MCAS Practice (2021 Released Questions)

1. Consider this equation.

$$x^3 = 27$$

Which of the following values of x makes the equation true?

- A. 3
- B. 9
- C. $\frac{1}{3}$
- D. $\frac{1}{9}$

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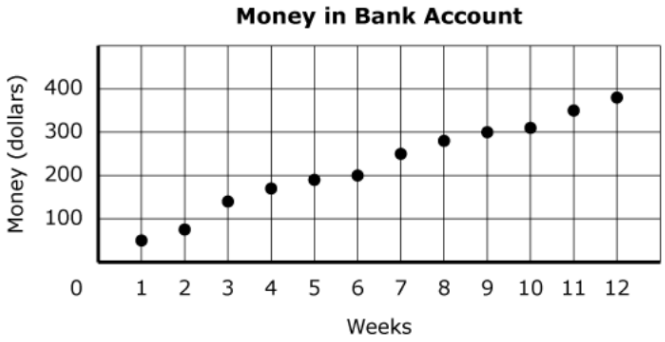
2. The scatterplot shows the total amount of money in a bank account at the end of each week for a period of 12 weeks.



Which of the following statements is true about the scatter plot?

- A. The scatter plot shows one outlier.
- B. The scatter plot shows clustered data.
- C. The scatter plot shows a positive linear association.
- D. The scatter plot shows a negative linear association.

3. Susan wants to hire one of two mechanics to repair her car. Each mechanic charges a one-time fee in addition to an hourly rate.

Mechanic A charges a one-time fee plus $\$35$ per hour. A repair made by Mechanic A that takes 5 hours to complete will cost a total of $\$225$.

This table shows the total cost, including the one-time fee, for repairs made by Mechanic B that take different numbers of hours to complete.

Mechanic B

Time (hours)	Total Cost (dollars)
1	80
2	120
3	160
4	200
5	240
6	280

How much more money, in dollars, does Mechanic A charge for the one-time fee than Mechanic B charges?

Enter your answer in the box.

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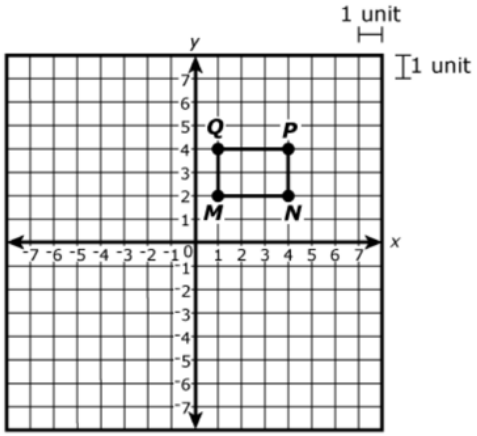
4. What number multiplied by the expression 5×10^3 is equivalent to the expression 5×10^6?

- A. 3
- B. 100
- C. $1{,}000$
- D. $5{,}000$

5.



Determine whether the transformations of rectangle $MNPQ$ described in the table would create an image that is congruent to rectangle $MNPQ$.

For each transformation, select "Congruent" or "Similar but Not Congruent."

Transformation	Congruent	Similar but Not Congruent
a translation 4 units up and 2 units right	○	○
a 90° clockwise rotation, followed by a reflection over the x-axis	○	○
a reflection over the y-axis, followed by a dilation by a scale factor of 2 with the center at the origin	○	○
a dilation by a scale factor of 1.5 with the center at the origin, followed by a translation 5 units left	○	○

6. Consider this system of equations.

$$p = 2n$$
$$p - 5 = 1.5n$$

What value of n makes the system of equations true?

Enter your answer in the box.

7. The lengths of three sides of a triangle are $3, \pi, \sqrt{5}$
Which list shows the lengths in order from least to greatest?

A. $3, \pi, \sqrt{5}$

B. $3, \sqrt{5}, \pi$

C. $\sqrt{5}, 3, \pi$

D. $\sqrt{5}, \pi, 3$

8. Determine whether each equation is a linear function or a nonlinear function.

Drag and drop each equation into the appropriate box.

$y = x^2 - 1$ | $y = 2x + 1$ | $y = \frac{1}{2}x - 5$ | $y = \frac{1}{3}x^2$ | $y = -x$

Linear Function	Nonlinear Function

9.

Consider this number.

$$4.0\overline{83}$$

Which of the following statements about the number is true?

