



NEW MEXICO MEASURES  
OF STUDENT SUCCESS AND  
ACHIEVEMENT

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**NM-MSSA**

**Mathematics**

**Grade 8 • Practice Test**



PLACE STUDENT  
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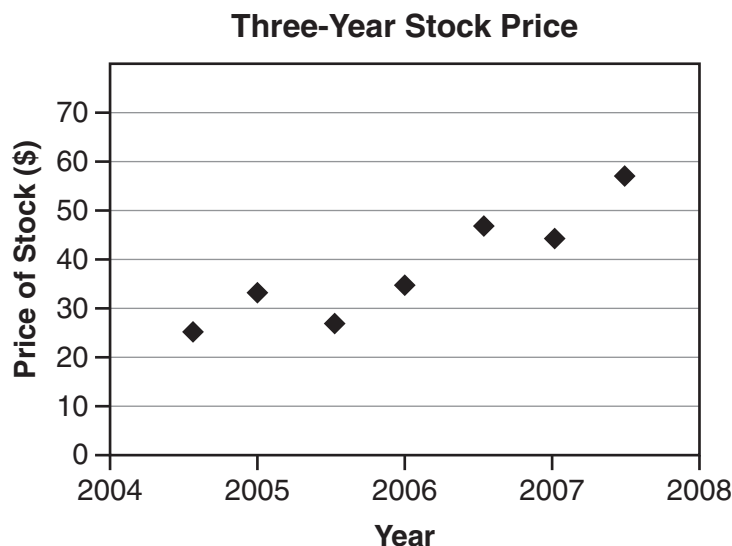
# Mathematics Session 1

## DIRECTIONS

Today you will take a test in mathematics. For this test, you will answer selected-response and constructed-response questions. Some of the questions may look different from test questions you have seen before, and some may ask about material that is new to you, but it is important to do your best. If you are not sure of the answer to a question, you should still try to answer it.

You may NOT use a calculator to answer the questions in this session.

1. Beginning in June 2004, Raphael noted the price of a stock at the same time twice each year. The graph shows the price of the stock during a three-year period.



Which statement is true about the data?

- A The price was constantly increasing.
- B The price rose at least 10% every six months.
- C The price more than tripled during the three-year period.
- D The price more than doubled during the three-year period.

2. What fraction is equivalent to  $0.\overline{27}$ ?

A  $\frac{2}{7}$

B  $\frac{3}{11}$

C  $\frac{1}{27}$

D  $\frac{27}{100}$

3. Miko will solve this equation for  $x$  in exactly two steps.

$$2(x+7)=5$$

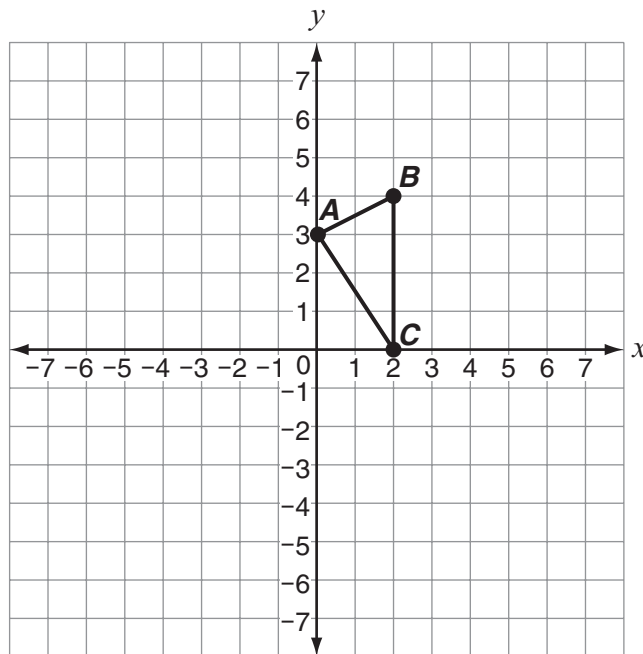
- Step 1: ?
- Step 2: ?

What is **most likely** the first step in Miko's solution?

- A Divide each side of the equation by 2.
- B Divide each side of the equation by 5.
- C Subtract 7 from each side of the equation.
- D Use the distributive property on the left side of the equation.



4. Triangle  $ABC$  is shown on this coordinate plane.



The triangle is dilated by a scale factor of 3 with point  $A$  as the center of dilation.

What are the coordinates of vertex  $B$  after the dilation?

- A**  $(5, 7)$
- B**  $(6, 6)$
- C**  $(6, 12)$
- D**  $(8, 7)$

5. The equation  $w = 3.1t + 6$  can be used to estimate  $w$ , the weight of a puppy in ounces that is  $t$  weeks old.

Based on the equation, which statement compares the expected weight of a 1-week old puppy to the weight of a newborn puppy?

- A The 1-week old puppy weighs 3.1 ounces more.
- B The 1-week old puppy weighs 3.1 ounces less.
- C The 1-week old puppy weighs 6 ounces more.
- D The 1-week old puppy weighs 6 ounces less.

6. Rory is looking at a table of  $x$ -values and  $y$ -values. Which process could Rory use to determine if  $y$  can be considered a function of  $x$ ?

