

Student Name _____

P



**Grade 8
Mathematics
Test Booklet**

Practice Test

TEST BOOKLET SECURITY BARCODE

Section 1

(Non-Calculator)

Directions:

Today, you will take Section 1 of the Grade 8 Mathematics Practice Test. You will not be able to use a calculator.

Read each question. Then, follow the directions to answer each question. Mark your answers by completely filling in the circles in your answer document. Do not make any pencil marks outside of the circles. If you need to change an answer, be sure to erase your first answer completely. If a question asks you to show or explain your work, you must do so to receive full credit. Only responses entered within the space provided will be scored.

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1 Which expression is equivalent to $8^{-4} \cdot 8^3$?

Select one answer.

A -8

B $-\frac{1}{8}$

C $\frac{1}{8}$

D 8

2 Which sets of ordered pairs represent functions?

Select **all** that apply.

A $\{(1, 2), (2, 3), (3, 4)\}$

B $\{(2, 1), (2, 3), (4, 1)\}$

C $\{(3, 1), (4, 2), (5, 3)\}$

D $\{(6, 1), (6, 2), (6, 3)\}$

E $\{(7, 1), (8, 3), (9, 3)\}$

3 Consider the following equation.

$$x^2 = \frac{49}{16}$$

Which values are the solutions to the equation?

Select one answer.

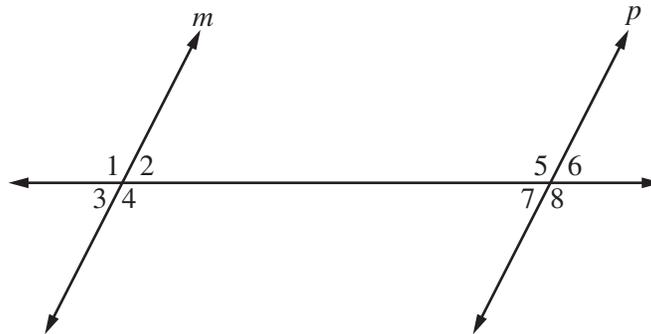
A $\pm \frac{7}{8}$

B $\pm \frac{7}{4}$

C $\pm \frac{49}{8}$

D $\pm \frac{49}{4}$

- 4 The following figure shows three lines. Lines m and p are parallel. Angle 1 is labeled. Some of the other seven angles that are labeled in the figure are congruent to angle 1.



Which angles are congruent to angle 1?

Select **all** that apply.

- A 2
- B 3
- C 4
- D 5
- E 6
- F 7
- G 8

5 Which fraction is the **best** estimate for the value of $\frac{\sqrt{65}}{\sqrt{122}}$?

A $\frac{1}{2}$

B $\frac{33}{61}$

C $\frac{2}{3}$

D $\frac{8}{11}$

6 What value of x satisfies the equation $5(x - 6) - 2(x + 3) = 12$?

Enter your answer in the space provided.

7 Which of the following numbers are rational?

Select **all** that apply.

A -72

B $\frac{4}{5}$

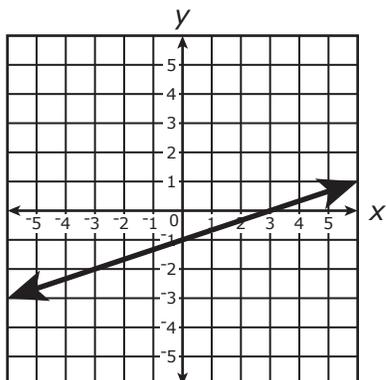
C $\sqrt{6}$

D $\sqrt{\frac{5}{16}}$

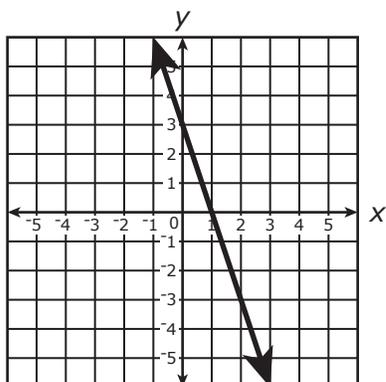
E $\sqrt{100}$

- 8 The equation $x + 3y = -3$ represents a linear function.
Which graph represents the function?

