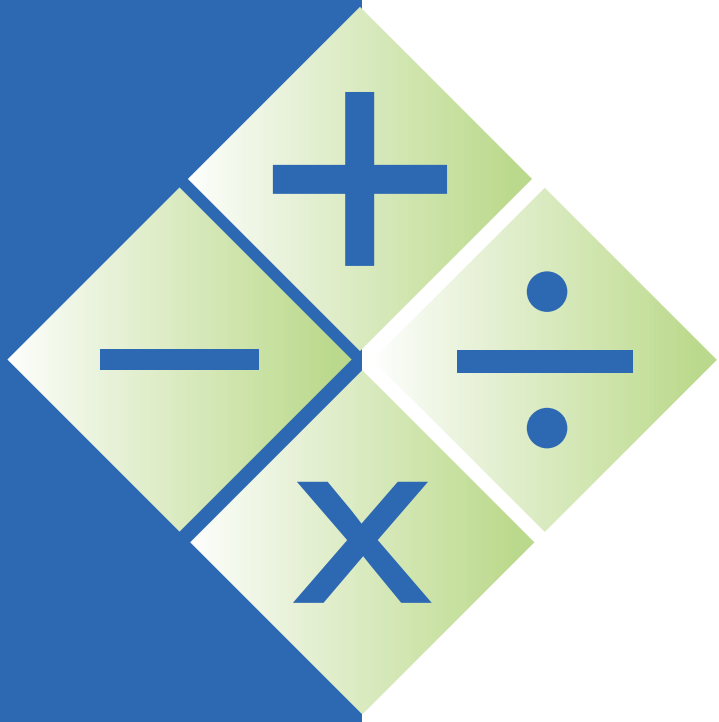
Mathematics

Forward Exam Practice Test Grade 8



Wisconsin Forward Exam

WISCONSIN DEPARTMENT OF Public Instruction

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MATHEMATICS NON-CALCULATOR ITEMS—SESSION 1

Answer the items below. A calculator **may not** be used to assist with calculations necessary to answer items in Session 1.

1. Match each fraction to an equivalent decimal number.

$\frac{2}{11}$	0.181
$\frac{17}{90}$	$0.1\overline{8}$
$\frac{188}{999}$	$0.\overline{18}$
$\frac{181}{1{,}000}$	$0.\overline{188}$

2. An expression is shown.

$$\frac{9.6 \times 10^{6}}{1.2 \times 10^{-2}}$$

Which expression is equivalent to the given expression?

A. 8×10^{8}

B. 8×10^{4}

C. 11.52×10^{-3}

D. 11.52×10^{-12}

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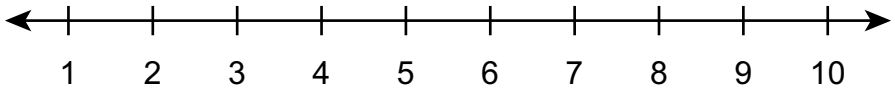
3. Plot a point on the number line to represent the approximate value of $\sqrt{12}$.



4. The table shows the approximate populations of four countries in 2023.

Approximate Country Populations in 2023

Country	Population
Nicaragua	7×10^6
Thailand	7×10^7
Tonga	1×10^5
Vietnam	1×10^8

Select the **two** statements that are true based on the information in the table.

Select **two** options.

A. The population of Nicaragua is approximately 7 times the population of Tonga.

B. The population of Tonga is approximately 700 times the population of Thailand.

C. The population of Vietnam is approximately 1.4 times the population of Thailand.

D. The population of Thailand is approximately 10 times the population of Nicaragua.

E. The population of Nicaragua is approximately 1,000 times the population of Vietnam.

Go on to the next page.

5. Write each number in the appropriate column in the table to indicate whether the number is rational or irrational.

Rational	Irrational

$\frac{3}{4}$ $\frac{4}{3}$ $\sqrt{7}$ $\sqrt{8}$ π

6. For each expression in the table, determine whether it is equal to 9.

	Equal to 9	Not Equal to 9
$3^4 \div 3^{-2}$		
$\frac{3 \bullet 3^5}{3^3}$		
$\frac{3^5}{3} \bullet \frac{3^{-4}}{3^{-2}}$		

STOP.

STOP.

STOP.

MATHEMATICS CALCULATOR ITEMS—SESSION 2

Answer the items below. A calculator **may** be used to assist with calculations necessary to answer items in Session 2.

1. Which table does **not** represent a function?

A.

x	*y*
−2	4
−1	4
0	1
1	4

B.

x	*y*
−2	7
−1	6
0	5
−1	4

C.