- A make sure the  $x$ -values follow a pattern
- B make sure the  $y$ -values follow a pattern
- C make sure no two distinct  $x$ -values correspond to the same unique  $y$ -value
- D make sure each unique  $x$ -value corresponds to exactly one unique  $y$ -value

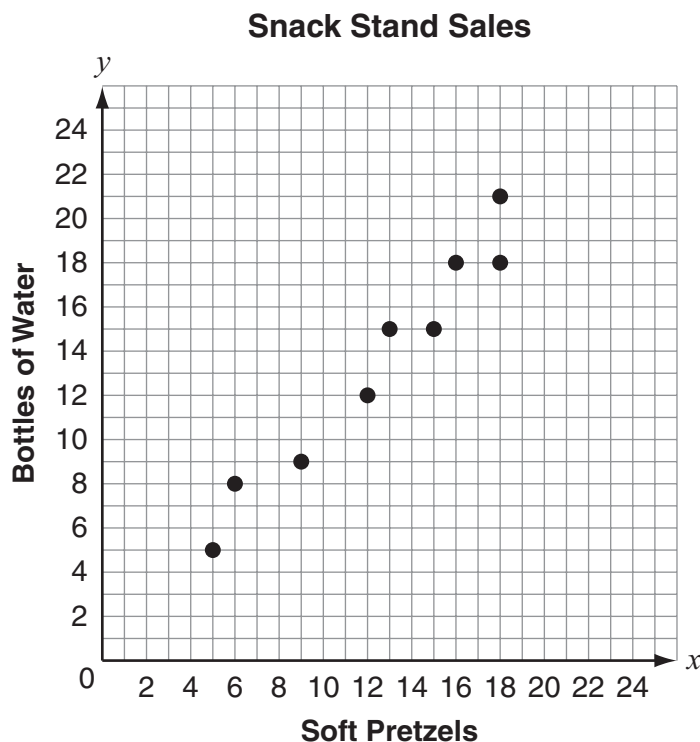
7. Which inequalities are true? Select **all** that apply.

- A  $\sqrt{5} > \sqrt{6}$
- B  $\sqrt{3+4} > 3$
- C  $\pi^2 > 9$
- D  $-6 > -2\pi$
- E  $\sqrt{22} > 5$



This question has two parts. Be sure to answer all parts of the question.

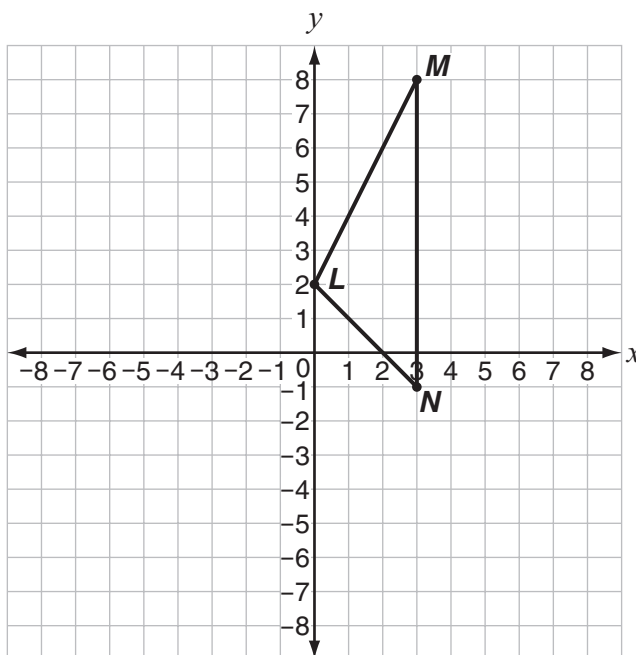
8. This scatterplot shows the number of bottles of water and the number of soft pretzels sold during different hours at a stadium snack stand.



The equation  $y = x + 0.5$  models the line of best fit, where  $x$  is the number of soft pretzels sold and  $y$  is the number of bottles of water sold.

- What does the slope of the model represent in this situation?
- Based on the line of best fit, how many bottles of water could be sold when 22 soft pretzels are sold? Show your work or explain how you know.

9. Triangle  $LMN$  is shown on this coordinate plane.



Triangle  $PQR$  has these coordinates:  $P(0, 2)$ ,  $Q(-3, -4)$ , and  $R(-3, 5)$ .

Which transformation can be used to show that  $\triangle LMN$  is congruent to  $\triangle PQR$ ?

- A** a reflection across the  $x$ -axis
- B** a reflection across the  $y$ -axis
- C** a rotation  $180^\circ$  about point  $L$
- D** a rotation  $180^\circ$  about the origin

**10.** Erin, Roxby, and Joe went to a farm to purchase some fruit.

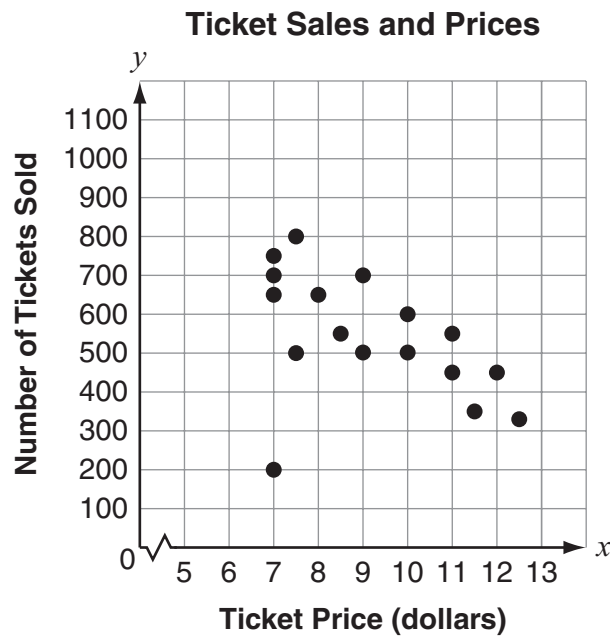
- Erin purchased 4.2 pounds of peaches and 1.4 pounds of raspberries for \$14.00.
- Roxby purchased 2.0 pounds of blueberries and 1.5 pounds of raspberries for \$14.00.
- Joe purchased only blueberries for \$7.75.

Which additional information would **not** be sufficient to determine how many pounds of blueberries Joe purchased?

- A** the cost per pound of peaches
- B** the cost per pound of raspberries
- C** the cost of 2.1 pounds of peaches and 2.8 pounds of raspberries
- D** the cost of 4.0 pounds of blueberries and 3.0 pounds of raspberries



11. A zoo manager wanted to find out how ticket prices affected the number of tickets he sold. The data he collected is shown in this scatterplot.



Which equation describes the line of best fit for the data?