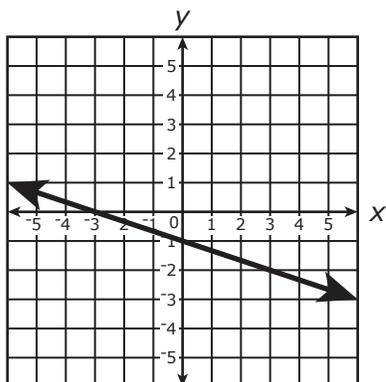
A



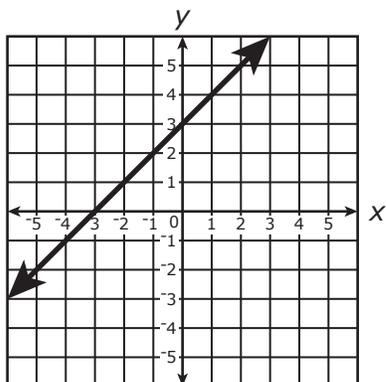
B



C



D



- 9 The population of the world is estimated to be 8×10^9 . The population of a country is estimated to be 2×10^8 .

The world population is about how many times as large as the population of the country?

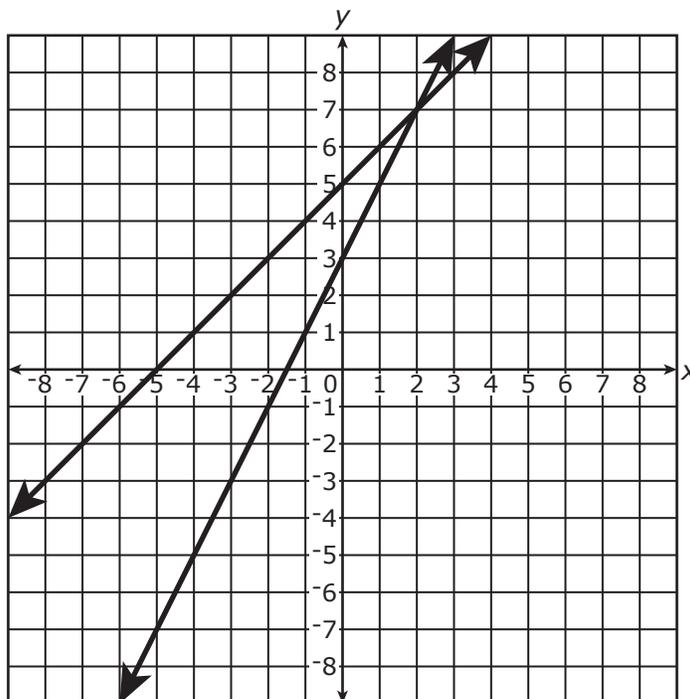
Enter your answer in the space provided.

- 10 Line segment PQ is the result of reflecting line segment AB across the x -axis. P has coordinates of $(2, -2)$ and Q has coordinates $(8, -2)$.

What is the length of line segment AB ?

- A 4
- B 6
- C 8
- D 10

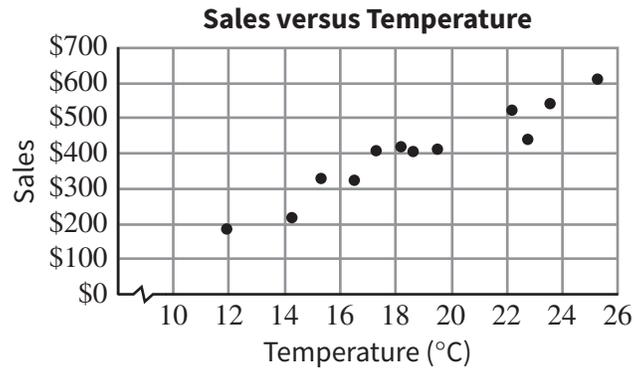
- 11** The graph of the system of equations $\begin{cases} y = 2x + 3 \\ y = x + 5 \end{cases}$ is shown on the coordinate plane.



What is the solution to the system of equations?