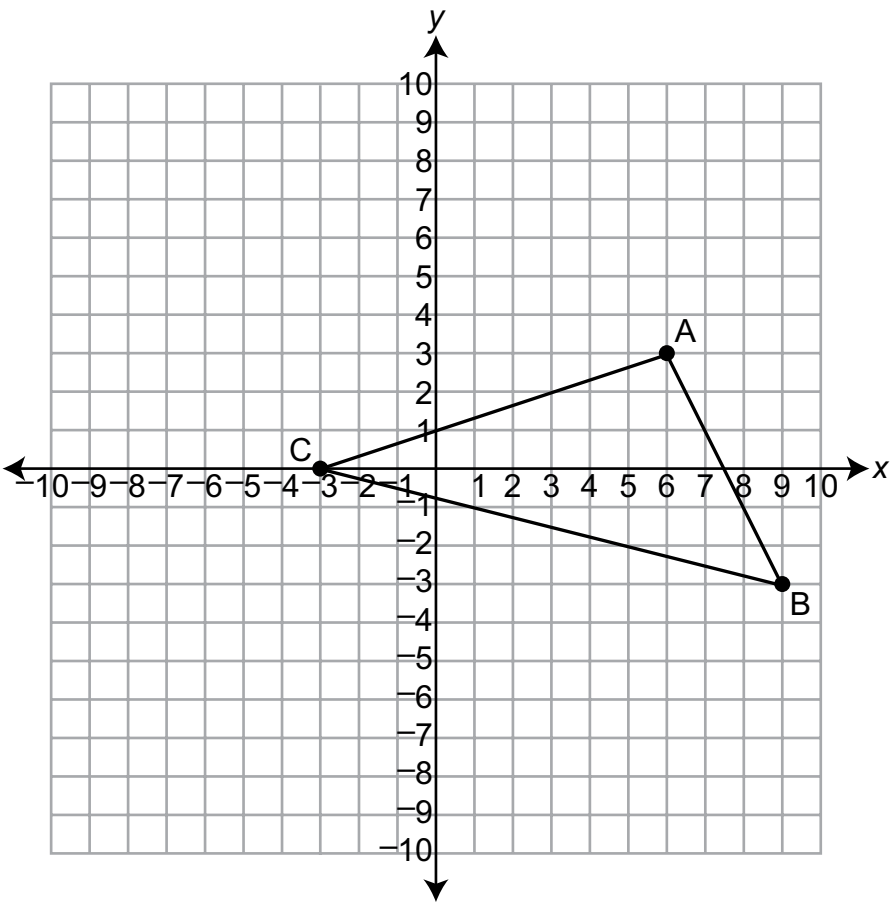
x	*y*
4	−1
5	−2
6	−3
7	−4

D.

x	*y*
4	1
5	0
6	1
7	4

Go on to the next page.

2. Triangle ABC has vertices A(6, 3), B(9, −3), and C(−3, 0) as shown on the coordinate grid.



Triangle ABC is dilated by a scale factor of $\frac{3}{2}$ centered at the origin to create similar triangle DEF.

What is the *x*-coordinate of point D?

Go on to the next page.

3. An equation is shown.

$8 - 2(x + 10) = 4x - 6$

What is the value of x?

A. -33

B. -8

C. -1

D. 4

4. A farmer is plowing her fields. She has already plowed 12 acres. The farmer continues to plow at a constant rate so that she will have plowed a total of 36 acres after 4 hours. Which equation could the farmer use to find the number of acres, y, she will have plowed after x hours?

A. $y = 6x + 12$

B. $y = 9x + 12$

C. $y = 12x + 6$

D. $y = 12x + 9$

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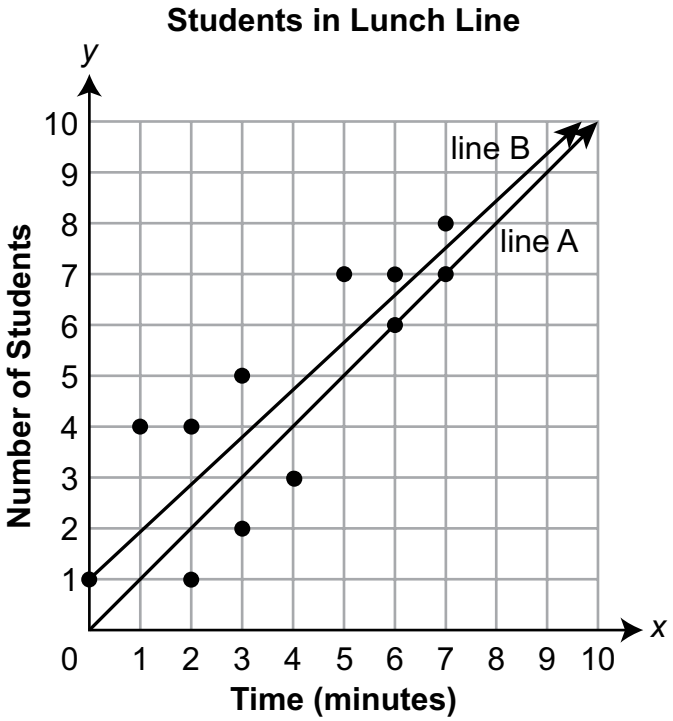
5. A school is recording the amount of time it takes students to go through the lunch line. The scatterplot shows the data collected on several days last month.



Which line best fits the school's data, and why?

A. Line A best fits the data because the line of best fit must go through the origin.

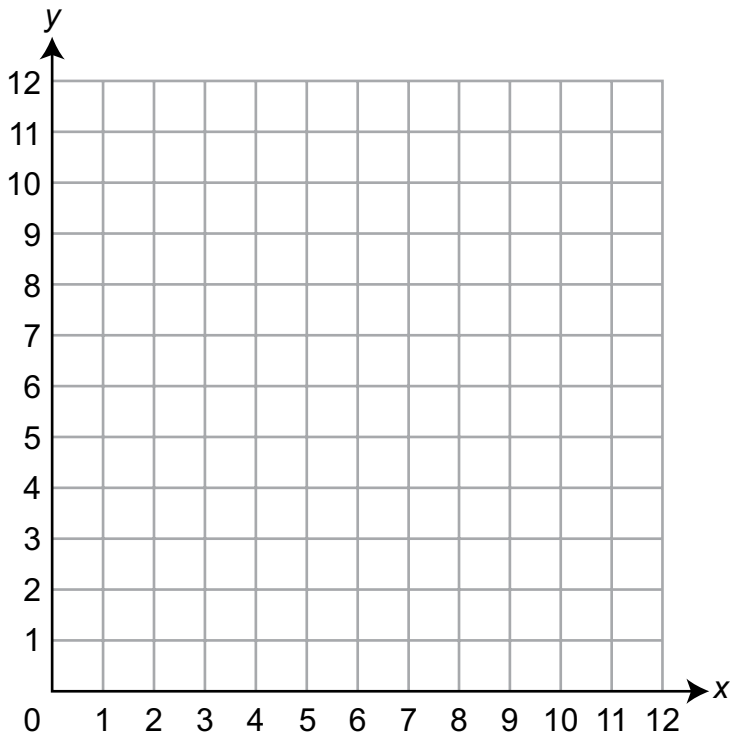
B. Line A best fits the data because the line of best fit must go through the most data points.