- A  $y = 50x - 150$
- B  $y = -60x + 1,020$
- C  $y = -60x + 1,120$
- D  $y = -75x + 1,400$

12. Here are descriptions of two functions:

- Function 1: a line that passes through the points listed in this table

$x$	-3	-1	1	3
$y$	-14	-8	-2	4

- Function 2: a line that has a slope of 2 and goes through the point (2, 1)

Which statement correctly compares the slopes and  $y$ -intercepts of the two functions?

- A Function 1 has a greater slope and a lesser  $y$ -intercept than Function 2.
- B Function 1 has a greater slope and a greater  $y$ -intercept than Function 2.
- C Function 1 has a lesser slope and a lesser  $y$ -intercept than Function 2.
- D Function 1 has a lesser slope and a greater  $y$ -intercept than Function 2.

13. Wendi is trying to find this sum.

$$(1.2 \times 10^5) + (2.4 \times 10^4)$$

Which step will **best** help Wendi find the sum, if it is possible?

- A Multiply 4 and 5.
- B Add 1.2 and 2.4.
- C Rewrite  $2.4 \times 10^4$  as  $0.24 \times 10^5$ .
- D Since the exponents are different, the sum cannot be determined.

14. Between which two integers does  $\sqrt{52}$  fall?

- A 6 and 7
- B 7 and 8
- C 8 and 9
- D 9 and 10

*This question has three parts. Be sure to answer all parts of the question.*

15. The Jewelry Shop sells bracelets with beads.

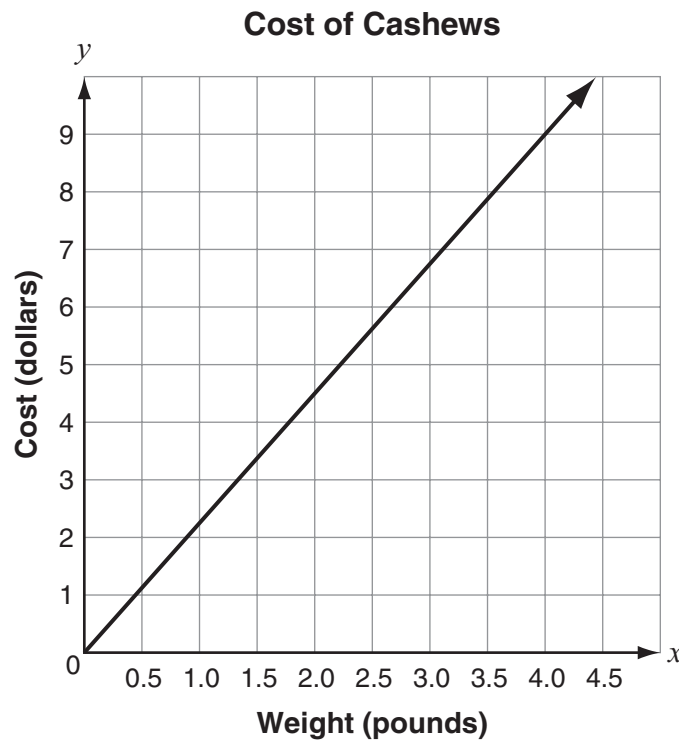
- The price of a bracelet that includes one bead is \$5.00.
  - The price of the bracelet increases by 50¢ for each additional bead.
- a. Write an equation that represents the cost of a bracelet,  $y$ , as a function of the number of beads,  $x$ , on the bracelet.
- b. What do the **slope** and **y-intercept** of the graph of the equation you wrote in part (a) mean with respect to the number of beads and the cost of the bracelet?
- c. What would be the cost, in dollars, of a bracelet with 12 beads? Use words or numbers to justify your answer.

SESSION

1



16. Eduardo compares the costs of cashews and pistachios. He uses this graph to model the cost of cashews.



Eduardo uses this equation to model the cost in dollars,  $c$ , for  $p$  pounds of pistachios.

$$c = 3.25p$$

Based on Eduardo's models, which statement is true about the costs of cashews and pistachios?

- A Cashews cost \$1.00 less per pound than pistachios.
- B Cashews cost \$1.00 more per pound than pistachios.
- C Cashews cost \$2.25 less per pound than pistachios.
- D Cashews cost \$2.25 more per pound than pistachios.

- 17.** A cone has a radius of 5 centimeters and a height of 9 centimeters.

What is the volume, in cubic centimeters, of the cone?

- A**  $15\pi$
- B**  $75\pi$
- C**  $135\pi$
- D**  $225\pi$

- 18.** Lou and Kent's teacher wrote a decimal number that repeats.

- Lou thinks the number is an irrational number.
- Kent thinks the number can be written as the quotient of two integers.

Which student is correct?

- A** Only Lou is correct.
- B** Only Kent is correct.
- C** Both Lou and Kent are correct.
- D** Neither Lou nor Kent are correct.



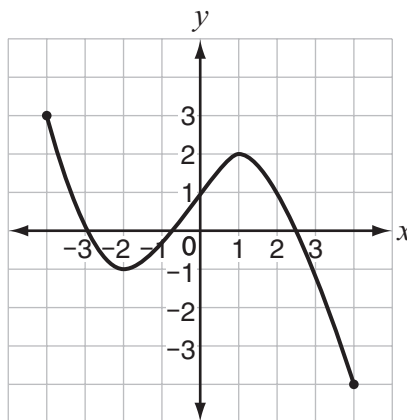
19. An equation is shown.

$$4x - 21 = 12x + 27$$

What value of  $x$  makes the equation true?

- A  $-\frac{3}{4}$
- B  $-\frac{3}{8}$
- C  $-3$
- D  $-6$

20. A graph of a function is shown.



For what values of  $x$  is the function increasing?

- A  $-2 < x < 1$
- B  $-1 < x < 2$
- C  $-4 < x < -2$  and  $1 < x < 4$
- D  $-1 < x < 3$  and  $-4 < x < 2$

# Mathematics Session 2

## DIRECTIONS



Today you will take a test in mathematics. For this test, you will answer selected-response and constructed-response questions. Some of the questions may look different from test questions you have seen before, and some may ask about material that is new to you, but it is important to do your best. If you are not sure of the answer to a question, you should still try to answer it.