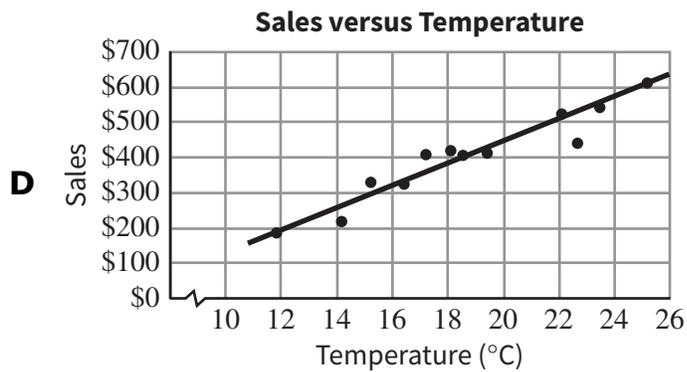
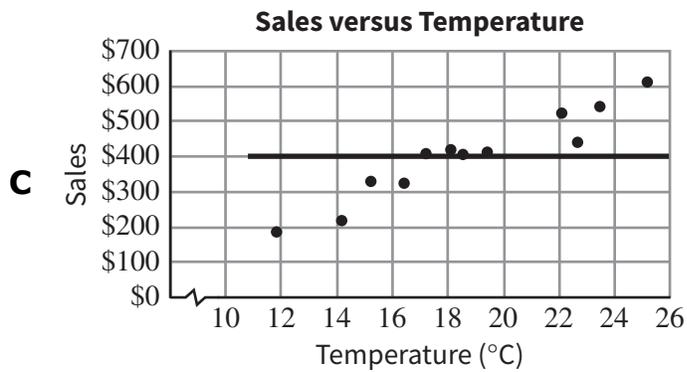
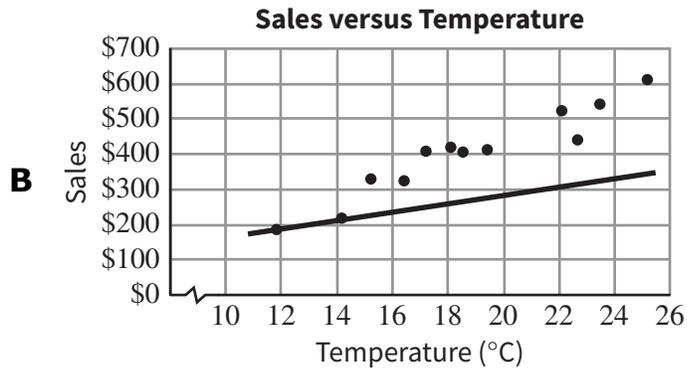
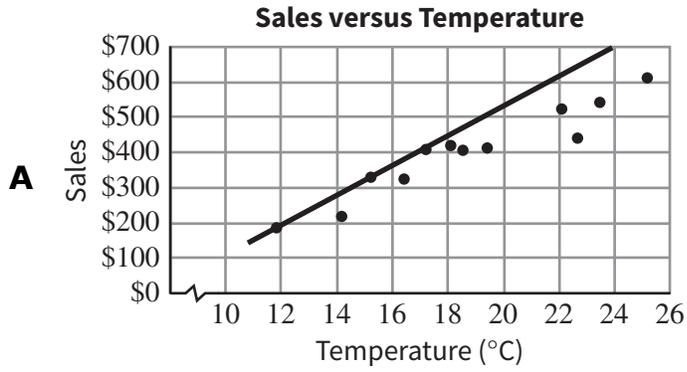
- A** The solution is $(2, 7)$ because the solution to the system must satisfy both equations simultaneously.
- B** The solution is $(1, 6)$ because the solution to the system must satisfy one equation or the other equation.
- C** The solution is $(3, 5)$ because the solution to the system must represent the y -intercepts of both equations.
- D** The solution is $(-1.5, -5)$ because the solution to the system must represent the x -intercepts of both equations.

- 12** The following scatter plot shows the dollar amount of sales at an ice cream shop for 12 days and the average daily temperature for each of the days.



Which graph shows the scatter plot with the linear model that **best** predicts sales for a given temperature?

Select one answer.



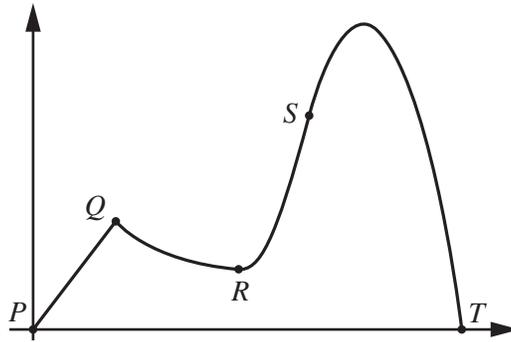
13 Consider the equation $2x + 3 = mx + b$.

For which values of m and b will the equation have **no** solutions?

Select one answer.

- A** $m = 2$ and $b = 2$
- B** $m = 3$ and $b = 3$
- C** $m = 2$ and $b = 3$
- D** $m = 3$ and $b = 2$

14 The graph of a function is shown in the following coordinate plane.



Over which interval does the graph show a constant rate of change?

Select one answer.

- A** From P to Q
- B** From Q to R
- C** From R to S
- D** From S to T





You have come to the end of Section 1 of the test. Review your answers from Section 1 only.





