $-2$  and  $y$ -intercept  $(0, 5)$  using points  $(0, 5)$  and  $(1, 3)$ .

Graph line 2:  $y = x - 1$  with slope  $1$  and  $y$ -intercept  $(0, -1)$  using points  $(-1, -2)$  and  $(2, 1)$ .

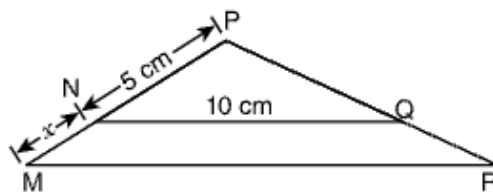
The lines intersect at the point  $(2, 1)$ .

Assume  $S(x)$  equals the sum of all positive even integers less than or equal to  $x$ . What is the value of  $S(7)$ ?

Enter your answer in the space.

**(12)**  $S(x)$  is the sum of all positive even integers less than or equal to  $x$ . 1, 2, 3, 4, 5, and 6 are all integers less than 7. Take the positive integers from the list and find the sum:

$$S(7) = 2 + 4 + 6 = 12$$



In the figure above,  $\triangle MPR$  is similar to  $\triangle NPQ$ . If the length of  $\overline{NQ}$  is 10 centimeters, what is the length of  $\overline{MR}$  in terms of  $x$ ?

- A.  $2x$
- B.  $2x + 10$
- C.  $x + 5$
- D.  $\frac{1}{2}x + 5$

**(B)** Triangles NPQ and MPR are similar. Corresponding sides of the triangles are proportional. Set up a proportion to find  $\overline{MR}$ .

$$\frac{\overline{MR}}{\overline{MP}} = \frac{\overline{NQ}}{\overline{NP}}$$

$$\frac{\overline{MR}}{x+5} = \frac{10}{5}$$

$$5(\overline{MR}) = 10(x + 5)$$

$$5(\overline{MR}) = 10x + 50$$

$$\overline{MR} = 2x + 10$$