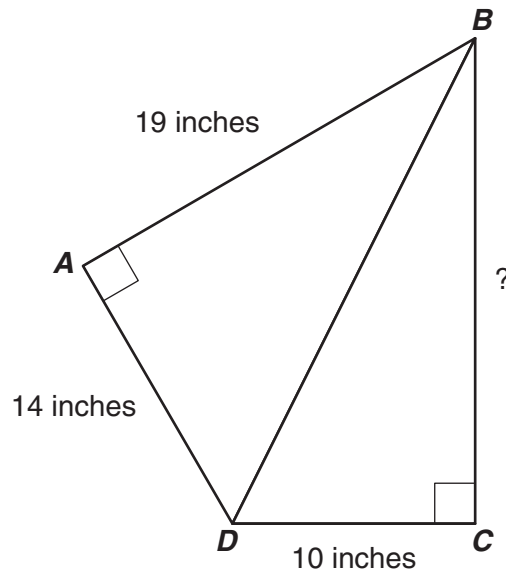
You **MAY** use a calculator to answer the questions in this session.

21. Dulaney solved a system of equations correctly and ended with the equation  $16 = 16$ . Which statement **must** be true about the system of equations Dulaney solved?
- A There are no solutions to the system of equations.
  - B The solution to the system of equations is  $(0, 0)$ .
  - C The solution to the system of equations is  $(16, 16)$ .
  - D There are infinitely many solutions to the system of equations.





22. Quadrilateral  $ABCD$  is divided into two right triangles by one of its diagonals, as shown.



Which is **closest** to the length of side  $BC$ ?

- A 16 inches
- B 21 inches
- C 24 inches
- D 26 inches





23. The table shows the total cost a telephone company charges its customers for calls.

**Long Distance Rates**

Length of Call (minutes)	Cost for Call
0	\$0.39
1	\$0.42
2	\$0.45
3	\$0.48
4	\$0.51

Based on the data in the table, what is the cost of a 25-minute long-distance telephone call?

- A \$12.75
- B \$9.75
- C \$1.14
- D \$0.75



24. Which equation is true?

- A  $\frac{3^4 \cdot 3}{3^{-2}} = 3^6$
- B  $(3^{-2})^{-4} = 3^{-8}$
- C  $\frac{7^{-4}}{7^{-2}} = 7^{-6}$
- D  $(4^3 \cdot 4^2)^{-1} = \frac{1}{4^5}$



25. A counselor at Camp Chickadee surveys the campers to find out which morning activity they want to participate in. The results are shown in the table.

**Survey Results**

	Archery	Kayaking
Girls	96	54
Boys	79	72

What percentage of girls choose kayaking?

- A 18%
- B 36%
- C 43%
- D 75%



26. Which table represents a function that is **not** linear?

A

$x$	$y$
-1	-18
0	-9
2	9
3	18

B

$x$	$y$
-1	-9
0	0
2	18
3	27

C

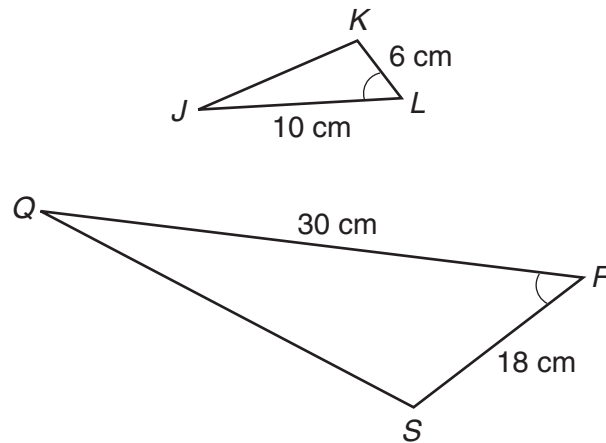
$x$	$y$
-1	10
0	9
2	7
3	6

D

$x$	$y$
-1	1
0	0
2	4
3	9



27. Triangle  $JKL$  is similar to triangle  $QSR$ , as shown.



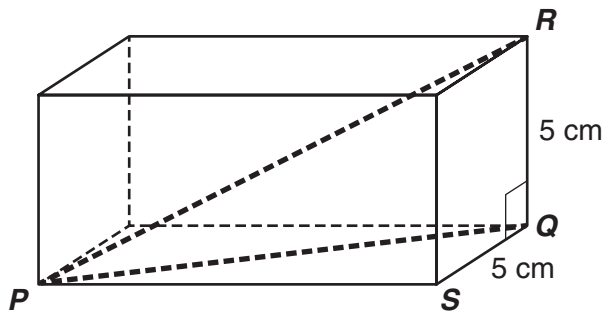
Which statement is **not** true?

- A The length of line segment  $QS$  is three times the length of line segment  $JK$ .
- B The length of line segment  $KL$  is one-third the length of line segment  $SR$ .
- C The measure of angle  $Q$  is three times the measure of angle  $J$ .
- D The measure of angle  $L$  is equal to the measure of angle  $R$ .



This question has two parts. Be sure to answer all parts of the question.

28. Points  $P$ ,  $Q$ ,  $R$ , and  $S$  are vertices of a right rectangular prism as shown. The length of  $\overline{QR}$  is 5 centimeters and the length of  $\overline{QS}$  is 5 centimeters.



The length of  $\overline{PS}$  is two more than three times the length of  $\overline{QS}$ .

- Write an expression to represent the length of  $\overline{PQ}$ .
- What is the estimated length, in centimeters, of  $\overline{PR}$ ? Show your work or explain how you know.

SESSION  
2

29. Light travels at an approximate speed of  $3 \times 10^8$  meters per second. The distance from Earth to the Sun is approximately  $1.5 \times 10^{11}$  meters.

Which is the **best** estimate for the number of seconds it takes light to travel from the Sun to Earth?