Section 2 (Calculator)

Directions:

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Directions for Completing the Answer Grids

1. Work the problem and find an answer.
2. Write your answer in the boxes at the top of the grid.
3. Print only one number or symbol in each box. Do not leave a blank box in the middle of an answer.
4. Under each box, fill in the circle that matches the number or symbol you wrote above. Make a solid mark that completely fills the circle.
5. Do not fill in a circle under an unused box.
6. Fractions cannot be entered into an answer grid and will not be scored. Enter fractions as decimals.
7. See below for examples on how to correctly complete an answer grid.

EXAMPLES

To answer -3 in a question, fill in the answer grid as shown below.

-	3					
<input checked="" type="radio"/>	<input type="radio"/>					
0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
<input checked="" type="radio"/>	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	5	5	5	5	5
6	6	6	6	6	6	6
7	7	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9

To answer $.75$ in a question, fill in the answer grid as shown below.

.	7	5				
<input type="radio"/>	<input checked="" type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
0	0	0	0	0	0	0
1	1	1	1	1	1	1
2	2	2	2	2	2	2
3	3	3	3	3	3	3
4	4	4	4	4	4	4
5	5	<input checked="" type="radio"/>	5	5	5	5
6	6	6	6	6	6	6
7	<input checked="" type="radio"/>	7	7	7	7	7
8	8	8	8	8	8	8
9	9	9	9	9	9	9



- 1 The amounts that two plumbers charge for their services are described.
- The first plumber charges a fixed fee of \$40 for house calls and \$15 per hour of work.
 - The second plumber charges a fixed fee of \$30 for house calls and \$19 per hour of work.

For what number of hours of work do the first plumber and the second plumber charge the same total amount?

Enter your answer in the space provided.

- 2 Consider the function defined by $y = 2x - 5$.

Which statements can be used to justify that the function is linear?

Select **all** that apply.

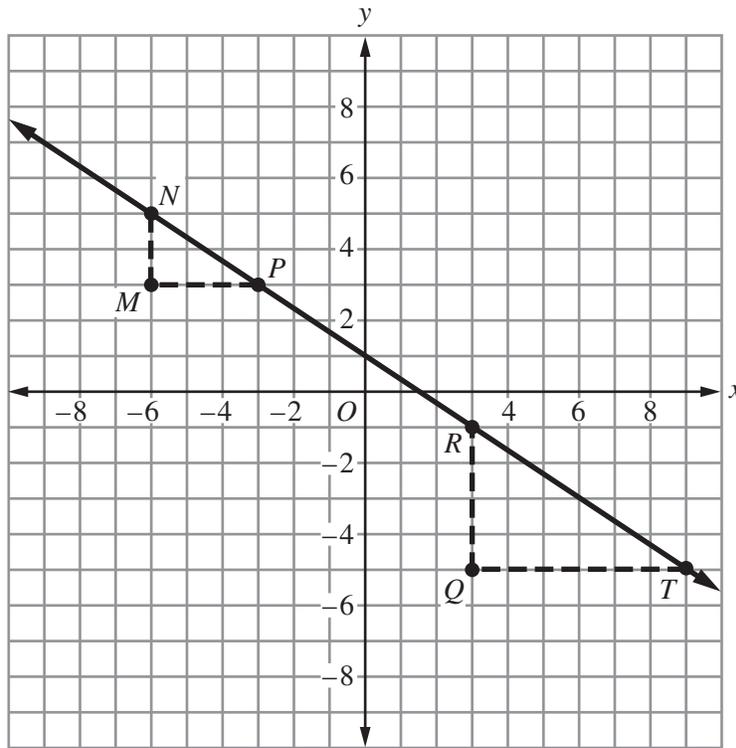
- A** The coefficient of x is greater than 1.
 - B** The function has a constant slope of 2.
 - C** The function has a negative y -intercept.
 - D** The graph of the function is a straight line.
 - E** The equation is written in the form $y = mx + b$.
- 3 A person purchased 10 items to donate to a school, backpacks that cost \$25.75 each and notebooks that cost \$4.25 each. The total cost of the items is \$150. This situation can be represented by a system of equations with a unique solution.

What does the solution to the system of equations represent in this context?

- A** the cost of all the backpacks
- B** the cost of all the notebooks
- C** the total amount of money spent on the items
- D** the number of backpacks and notebooks purchased



- 4 On the following coordinate grid, points N , P , R , and T are collinear. The coordinates of each point are integers. The dashed lines shown on the coordinate grid form triangles MNP and QRT .



Part A

Linda claimed that the slope of \overline{PR} is $\frac{6}{4}$ because point P is 6 units to the left of point R and 4 units up from point R .

Explain the error in Linda's claim and calculate the correct slope of \overline{PR} . Show all of your work.

Enter your work and explanation in the space provided.