C. Line B best fits the data because the line of best fit must go through the first data point.

D. Line B best fits the data because the line of best fit must be closest to the most data points.

Go on to the next page.

6. The coordinates of two opposite vertices of square PQRS are (2, 1) and (5, 4). Square PQRS is dilated by a scale factor of 2 to create square P'Q'R'S'. The dilation is centered at the origin. Plot the vertices of square P'Q'R'S' on the coordinate plane.



7. A new company hired 24 employees. Some of the employees work 40 hours each week, and the rest work 20 hours each week. In total, the 24 employees work 740 hours each week. How many of the 24 employees the company hired work 40 hours each week?

A. 11

B. 12

C. 13

D. 16

Go on to the next page.

8. Ana is graphing function F on a coordinate plane. Which statement is true about the maximum number of different outputs of function F for an input value of 2?

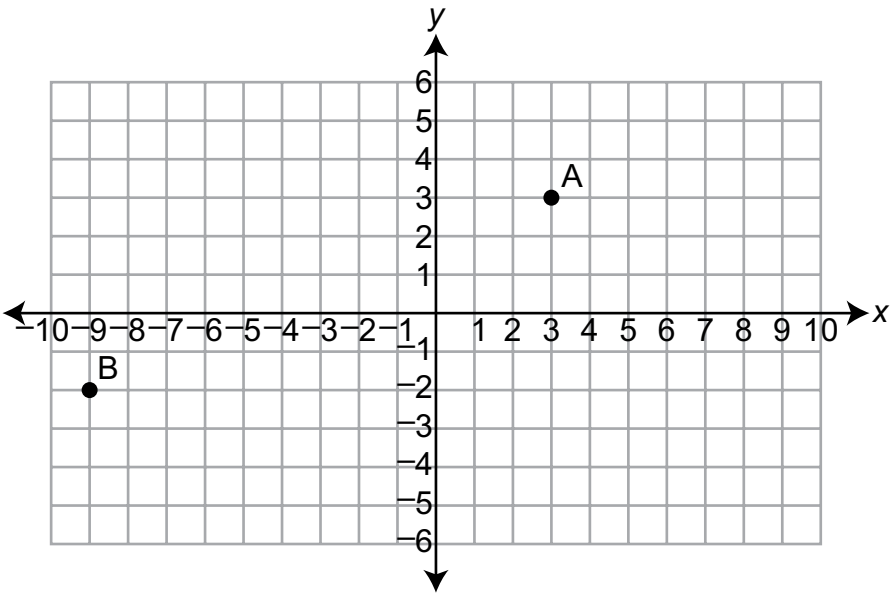
A. Regardless of the input value, for any function, there can be only one output for every input, so there is a maximum of one output.

B. The maximum number of outputs is always half the value of the input, so when the input value is 2, there is a maximum of one output.

C. The maximum number of outputs is always the same as the value of the input, so when the input value is 2, there is a maximum of two outputs.

D. Regardless of the input value, for any function, there could be both a positive and a negative output value, so there is a maximum of two outputs.

9. The coordinate grid shows point A(3, 3) and point B(−9, −2).



What is the distance, in units, between point A and point B?

A. 5

B. 12

C. 13

D. 17

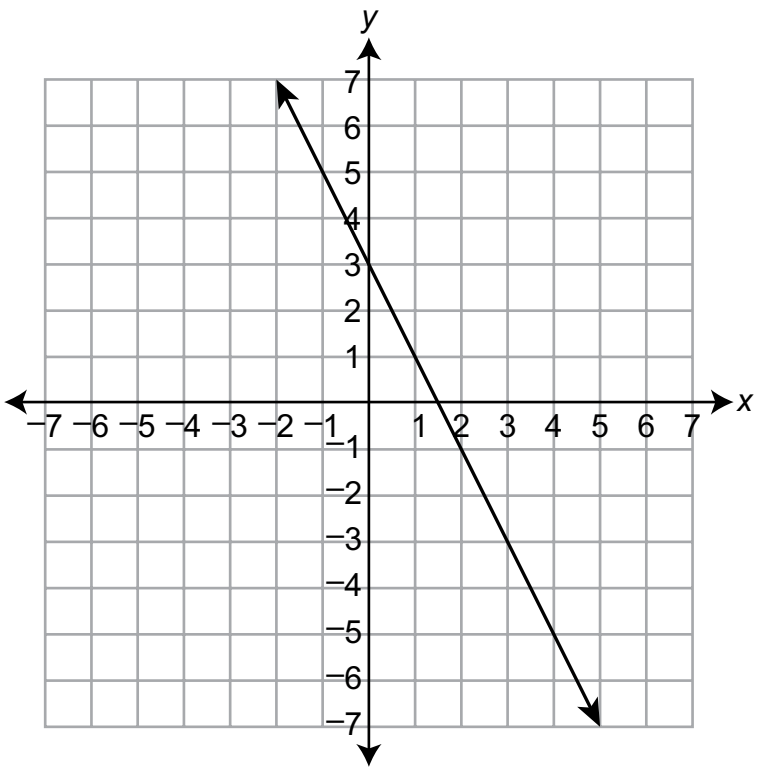
Go on to the next page.