- 200 seconds
- 500 seconds
- 2,000 seconds
- 5,000 seconds



30. This table shows the relationship between  $x$  and  $y$  in a function.

$x$	$y$
-3	11
-1	7
1	3
3	-1

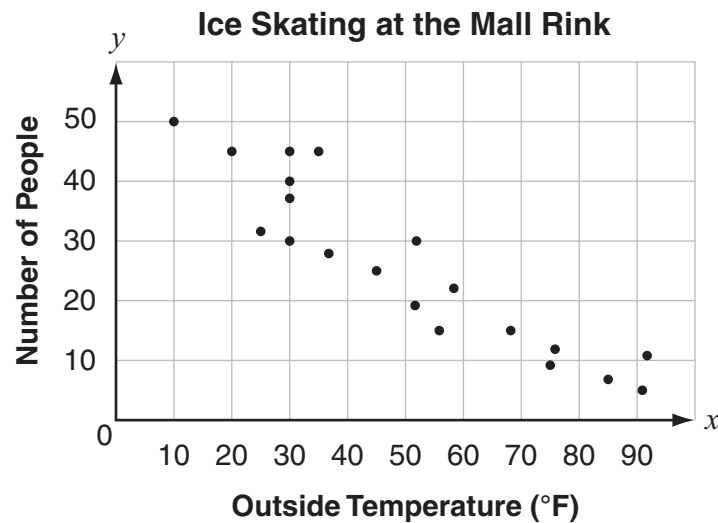
Which equation represents all the data in the table?

- A  $y = 4x + 1$
- B  $y = -x + 2$
- C  $y = \frac{1}{2}x + 4$
- D  $y = -2x + 5$



Use the information below to answer questions 31 and 32.

The relationship between the outside high temperature, in degrees Fahrenheit, and the number of people who went to ice-skate at the Mall Rink for 20 random days throughout the year is shown in this scatterplot.



SESSION  
**2**

31. Jordan was asked to analyze the scatterplot to see if there are any outliers in the data. Which feature should Jordan look for that would indicate an outlier?

- A data points that are identical
- B data points that are the farthest left and the farthest right
- C a data point that is far removed from the basic pattern of the other data points
- D a data point that is on the direct line from the farthest left point and the farthest right point



**32.** Four students were asked to analyze the 20 data points on the scatterplot and predict the number of people who would go to the mall to ice-skate one morning if the outside high temperature was  $40^{\circ}\text{F}$ . Each student's prediction and reasoning are listed:

- Brenda: 45, since that is the number of people who went to the mall to ice-skate the most often
- Franklin: 35, since that is the average of the greatest and least number of people in the interval from  $30^{\circ}\text{F}$  to  $50^{\circ}\text{F}$
- Thera: 28, since that is the average number of people for the data points on either side of  $40^{\circ}\text{F}$
- Zachary: 32, since the line of best fit would have an approximate equation of  $y = -0.5x + 52$  and  $-0.5(40) + 52 \approx 32$

Which student **best** analyzed the scatterplot to predict the number of people who would go to the mall to ice-skate if the outside high temperature was  $40^{\circ}\text{F}$ ?

- A** Brenda
- B** Franklin
- C** Thera
- D** Zachary





33. Which of these tables shows the inputs and outputs of a function?

**A**

$x$	4	5	7	-10
$y$	6	6	6	-6

**B**

$x$	4	4	4	4
$y$	5	6	7	8

**C**

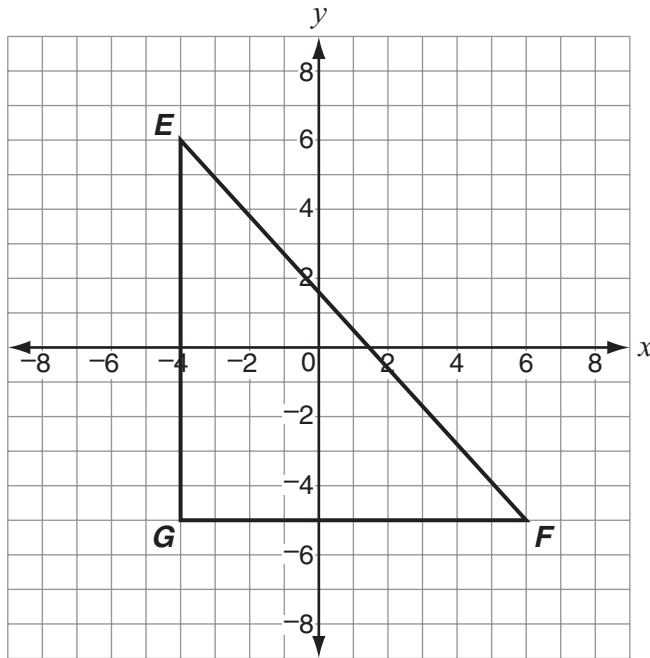
$x$	4	4	5	5
$y$	2	6	2	6

**D**

$x$	-3	-3	3	3
$y$	2	4	2	4



34. Triangle  $EFG$  is reflected across the  $x$ -axis and dilated by a scale factor of  $\frac{1}{2}$  about the origin to form triangle  $E'F'G'$ .



Which ordered pair describes the location of vertex  $E'$ ?

- A (2, 3)
- B (-2, -3)
- C (8, 12)
- D (-8, -12)



*This question has three parts. Be sure to answer all parts of the question.*

- 35.** At a music festival, there is one price for adult tickets, one price for child tickets, and one price for senior citizen tickets.
- The Hernandez family bought 3 adult tickets and 2 child tickets for a total of \$180.
  - The Carr family bought 1 adult ticket and 2 child tickets for a total of \$100.
- a. Write a system of equations that can be used to find the price of each adult ticket and the price of each child ticket. Be sure to use variables to represent each type of ticket in your system of equations.
- b. What is the price, in dollars, for each adult and each child ticket? Show your work or explain how you know.
- The Gupta family bought 2 adult tickets, 4 child tickets, and 1 senior citizen ticket for a total of \$235.
- c. What is the price, in dollars, for each senior citizen ticket? Show your work or explain how you know.

- 36.** Daniel wants to know if people prefer to watch movies in a theater or at home. He randomly surveyed 200 students and adults. The results of his survey are shown in this table.