- A. It is an integer because the decimal repeats.
- B. It is a whole number because the decimal repeats.
- C. It is a rational number because the decimal repeats.
- D. It is an irrational number because the decimal repeats.

10.

This table represents a linear relationship between x and y.

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

What is the value of y when $x = 2$?

Enter your answer in the box.

11.

This question has four parts.

Part A

Consider this equation.

$$x - 4 = 16$$

What is the solution to the equation? Show or explain how you got your answer.

Enter your answer and your work or explanation in the space provided.

Part B

Write a linear equation in one variable that has infinitely many solutions. Show the process of simplifying the equation to prove that it has infinitely many solutions.

Part C

Consider this equation.

$$3(4 + x) = 7x - 2(2x + 3)$$

How many solutions does the equation have? Show or explain how you got your answer.

Part D

Consider this equation.

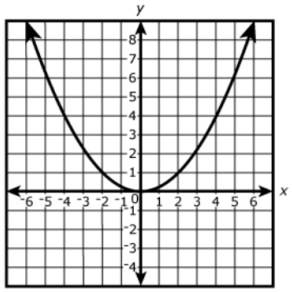
$$\frac{3}{8}x - 6 = \frac{1}{2}\left(4 - x\right)$$

How many solutions does the equation have? Show or explain how you got your answer.

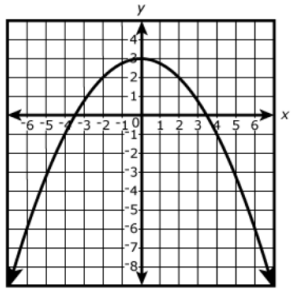
Enter your answer and your work or explanation in the space provided.

12. Which of the following graphs represents an increasing linear function?

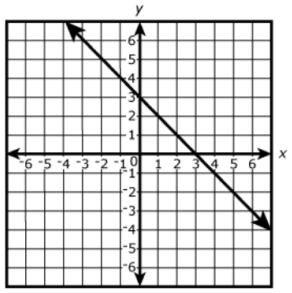
A.



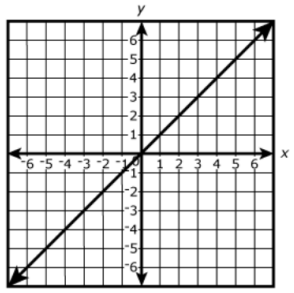
B.



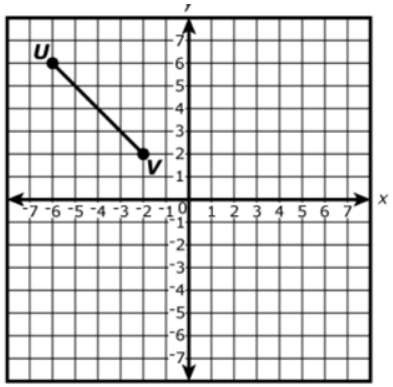
C.



D.



13. Line segment *UV* is shown on the coordinate plane.



Point W, not shown, lies on line segment UV. The coordinates (x, y) represent point W.

Line segment UV will be reflected over the *y*-axis. After the reflection, what will be the coordinates of the image of point W?

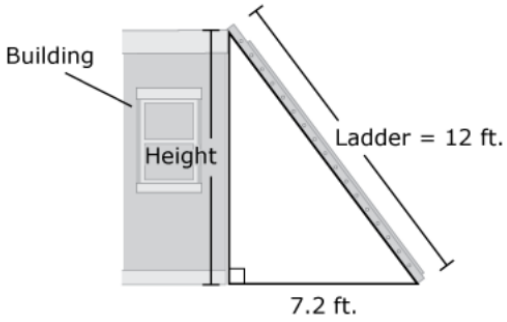
A. $(-y, x)$

B. $(y, -x)$

C. $(x, -y)$

D. $(-x, y)$

14. A ladder is placed against the outside wall of a building, as shown.



Create an equation to show the relationship between the height of the building, the length of the ladder, and the distance between the building and the bottom of the ladder.

Drag and drop a number into each box to complete the equation.

Each number may be used once or not at all.