10. A group of 7th graders and a group of 12th graders were asked whether they have a pet. Some of the results are shown in the two-way table.

	Have a Pet	Do Not Have a Pet	Total
7th Graders		108	
12th Graders	76		
Total		237	500

What percentage of the total number of students questioned were 12th graders?

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



Which equation represents the graphed line?

A. $y = {}^{-}2x + 3$

B. $y = {}^{-}\frac{1}{2}x\ \ 3$

C. $y = 3x - 2$

D. $y = 3x - \frac{1}{2}$

Go on to the next page.

12. Yuri is comparing two linear functions.

- Linear function A can be represented by the equation $y = 3x - 4$.
- Some of the values of linear function B are shown in the table.

Function B

x	−3	6	9
y	−7	5	9

Which statement about the two functions is correct?

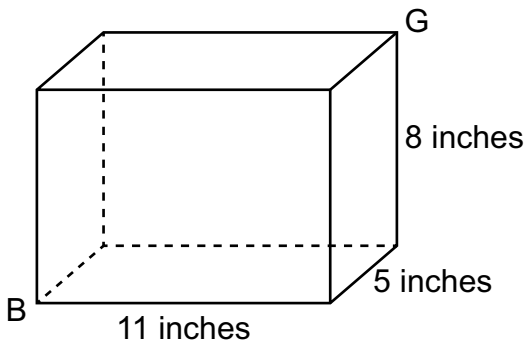
A. The rate of change of function B is greater than the rate of change of function A; the *y*-intercept of function B is greater than the *y*-intercept of function A.

B. The rate of change of function B is greater than the rate of change of function A; the *y*-intercept of function B is less than the *y*-intercept of function A.

C. The rate of change of function B is less than the rate of change of function A; the *y*-intercept of function B is greater than the *y*-intercept of function A.

D. The rate of change of function B is less than the rate of change of function A; the *y*-intercept of function B is less than the *y*-intercept of function A.

13. A rectangular prism is shown.



Rounded to the nearest tenth of an inch, what is the distance from vertex B to vertex G?

A. 9.4

B. 12.1

C. 13.6

D. 14.5

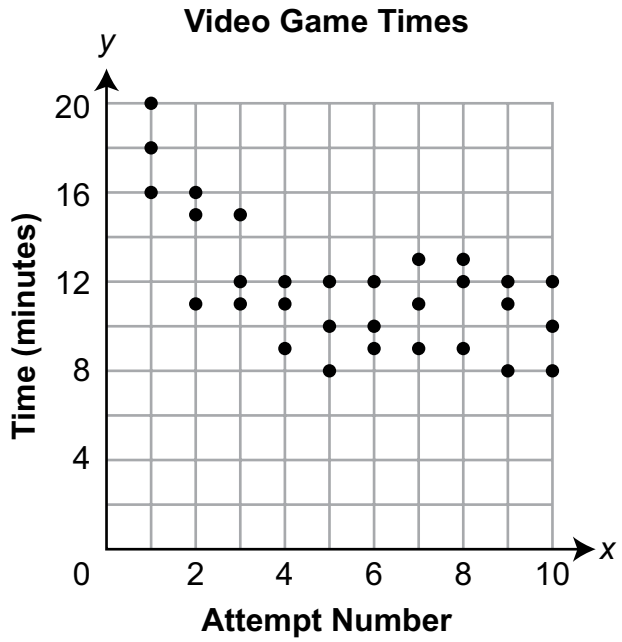
Go on to the next page.

14. The linear equation shown has infinitely many solutions.

$$3(2x + 8) = 6x + k$$

What is the value of k?

15. Three players are attempting to beat a video game in the fastest time. The times for each of their first ten attempts are shown on the scatterplot.



Which statement about the scatterplot is correct?

A. There is a negative, linear association on the scatterplot.

B. There is a negative, nonlinear association on the scatterplot.

C. There is a positive, linear association on the scatterplot.

D. There is a positive, nonlinear association on the scatterplot.

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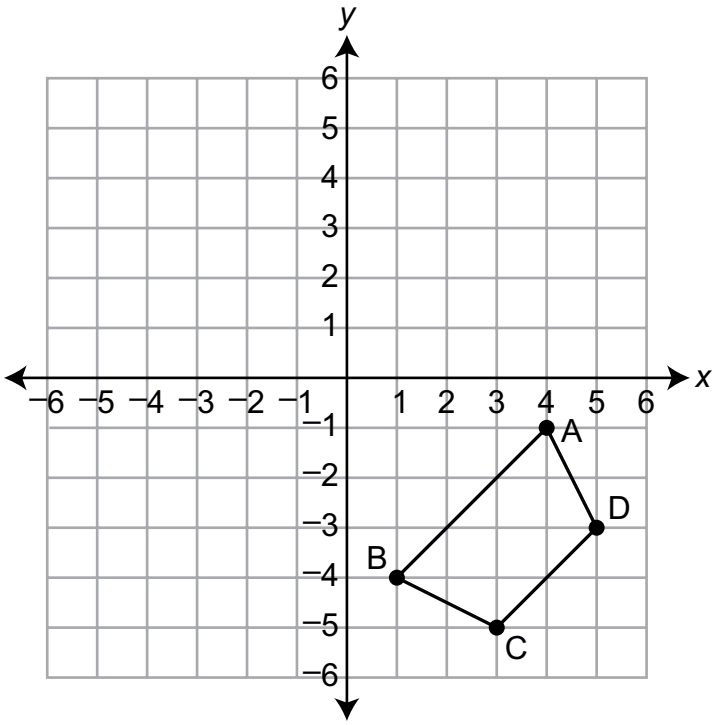
16. Quadrilateral ABCD is shown on the coordinate grid.