	In Theater	At Home	Total
Students	50	30	80
Adults	36	84	120
Total	86	114	200

Based on the data in the table, which statement is true?

- A** Of the total people surveyed, 80% were students.
- B** Of the adults surveyed, 70% prefer to watch movies at home.
- C** Of the students surveyed, 30% prefer to watch movies at home.
- D** Of the total people surveyed, 50% prefer to watch movies in a theater.

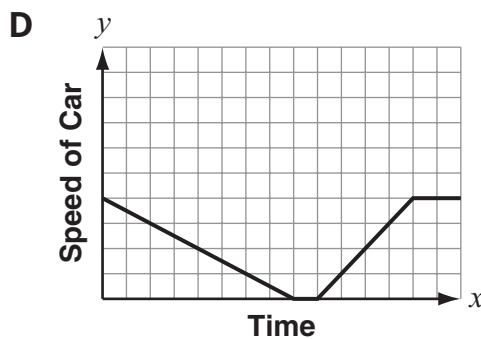
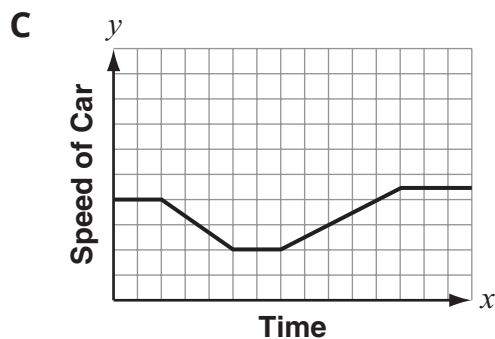
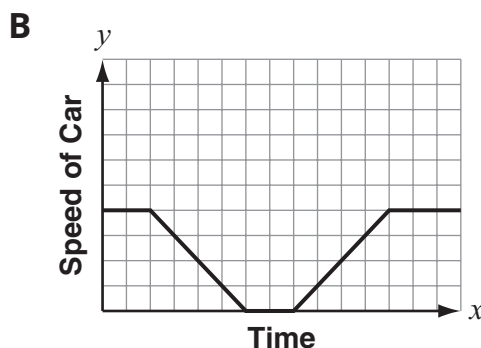
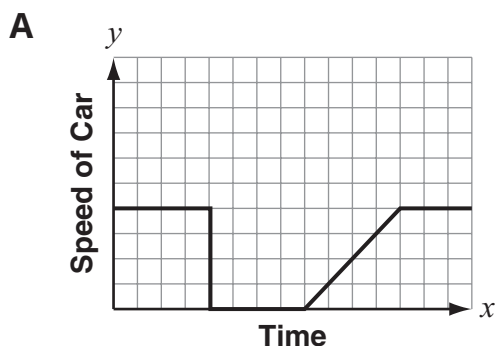


37. Which dimensions describe a cylinder with a volume of  $250\pi$  cubic inches?

- A radius = 5 inches; height = 10 inches
- B radius = 10 inches; height = 5 inches
- C radius = 10 inches; height = 25 inches
- D radius = 25 inches; height = 10 inches

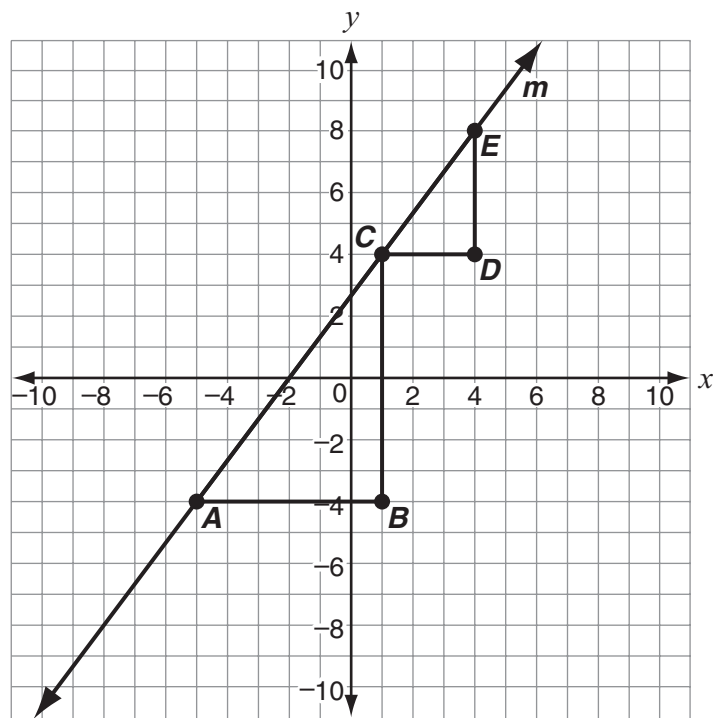
38. A car is moving at a constant speed. It slows down and stops at a traffic light, then speeds up and moves at a constant speed.

Which graph **best** represents the situation?





39. Similar triangles  $ABC$  and  $CDE$  are shown on a coordinate plane. Line  $m$  passes through the points  $A$ ,  $C$ , and  $E$ .

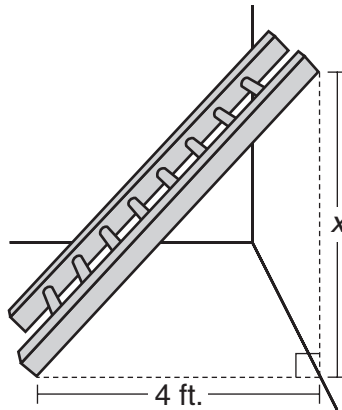


Which statement about triangles  $ABC$  and  $CDE$  is true?

- A  $AB = CD$
- B  $BC = DE$
- C The slope of  $\overline{AC}$  is the same as the slope of  $\overline{CE}$ .
- D The slope of  $\overline{AC}$  is greater than the slope of  $\overline{CE}$ .



- 40.** A 6-foot ladder is leaning against a wall. The bottom of the ladder is 4 feet from the wall, as shown.