Part B

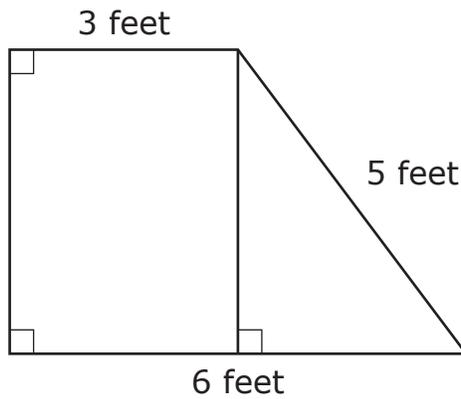
Use triangles MNP and QRT to show that the slope of the line is the same from point N to point P and from point R to point T .

Enter your work or explanation in the space provided.



Mathematics

- 5 The figure shows the front side of a store sign and its dimensions, in feet. The store owner will paint the entire front side of the sign.



What is the area, in square feet, of the front side of the sign?

Enter your answer in the space provided.



- 6 Certain values of linear function J are shown in the following table, where x is the input variable and y is the output variable.

x	y
0	2
1	7
2	12

Linear function K is represented by the equation $y = 3x + 8$.

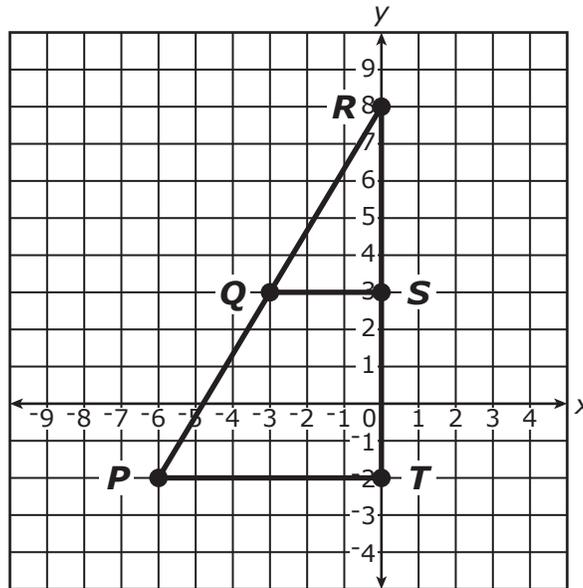
Which statements about function J and function K are true?

Select **all** that apply.

- A The graph of function J has a greater slope.
- B The graph of function K has a greater slope.
- C The graph of function J has a greater y -intercept.
- D The graph of function K has a greater y -intercept.
- E The graph of function K and the graph of function J have equal slopes.
- F The graph of function K and the graph of function J have equal y -intercepts.



- 7 Triangle PRT and triangle QRS are shown on the coordinate plane. Points P , Q , and R all lie on the same line, and points T , S , and R all lie on the y -axis. The vertices of both triangles have integer coordinates.



Which statement about the slopes is true?

- A The slopes of \overline{PR} and \overline{QR} are equal because $\frac{PT}{QS} = \frac{SR}{TR}$.
- B The slopes of \overline{PR} and \overline{QR} are equal because $\frac{TR}{TP} = \frac{SR}{SQ}$.
- C The slope of \overline{PR} is less than the slope of \overline{QR} because $\frac{PT}{QS} < \frac{SR}{TR}$.
- D The slope of \overline{PR} is greater than the slope of \overline{QR} because $\frac{TR}{TP} > \frac{SR}{SQ}$.





You have come to the end of Section 2 of the test. Review your answers from Section 2 only.





Section 3 (Calculator)

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EXAMPLES

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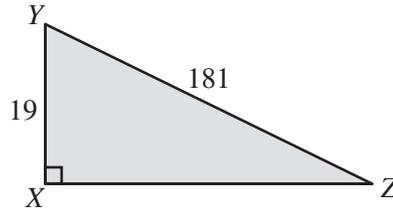
-	3					
●						
○	○	○	○	○	○	○
○	1	1	1	1	1	1
○	2	2	2	2	2	2
●	3	3	3	3	3	3
○	4	4	4	4	4	4
○	5	5	5	5	5	5
○	6	6	6	6	6	6
○	7	7	7	7	7	7
○	8	8	8	8	8	8
○	9	9	9	9	9	9

To answer $.75$ in a question, fill in the answer grid as shown below.

.	7	5				
○	○	○	○	○	○	○
○	1	1	1	1	1	1
○	2	2	2	2	2	2
○	3	3	3	3	3	3
○	4	4	4	4	4	4
○	5	5	●	5	5	5
○	6	6	6	6	6	6
○	7	○	7	7	7	7
○	8	8	8	8	8	8
○	9	9	9	9	9	9



- 1 The following figure shows triangle XYZ . The length of \overline{XY} is 19 units, and the length of \overline{YZ} is 181 units.