Select the **two** statements that must be true when quadrilateral ABCD is rotated 90° clockwise about the origin to create quadrilateral EFGH.

Select **two** options.

A. Quadrilateral ABCD maps onto quadrilateral EFGH when reflected across the *y*-axis.

B. Any corresponding angles between quadrilateral ABCD and quadrilateral EFGH have the same measure.

C. Any corresponding vertex between quadrilateral ABCD and quadrilateral EFGH remains in the same location.

D. The length of each line segment in quadrilateral ABCD is greater than the length of the corresponding line segment in quadrilateral EFGH.

E. The distance between the parallel line segments in quadrilateral ABCD is equal to the distance between the parallel line segments in quadrilateral EFGH.

Go on to the next page.

17. A system of linear equations is shown.

$$y = 2x - 4$$

$$y - 4 = 2x$$

How many solutions does the system of equations have?

A. 0

B. 1

C. 2

D. infinite

18. A relationship is shown in the table.

x	*y*
−6	19
−3	13
1	5
6	−5

Write an equation in slope-intercept form ($y = mx + b$) to represent the relationship.

Go on to the next page.

19. Garrett draws line segment GH on a coordinate grid with vertices at (2, 3) and (6, 5). He then rotates his line segment 270° counterclockwise about the origin to draw line segment JK. Use the words and numerals below the blank lines to complete the statement.

Line segment GH is _____ line segment JK, and line segment JK is in quadrant ____.

shorter than	I
the same length as	II
longer than	III
	IV

20. A hot-air balloon is fueled by propane gas. A pilot records her propane gas use, y, in gallons, after flying for x minutes. She determines that the equation $y = 40 - \frac{2}{5}x$ best models the data. What does the slope of the pilot's equation represent?

A. The hot-air balloon uses 2 gallons of propane gas every 5 minutes.

B. The hot-air balloon uses 5 gallons of propane gas every 2 minutes.

C. The hot-air balloon uses $\frac{2}{5}$ gallon of propane gas every 40 minutes.

D. The hot-air balloon uses $\frac{5}{2}$ gallons of propane gas every 40 minutes.

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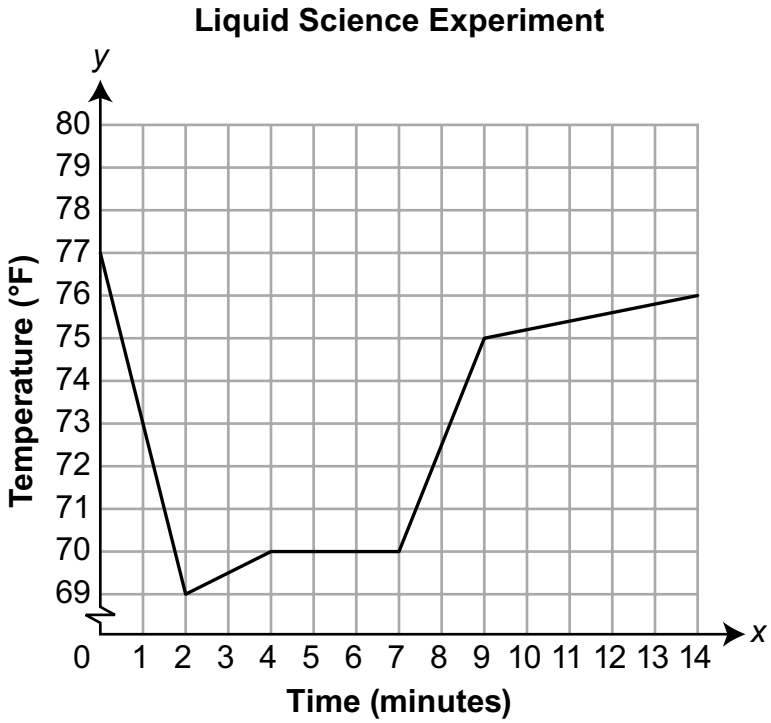
21. A science class graphs the temperature of a liquid based on the length of time since the start of an experiment on the coordinate grid shown.



What is the length of time, in minutes, during which the temperature of the liquid remains the same?