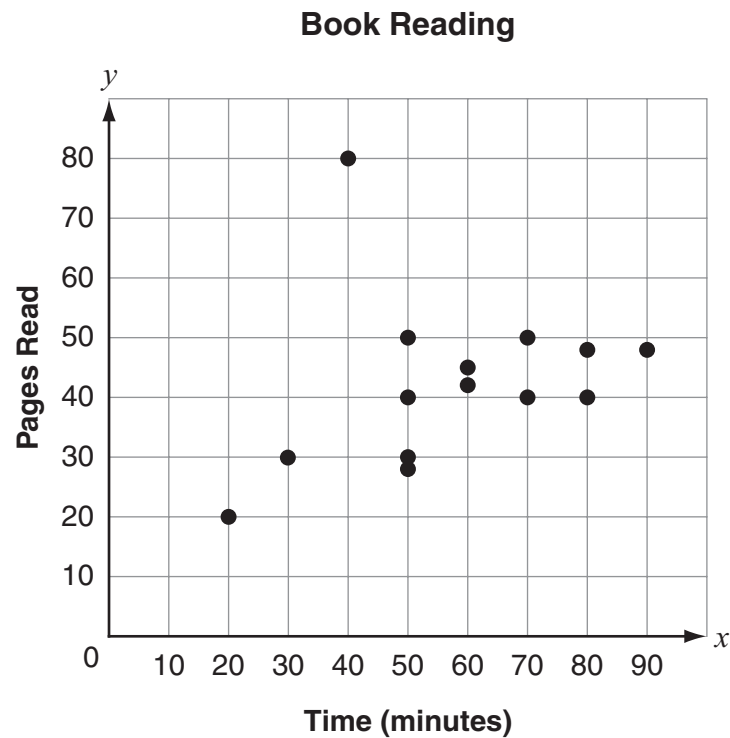


Which length is closest to  $x$ , the distance from the floor to where the ladder touches the wall?

- A** 2 ft.
- B** 4 ft.
- C**  $\sqrt{20}$  ft.
- D**  $\sqrt{52}$  ft.



41. This scatterplot shows the relationship between the number of minutes students read a certain book one night and the number of pages read.



Which ordered pair can **best** be described as an outlier?

- A (20, 20)
- B (40, 80)
- C (50, 50)
- D (90, 48)



# **NM-MSSA MATH**

## **PRACTICE TEST ANSWER KEY**

### **Grade 8**

Item Number	Key	Standards
1	D	8.SP.1.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
2	B	8.NS.1.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
3	A	8.EE.3.7 Solve linear equations in one variable. 8.EE.3.7.B Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
4	B	8.G.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
5	A	8.SP.1.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>
6	D	8.F.1.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. <sup>1</sup> <sup>1</sup> Function notation is not required for Grade 8.
7	C, D	8.NS.1.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$ ). <i>For example, by truncating the decimal expansion of <math>\sqrt{2}</math>, show that <math>\sqrt{2}</math> is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i>
8		8.SP.1.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. <i>For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</i>



## Practice Test Answer Key • Grade 8 Math

Item Number	Key	Standards
9	C	8.G.1.2 Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.
10	D	8.EE.3.8 Analyze and solve pairs of simultaneous linear equations.
11	C	8.SP.1.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
12	A	8.F.1.2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</i>
13	C	8.EE.1.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.
14	B	8.NS.1.2 Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., $\pi^2$ ). <i>For example, by truncating the decimal expansion of <math>\sqrt{2}</math>, show that <math>\sqrt{2}</math> is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i>
15		8.F.2.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
16	A	8.EE.2.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. <i>For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.</i>
17	B	8.G.3.9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
18	B	8.NS.1.1 Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.

## Practice Test Answer Key • Grade 8 Math

Item Number	Key	Standards
19	D	8.EE.3.7 Solve linear equations in one variable.
20	A	8.F.2.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
21	D	8.EE.3.8 Analyze and solve pairs of simultaneous linear equations.
22	B	8.G.2.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
23	C	8.F.2.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
24	D	8.EE.1.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$ .
25	B	8.SP.1.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. <i>For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?</i>
26	D	8.F.1.3 Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. <i>For example, the function <math>A = s^2</math> giving the area of a square as a function of its side length is not linear because its graph contains the points <math>(1,1)</math>, <math>(2,4)</math> and <math>(3,9)</math>, which are not on a straight line.</i>
27	C	8.G.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
28		8.G.2.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
29	B	8.EE.1.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology.

## Practice Test Answer Key • Grade 8 Math

Item Number	Key	Standards
30	D	8.F.2.4 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two $(x, y)$ values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
31	C	8.SP.1.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
32	D	8.SP.1.2 Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.
33	A	8.F.1.1 Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output. <sup>1</sup> <sup>1</sup> Function notation is not required for Grade 8.
34	B	8.G.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.
35		8.EE.3.8 Analyze and solve pairs of simultaneous linear equations. 8.EE.3.8.C Solve real-world and mathematical problems leading to two linear equations in two variables. <i>For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</i>
36	B	8.SP.1.4 Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. <i>For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?</i>
37	A	8.G.3.09 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
38	B	8.F.2.5 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

## Practice Test Answer Key • Grade 8 Math

Item Number	Key	Standards
39	C	8.EE.2.6 Use similar triangles to explain why the slope $m$ is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at $b$ .
40	C	8.G.2.7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
41	B	8.SP.1.1. Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

## Practice Test Answer Key • Grade 8 Math

#8

### Concepts and Procedures Scoring Rubric

Score	Description
2	Student earns 2 points.
1	Student earns 1 point.
0	Student earns 0 points.
Blank	No response

### Concepts and Procedures Training Notes:

Part a      2 points      for correct answer, **1 bottle of water is sold for every 1 soft pretzel sold**, or equivalent

Part b      1 point      for correct answer, **23**

**Rubric Block:** Author, Scorer, Test-creator, Tutor

### Mathematical Practices Scoring Rubric

Score	Description
1	Student earns 1 point.
0	Student earns 0 points.
Blank	No response

### Mathematical Practices Training Notes:

1 point      for interpreting and analyzing models (interpret the data either from the graph or from the equation to extrapolate the predicted value)