4.8	7.2	9.6	12	15.4

$\square^2 + \square^2 = \square^2$

15. A line passes through the point (2, 10) and has a *y*-intercept of 4. What is the equation of the line?

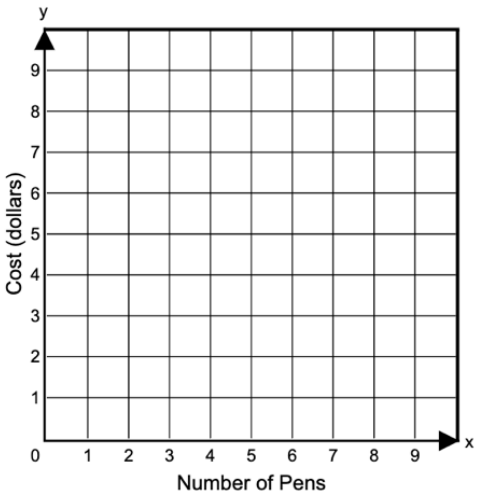
17. A candle is in the shape of a cylinder. The candle has a diameter of 6 inches and a height of 5 inches. What is the volume of the candle? (Use 3.14 for π)

- A. 94.2 cubic inches
- B. 141.3 cubic inches
- C. 150.7 cubic inches
- D. 188.4 cubic inches

16. Pens cost $\$1.50$ each at a school store. Graph a line that represents y, the cost, in dollars, of purchasing x pens at the store.

To graph a line, select two points on the coordinate plane. A line will be drawn through the points.

Cost of Pens

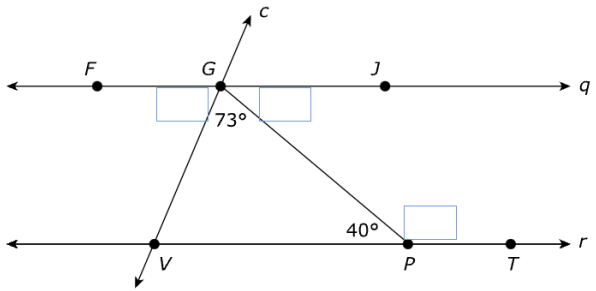


18. Parallel lines q and r are intersected by transversal line c.

Determine the measures of angles FGV, JGP, and GPT.

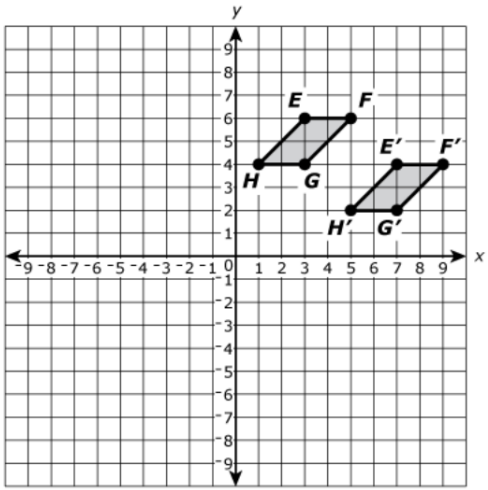
Drag and drop an angle measure into each box to correctly show the measures of the angles. Each angle measure may be used once, more than once, or not at all.

40° 67° 73° 107° 140°



19. **This question has three parts.**

Parallelogram $EFGH$ was transformed to create its image, parallelogram $E'F'G'H'$, as shown on this coordinate plane.



Part A

Describe the transformation that was performed on parallelogram $EFGH$ to create parallelogram $E'F'G'H'$. Show or explain how you got your answer.

Part B

Is parallelogram $EFGH$ congruent to parallelogram $E'F'G'H'$? Explain your reasoning.

Part C

Parallelogram $E'F'G'H'$ will be reflected over the *x*-axis to create its image, parallelogram $E''F''G''H''$.

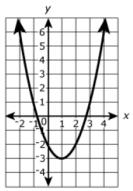
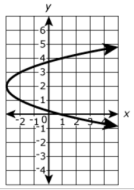
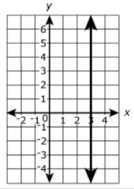
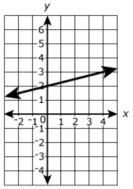
Will parallelogram $E''F''G''H''$ be congruent to parallelogram $EFGH$? Explain your reasoning.

20. **This question has two parts.**

Part A

Determine whether each graph in this table represents y as a function of x.

Select "Function" or "Not a Function" for each graph.

Graph	Function	Not a Function
	○	○
	○	○
	○	○
	○	○

Part B

The relationship between the x and y values in this table is not a function. One of the values of x is missing from the table, as shown.

x	7	12	?
y	-6	-1	8

What is **one** value of x that could replace the missing value in the table to show that y is **not** a function of x?

Enter your answer in the box.

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