A. 2

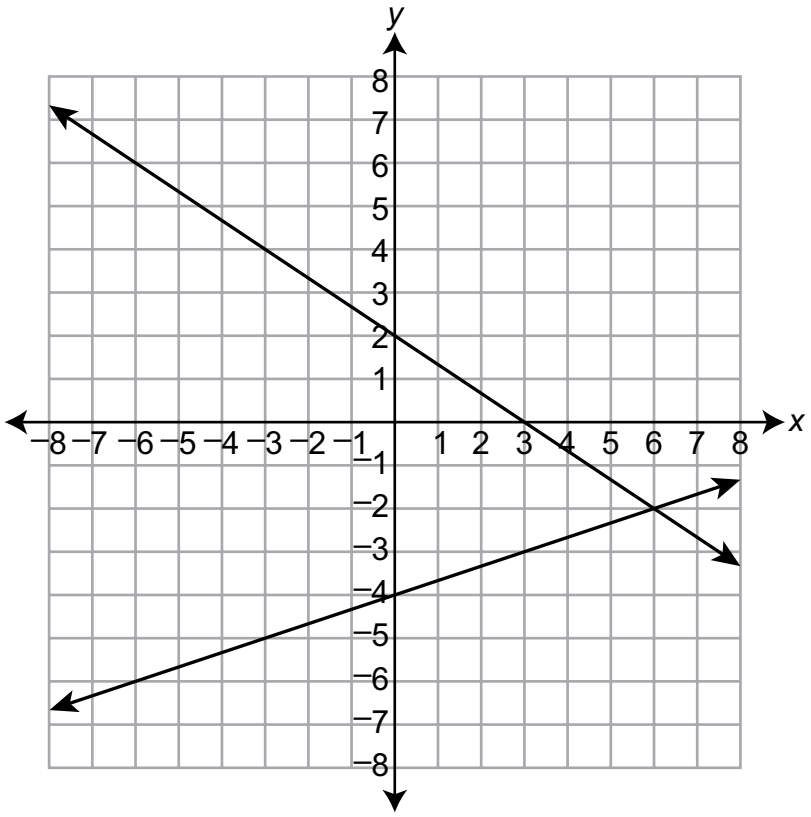
B. 3

C. 4

D. 5

Go on to the next page.

22. A system of equations is shown on the coordinate plane.



What is the *y*-value of the solution to the system of equations?

23. Thomas has a cup shaped like a cone and a cup shaped like a cylinder.

- Both cups have the same height.
- The circular tops of the two cups have the same radius.

Thomas completely fills the cone cup with water twice and empties it into the cylinder cup. Which fraction of the volume of the cylinder cup is filled with water?

A. $\frac{1}{3}$

B. $\frac{1}{2}$

C. $\frac{2}{3}$

D. 1

24. Charlie has $12 to spend on grapes and apples.

- Grapes cost $3.75 per pound.
- Apples cost $2.50 per pound.

Charlie graphs a function that represents the relationship between the pounds of grapes, x, and the pounds of apples, y, Charlie can buy with $12. Which statement **best** explains whether Charlie's function is linear?

A. The function is linear because it contains both x and y.

B. The function is linear because the rate of change is $^{-}1.5$.

C. The function is not linear because its graph does not pass through the origin.

D. The function is not linear because the rate of change has to be a positive value.

STOP.

STOP.

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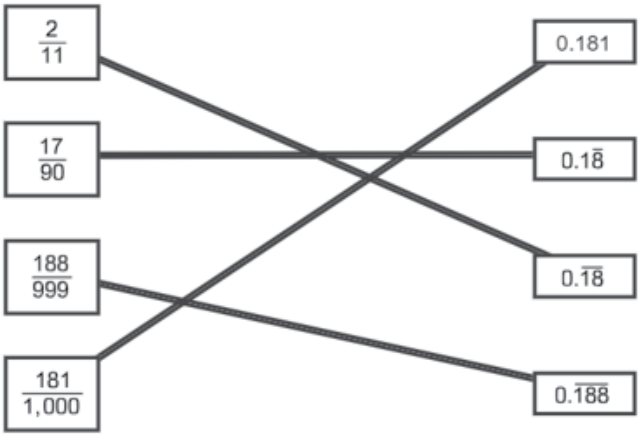
MATHEMATICS—APPENDIX

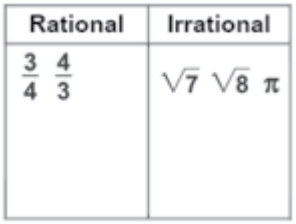
SUMMARY DATA—GRADE 8, SESSION 1

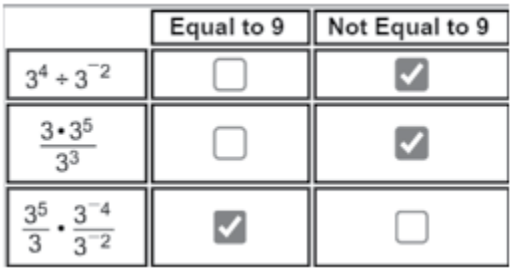
Number 1	
Alignment	M.8.NS.A.1
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to match each rational number to its decimal expansion. To receive full credit, the student must match each fraction to its correct decimal equivalent as shown. 

Number 2	
Alignment	M.8.EE.A.4
Depth of Knowledge	1
Key(s)	A
Points	1
Annotations	The question asks the student to evaluate an expression involving dividing two numbers expressed in scientific notation. A. Correct. Dividing 9.6 by 1.2 results in 8. The exponents are subtracted to get 8 (6 − −2). B. Incorrect. The student divides 9.6 by 1.2 correctly but takes 6 − 2 to get 4 rather than 6 − −2. C. Incorrect. The student multiplies 9.6 and 1.2 and divides the exponents. D. Incorrect. The student multiplies 9.6 and 1.2 and multiplies the exponents.

Number 3	
Alignment	M.8.NS.A.2
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to use rational approximations of irrational numbers to locate them approximately on a number line. To receive full credit, the student must plot a point at approximately 3.5 on the number line. The square root of 9 is 3, and the square root of 16 is 4. Since 12 is between 9 and 16, the square root of 12 must be between 3 and 4.

Number 4	
Alignment	M.8.EE.A.3
Depth of Knowledge	2
Key(s)	C, D
Points	2
Annotations	The question asks the student to compare the size of one number expressed in the form of a single digit times an integer power of 10 to another number expressed in the same form. To receive full credit, the student must select choices C and D. To receive partial credit, the student must select either choice C or choice D. A. Incorrect. The student finds 7 times as much because 7 divided by 1 is 7, but the student does not consider the power of 10. B. Incorrect. The student reverses the countries. C. Correct. Vietnam's population divided by Thailand's population is $\frac{1}{7}$ times 10, which is approximately 1.4. D. Correct. Thailand's population divided by Nicaragua's population is 1 times 10, which is 10. E. Incorrect. The student subtracts the last two exponents to get 10 to the third power, resulting in 1,000.