Note: Figure not drawn to scale.

What is the value of $\frac{XZ}{YZ}$?

Select one answer.

- A $\frac{19}{181}$
- B $\frac{162}{181}$
- C $\frac{180}{181}$
- D $\frac{361}{181}$



- 2** A school had 380 sweatshirts in stock for students to buy. Two colors, green and purple, and two styles, hood and no hood, were available. Of all the sweatshirts, 210 had no hood and 180 were green. Of the sweatshirts that were purple, 70 had a hood.

Which statements about the sweatshirts are true?

Select **all** that apply.

- A** More than half of the sweatshirts had hoods.
- B** More than half of the sweatshirts were purple.
- C** More than half of the green sweatshirts had hoods.
- D** More than half of the sweatshirts without hoods were purple.
- E** More than half of the sweatshirts were green and had a hood.
- 3** Student J and Student K are both reading the same book for a class assignment. Student J reads 20 pages of the book each day. Student K starts reading 2 days after Student J starts reading, and Student K reads 30 pages of the book each day.
- Define one variable **and** write an equation that represents the information given.
 - Determine the number of days after Student J starts reading when both students will have read the same number of pages of the book. Show your work or explain how you found your answer.

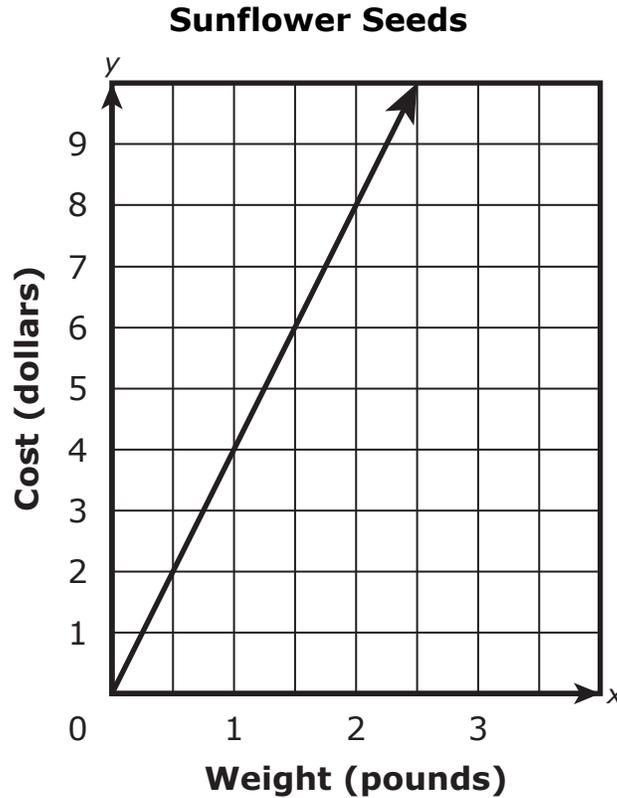
Enter your answers and your work or explanation in the space provided.



4 A grocery store sells pumpkin seeds and sunflower seeds by the pound.

The equation $y = 6x$ models the relationship between y , the cost, in dollars, and x , the weight, in pounds, of the pumpkin seeds.

The graph shows the relationship between the cost, in dollars, and the weight, in pounds, of the sunflower seeds.



A customer purchased seeds and paid \$12 for the pumpkin seeds and \$20 for the sunflower seeds.

Which statement is true?

- A The customer purchased 2 more pounds of sunflower seeds than pumpkin seeds.
- B The customer purchased 3 more pounds of sunflower seeds than pumpkin seeds.
- C The customer purchased 2 more pounds of pumpkin seeds than sunflower seeds.
- D The customer purchased 3 more pounds of pumpkin seeds than sunflower seeds.



- 5** The vertices of $\triangle PQR$ are $P(6, 1)$, $Q(3, 5)$, and $R(11, 11)$. The length of segment PR is $\sqrt{125}$ units.

Use the coordinates and geometric reasoning to show that $\triangle PQR$ is a right triangle. Explain your reasoning and show your work.

Enter your explanation and your work in the space provided.

- 6** A drama club is selling tickets to a play. The cost of each adult ticket is \$8 and the cost of each student ticket is \$4. One customer purchased 8 tickets and spent a total of \$56.

The system of equations shown can be used to model this situation.

$$\begin{cases} y = 8 - x \\ 8x + 4y = 56 \end{cases}$$

Which equation can be used to find x , the number of adult tickets the customer purchased?