**Rubric Block:** Author, Scorer, Test-creator, Tutor

### Exemplary Response:

a. 1 bottle of water is sold for every 1 soft pretzel sold

b.  $23; y = x + 0.5 = 1(22) + 0.5 = 22.5$  or about 23

## Practice Test Answer Key • Grade 8 Math

#15

Concepts and Procedures Scoring Rubric:

Score	Description
4	The student earns 5 points.
3	The student earns 4 points.
2	The student earns 2 or 3 points.
1	The student earns 1 point.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Scoring Notes:

- Part a    1 point    for a viable equation,  $y = 0.50x + 4.50$  or equivalent
- Part b    2 points    for viable answer, the slope represents the cost of each additional bead and the y-intercept represents the cost of the bracelet without any beads, or a correct answer based on an incorrect answer in part (a) that shows understanding of interpreting the rate of change and initial value of a linear function in terms of the situation it models
- OR
- 1 point    for a viable answer for either the slope or the y-intercept
- Part c    2 points    for correct answer, (\$)**10.50** or a correct answer based on an incorrect answer in part (a), with sufficient work or explanation that shows understanding of using functions to model relationships between quantities
- OR
- 1 point    for correct answer or a correct answer based on an incorrect answer in part (a) with insufficient or no work or explanation
- OR
- for appropriate strategy that shows understanding of using functions to model relationships between quantities with incorrect or no answer

**Rubric Block:** Author, Scorer, Test-creator, Tutor

**Mathematical Practices Scoring Rubric:**

Score	Description
2	The student earns 2 points.
1	The student earns 1 point.
0	Response is incorrect or contains some correct work that is irrelevant to the skill or concept being measured.
Blank	No response

Scoring Notes:

- 1 point    for creating and interpreting a model (creates a viable equation and interprets the slope and y-intercept of the equation)
- 1 point    for using a model to solve a problem (uses the equation for the function to determine the cost of a bracelet with 12 beads)

**Rubric Block:** Author, Scorer, Test-creator, Tutor

**Exemplary Response:**

a.  $y = 5.00 + 0.5(x - 1)$   $y = 0.50x + 4.50$

b. The slope is 0.50, which means the cost of the bracelet increases by 50¢ for each additional bead. The y-intercept is 4.50, which means the cost of a bracelet without any beads is \$4.50.

c. \$10.50;

$y = 0.50(12) + 4.50$

## Practice Test Answer Key • Grade 8 Math

#28

### Concepts and Procedures Scoring Rubric

Score	Description
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response

### Concepts and Procedures Training Notes:

Part a 1 point for viable work or explanation on how to find the length of  $\overline{PQ}$

Part b 1 point for correct answer, **18.41** (centimeters), or equivalent

Note: also accept correct answer, 18 (centimeters) for estimated length

**Rubric Block:** Author, Proctor, Scorer, Test-constructor, Tutor

### Mathematical Practices Scoring Rubric

Score	Description
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response

### Mathematical Practices Training Notes:

1 point for relying on using models to help conceptualize and solve a problem (using the Pythagorean theorem to calculate the diagonals of the prism in part b)

**Rubric Block:** Author, Scorer, Test-constructor, Tutor

### Exemplary Response:

a.  $\sqrt{17^2 + 5^2}$

b. **18.41** (centimeters); first find the length of  $\overline{PQ}$ ,

$$\sqrt{17^2 + 5^2} = \sqrt{289 + 25}$$

$$= \sqrt{314}$$

$$\approx 17.72$$

Using the Pythagorean theorem,  $\sqrt{(PQ)^2 + (QR)^2} = \overline{PR}$ , and substituting the values for  $\overline{P} = 17.72$ , and  $\overline{Q} = 5$ ,

$$\overline{P} = \sqrt{17.72^2 + 5^2}$$

$$= \sqrt{338.9984}$$

$$\approx 18.41$$

## Practice Test Answer Key • Grade 8 Math

#35

### Concepts and Procedures Scoring Rubric

Score	Description
4	The student earns 4 points.
3	The student earns 3 points.
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response

### Concepts and Procedures Training Notes:

Part a 1 point for correct answers,  $3x + 2y = 180$ ;  $x + 2y = 100$ , or equivalent

Part b 2 points for two correct answers, **\$40 adult and \$30 child**

OR

1 point for one correct answer, **\$40 adult or \$30 child**

Part c 1 point for correct answer, **\$35**

**Rubric Block:** Author, Scorer, Test-creator, Tutor

### Mathematical Practices Scoring Rubric:

Score	Description
2	The student earns 2 points.
1	The student earns 1 point.
0	The student earns 0 points.
Blank	No response

### Mathematical Practices Training Notes:

1 point for knowing and flexibly using different properties of operations (uses a process to solve the system of equations for both unknown prices in part (b))

1 point for making sense of quantities and their relationships in problem situations (uses an expression or equation for the total price of tickets for the Gupta family and substitutes the values for the adult and child prices into it to determine the price of the senior citizen ticket in part (c))

**Rubric Block:** Author, Scorer, Test-creator, Tutor

### Exemplary Response:

a.  $3x + 2y = 180$ ;  $x + 2y = 100$

b. **\$40** (adult ticket); **\$30** (child ticket)

Using the elimination method:

$$3x + 2y = 180$$

$$-(x + 2y = 100)$$

$$2x = 80$$

$$\frac{2x}{2} = \frac{80}{2}$$

$$x = 40$$

Substituting back into the equation  $x + 2y = 100$  and solving for  $y$ ,



## Practice Test Answer Key • Grade 8 Math

$$40 + 2y = 100$$

$$2y = 100 - 40$$

$$\frac{2y}{2} = \frac{60}{2}$$

$$y = 30$$

c. **\$35** (senior citizen); using the Gupta family equation  $2x + 4y + s = 235$  and substituting  $x$  for 40 and  $y$  for 30,

$$2(40) + 4(30) + s = 235$$

$$80 + 120 + s = 235$$

$$200 + s = 235$$

$$s = 35$$