Number 5	
Alignment	M.8.NS.A.1
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to classify numbers as rational or irrational. To receive full credit, the student must drag each number into the correct column as shown. 

Number 6	
Alignment	M.8.EE.A.1
Depth of Knowledge	1
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to apply the properties of integer exponents to generate equivalent numerical expressions. To receive full credit, the student must complete the three rows of the table correctly as shown. 

SUMMARY DATA—GRADE 8, SESSION 2

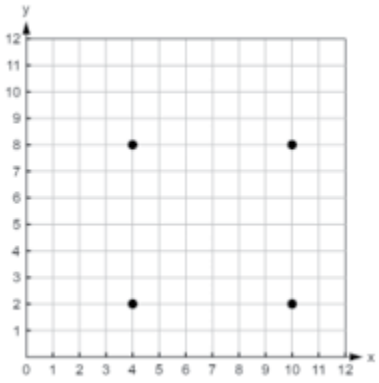
Number 1	
Alignment	M.8.F.A.1
Depth of Knowledge	1
Key(s)	B
Points	1
Annotations	The question asks the student to understand and explain that a function is a rule that assigns exactly one output to each input. A. Incorrect. The student confuses the idea of exactly one output for each input. B. Correct. The input value of $^{-}1$ has two different output values. C. Incorrect. The student chooses the option that is a function. D. Incorrect. The student confuses the idea of exactly one output for each input.

Number 2	
Alignment	M.8.G.A.4
Depth of Knowledge	2
Key(s)	9
Points	1
Annotations	The question asks the student to find the *x*-value of a coordinate point when a two-dimensional figure is obtained through a dilation. To receive full credit, the student must enter 9 or an equivalent value. Point D corresponds to point A (6, $^{-}3$). When 6 is multiplied by $\frac{3}{2}$, it results in 9.

Number 3	
Alignment	M.8.EE.C.7b
Depth of Knowledge	1
Key(s)	C
Points	1
Annotations	The question asks the student to solve a linear equation by expanding expressions by using the distributive property and collecting like terms. A. Incorrect. The student subtracts $^{-}2$ from 8 and then distributes to both terms in the parentheses. B. Incorrect. The student subtracts $^{-}2$ from 8 and then distributes only to the *x*. C. Correct. The distributive property, collecting like terms, and solving for *x* were done correctly. D. Incorrect. The student only distributes the $^{-}2$ to the 10.

Number 4	
Alignment	M.8.F.B.4
Depth of Knowledge	2
Key(s)	A
Points	1
Annotations	The question asks the student to construct a function to model a linear relationship between two quantities. A. Correct. The rate of change is found by subtracting 36 and 12 to find 24 and then dividing by 4 hours to get 6 acres per hour. The 12 acres she has already plowed is the *y*-intercept. B. Incorrect. The student chooses 9 as the rate of change by dividing 36 by 4. C. Incorrect. The student chooses to reverse the locations of the rate of change and the *y*-intercept. D. Incorrect. The student chooses to reverse the locations of the rate of change and the *y*-intercept and chooses 9 as the rate of change by dividing 36 by 4.

Number 5	
Alignment	M.8.SP.A.2
Depth of Knowledge	2
Key(s)	D
Points	1
Annotations	The question asks the student to identify the line of best fit in a scatterplot. A. Incorrect. The student identifies the line of best fit that goes through the origin, believing that this must be a characteristic of a line of best fit. B. Incorrect. The student identifies the line of best fit that goes through the most points, believing that this must be a characteristic of a line of best fit. C. Incorrect. The student identifies the line of best fit that goes through the first data point, believing that this must be a characteristic of a line of best fit. D. Correct. The line of best fit is the line that is closest to the most data points.

Number 6	
Alignment	M.8.G.A.3
Depth of Knowledge	2
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to identify the effect of dilation on a two-dimensional figure by using coordinates. To receive full credit, the student must plot the points (4, 2), (4, 8), (10, 2), and (10, 8) on the coordinate plane as shown. 

Number 7	
Alignment	M.8.EE.C.8c
Depth of Knowledge	2
Key(s)	C
Points	1
Annotations	The question asks the student to solve real-world problems leading to two linear equations in two variables. A. Incorrect. The student determines the number of 20-hour employees. B. Incorrect. The student divides 740 by the sum of the number of hours (60). C. Correct. A system of equations is set up and solved for the number of 40-hour employees. D. Incorrect. The student subtracts 24 from 40.

Number 8	
Alignment	M.8.F.A.1
Depth of Knowledge	1
Key(s)	A
Points	1
Annotations	The question asks the student to understand and explain that a function is a rule that assigns to each input exactly one output. A. Correct. A function can have only one output for every input. B. Incorrect. The student incorrectly explains there is only one option by taking half of the given input value of 2. C. Incorrect. The student believes input values and maximum numbers of outputs must be the same. D. Incorrect. The student believes having an answer and its opposite would still be a function.

Number 9	
Alignment	M.8.G.B.8
Depth of Knowledge	2
Key(s)	C
Points	1
Annotations	The question asks the student to apply the Pythagorean theorem to find the distance between two points in a coordinate system. A. Incorrect. The student calculates the vertical distance between the points. B. Incorrect. The student calculates the horizontal distance between the two points. C. Correct. The Pythagorean theorem is used to find the distance between the points. The legs of the right triangle are the horizontal distance between the points (12) and the vertical distance between the points (5). D. Incorrect. The student adds the vertical and horizontal distances between the points.