- A** $8x + 4(8 - x) = 56$
- B** $8(8 - x) + 4y = 56$
- C** $8x + 4y - 56 = 8 - x$
- D** $8x + 4y = 56 + 8 - x$
- 7** Consider the following system of two equations.

$$\begin{cases} 3x - 4y = -24 \\ 3x + 2y = -6 \end{cases}$$

What is the value of the expression $3x + 4y$?

Enter your answer in the space provided.





You have come to the end of Section 3 of the test. Review your answers from Section 3 only.





GO ON TO NEXT PAGE



Section 4 (Calculator)

Directions:

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EXAMPLES

To answer -3 in a question, fill in the answer grid as shown below.

-	3					
●						
○	○	○	○	○	○	○
○	1	1	1	1	1	1
○	2	2	2	2	2	2
●	3	3	3	3	3	3
○	4	4	4	4	4	4
○	5	5	5	5	5	5
○	6	6	6	6	6	6
○	7	7	7	7	7	7
○	8	8	8	8	8	8
○	9	9	9	9	9	9

To answer $.75$ in a question, fill in the answer grid as shown below.

	.	7	5			
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○	2	2	2	2	2	2
○	3	3	3	3	3	3
○	4	4	4	4	4	4
○	5	5	●	5	5	5
○	6	6	6	6	6	6
○	7	●	7	7	7	7
○	8	8	8	8	8	8
○	9	9	9	9	9	9



Mathematics

- 1 The dimensions of a circular cylinder are described.
- The diameter of the cylinder is 6 meters.
 - The height of the cylinder is 12 meters.

What is the volume, in cubic meters, of the cylinder?

Select one answer.

- A 18π
- B 36π
- C 54π
- D 108π



- 2 A group raised money by selling key chains and coffee cups.

In the equation $y = 2.75x$, the variable y represents the amount, in dollars, that the group raised from selling x key chains.

The following table shows the amount, in dollars, that the group raised from selling coffee cups, based on the number of cups sold on each of four days.

Coffee Cup Sale

Day	Number of Coffee Cups Sold	Amount Raised (dollars)
Monday	5	14
Tuesday	10	28
Wednesday	15	42
Thursday	25	70

On Friday, the group sells 40 key chains and 40 coffee cups.

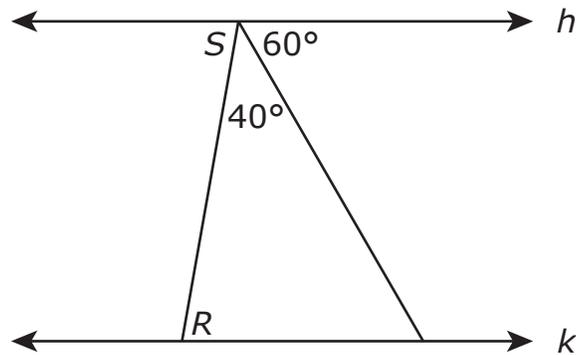
What is the total amount raised from selling 40 key chains compared to the total amount raised from selling 40 coffee cups?

Select one answer.

- A It is \$2 less than the total amount raised from selling 40 coffee cups.
- B It is \$2 more than the total amount raised from selling 40 coffee cups.
- C It is \$5 less than the total amount raised from selling 40 coffee cups.
- D It is \$5 more than the total amount raised from selling 40 coffee cups.



3 The figure shows parallel lines h and k intersected by two transversals.



A student claims that the $m\angle R = 80^\circ$.

Which statement about the claim is true?

- A The claim is incorrect because $m\angle S = 180^\circ \div 3 = 60^\circ$, and since $\angle R$ and $\angle S$ are corresponding angles, $m\angle R = 60^\circ$.
- B The claim is incorrect because $m\angle S = 60^\circ + 40^\circ = 100^\circ$, and since $\angle R$ and $\angle S$ are alternate interior angles, $m\angle R = 100^\circ$.
- C The claim is correct because $m\angle S = (360^\circ \div 3) - 40^\circ = 80^\circ$, and since $\angle R$ and $\angle S$ are corresponding angles, $m\angle R = 80^\circ$.
- D The claim is correct because $m\angle S = 180^\circ - (40^\circ + 60^\circ) = 80^\circ$, and since $\angle R$ and $\angle S$ are alternate interior angles, $m\angle R = 80^\circ$.



- 4 A teacher has a cube. Each face of the cube has an area of $\frac{1}{36}$ square foot.

Part A

Let d represent the length, in feet, of each edge of the cube. Write and solve an equation that includes the use of exponents to determine the value of d .

Enter your equation and solution in the space provided.

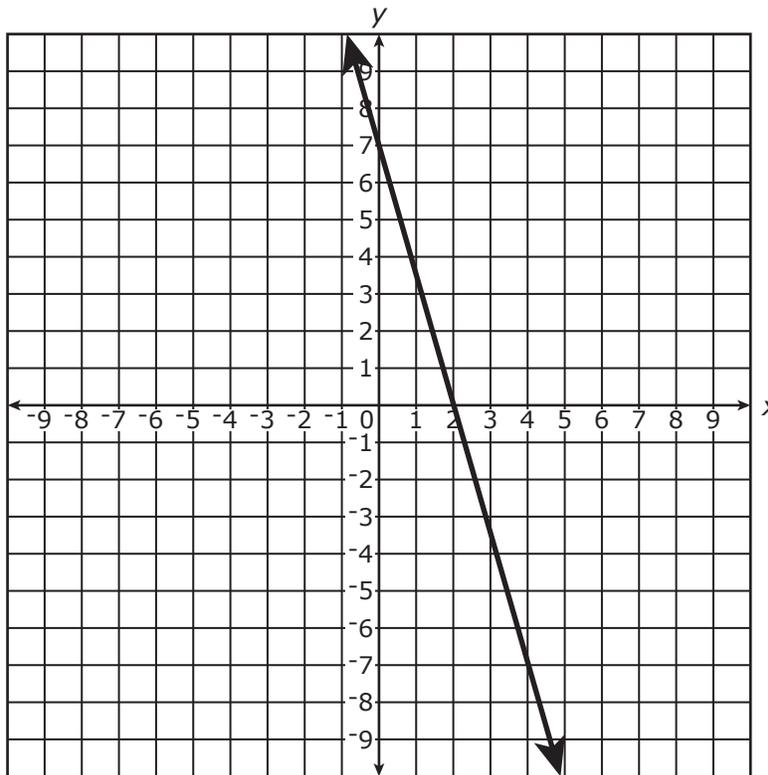
Part B

Let v represent the volume, in cubic feet, of the cube. Write and solve an equation that includes the use of exponents to determine the value of v .

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



5 The graph of a line is shown on the coordinate plane.



Which pair of statements describe the correct equation of the line **and** give a correct explanation about the ordered pairs on the line?

- A The equation of the line is $y = -7x - \frac{2}{7}$ because the slope of the line is $-\frac{2}{7}$, and the y -intercept is -7 . The coordinates of the ordered pairs on the line always satisfy the equation.
- B The equation of the line is $y = -7x - \frac{7}{2}$ because the slope of the line is -7 , and the y -intercept is $-\frac{7}{2}$. The coordinates of the ordered pairs on the line never satisfy the equation.
- C The equation of the line is $y = -\frac{7}{2}x + 7$ because the slope of the line is $-\frac{7}{2}$, and the y -intercept is 7 . The coordinates of the ordered pairs on the line always satisfy the equation.
- D The equation of the line is $y = -\frac{2}{7}x + 7$ because the slope of the line is 7 , and the y -intercept is $-\frac{2}{7}$. The coordinates of the ordered pairs on the line never satisfy the equation.



- 6** A school club ordered medium pizzas and large pizzas for a club meeting. Each medium pizza cost \$10 and was shared by 3 students. Each large pizza cost \$12 and was shared by 4 students. There are 26 students in the club, and the club spent \$80 on the pizzas.

Which system of equations models this situation, where x represents the number of medium pizzas and y represents the number of large pizzas?

A $\begin{cases} 10x + 12y = 80 \\ x + y = 26 \end{cases}$

B $\begin{cases} 10x + 12y = 80 \\ 3x + 4y = 26 \end{cases}$

C $\begin{cases} 3.33x + 3y = 80 \\ x + y = 26 \end{cases}$

D $\begin{cases} 3.33x + 3y = 80 \\ 3x + 4y = 26 \end{cases}$

- 7** Anton has some money saved for school. To increase the amount he has saved, he got a job and added all the money earned to the amount already saved.
- Anton was paid a constant rate in dollars per hour at his job.
 - After working 10 hours, the amount he had saved was \$450.
 - After working 20 hours, the amount he had saved was \$600.
 - Anton did not save any other money or spend any of the money he had saved.

Which equation represents y , the amount of money in dollars Anton would have saved after working x hours?

Select one answer.

A $y = 10x + 150$

B $y = 15x + 100$

C $y = 15x + 300$

D $y = 30x + 150$





You have come to the end of Section 4 of the test. Review your answers from Section 4 only.



8-MATH