Number 10	
Alignment	M.8.SP.A.4
Depth of Knowledge	2
Key(s)	41
Points	1
Annotations	The question asks the student to construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. To receive full credit, the student must enter 41 or an equivalent value. The number of 12th graders who do not have a pet must be found by, first, subtracting 108 from 237, which results in 129. Next, the total number of 12th graders is found by adding 129 to 76, resulting in 205. Finally, to find the percentage of 12th graders, 205 is divided by 500, resulting in 0.41, which is 41%.

Number 11	
Alignment	M.8.EE.B.6
Depth of Knowledge	2
Key(s)	A
Points	1
Annotations	The question asks the student to derive the equation $y = mx + b$ for a line intercepting the vertical axis at b. A. Correct. The student identifies the y-intercept of 3 and the slope of $^{-}2$. B. Incorrect. The student identifies the correct y-intercept but finds the reciprocal of the slope. C. Incorrect. The student reverses the slope and y-intercept. D. Incorrect. The student reverses the y-intercept and slope and uses the reciprocal of the slope.

Number 12	
Alignment	M.8.F.A.2
Depth of Knowledge	2
Key(s)	C
Points	1
Annotations	The question asks the student to compare properties of two functions each represented in a different way. A. Incorrect. The student does not compare the rates of change correctly ($\frac{4}{3}$ is not greater than 3). B. Incorrect. The student does not compare the y-intercepts nor the rates of change correctly. C. Correct. The rates of change are correctly compared as $\frac{4}{3}$ is less than 3 and the y-intercepts are correctly compared as $^{-}3$ is greater than $^{-}4$. D. Incorrect. The student does not compare the y-intercepts correctly ($^{-}3$ is not less than $^{-}4$).

Number 13	
Alignment	M.8.G.B.7
Depth of Knowledge	2
Key(s)	D
Points	1
Annotations	The question asks the student to apply the Pythagorean theorem to determine unknown side lengths in right triangles in a mathematical problem in three dimensions. A. Incorrect. The student determines the length when 5 and 8 are used as legs of the right triangle. B. Incorrect. The student determines the length when 5 and 11 are used as legs of the right triangle. C. Incorrect. The student determines the length when 8 and 11 are used as legs of the right triangle. D. Correct. The Pythagorean theorem needs to be used twice to find the answer. First, the length of the diagonal of the base of the prism needs to be found by using 11 and 5 as the legs of a right triangle, resulting in 12.1. Then, the length of BG can be found by using 12.1, the length of the diagonal of the base, and 8, the length of the height of the box.

Number 14	
Alignment	M.8.EE.C.7a
Depth of Knowledge	2
Key(s)	24
Points	1
Annotations	The question asks the student to solve a linear equation in one variable that has infinitely many solutions. To receive full credit, the student must enter 24 or an equivalent value.

Number 15	
Alignment	M.8.SP.A.1
Depth of Knowledge	1
Key(s)	B
Points	1
Annotations	The question asks the student to interpret a scatterplot for bivariate measurement data between two quantities to describe the pattern of the graph. A. Incorrect. The student chooses a negative association but confuses linear and nonlinear. B. Correct. The relationship has a negative association and does not form a linear association, so it would be considered nonlinear. C. Incorrect. The student confuses positive and negative association as well as linear and nonlinear association. D. Incorrect. The student confuses positive and negative association.

Number 16	
Alignment	M.8.G.A.1b
Depth of Knowledge	2
Key(s)	B, E
Points	2
Annotations	The question asks the student to verify the properties of a rotation. To receive full credit, the student must select choices B and E. To receive partial credit, the student must select either choice B or choice E. A. Incorrect. The student assumes a rotation of 90 degrees clockwise is the same as a reflection across the *y*-axis. B. Correct. An angle keeps the same measure when rotated. C. Incorrect. The student assumes the rotation has the properties of a translation. D. Incorrect. The student assumes the rotation has a property of a dilation. E. Correct. Parallel lines remain parallel with the same distance between them when rotated.

Number 17	
Alignment	M.8.EE.C.8b
Depth of Knowledge	2
Key(s)	A
Points	1
Annotations	The question asks the student to solve a system of two linear equations represented in algebraic symbols. A. Correct. The student identifies that the slopes are equal, so the lines would be parallel and have no points in common. B. Incorrect. The student chooses 1 solution as a misconception that all systems of linear equations have 1 solution. C. Incorrect. The student chooses 2 solutions because there are two variables. D. Incorrect. The student chooses infinite solutions. The student recognizes the equal slopes and that there is a $^{-}4$ in each equation but does not notice that one equation does not have y isolated.

Number 18	
Alignment	M.8.F.B.4
Depth of Knowledge	2
Key(s)	$y = {}^{-}2x + 7$
Points	1
Annotations	The question asks the student to determine the rate of change and initial value from a table of (x, y) values to construct a function. To receive full credit, the student must enter the equation $y = {}^{-}2x + 7$ or an equivalent equation.

Number 19	
Alignment	M.8.G.A.1a
Depth of Knowledge	2
Key(s)	See Annotations
Points	1
Annotations	The question asks the student to verify the properties of a rotation on a line segment. To receive full credit, the student must select “the same length as” in the first drop-down menu and “IV” in the second drop-down menu.

Number 20	
Alignment	M.8.SP.A.3
Depth of Knowledge	2
Key(s)	A
Points	1
Annotations	The question asks the student to interpret the slope of the equation of a linear model to solve problems in the context of bivariate measurement data. A. Correct. The slope of the equation is $\frac{-2}{5}$. The -2 is the vertical change of gallons used, while the 5 is the horizontal change of minutes. B. Incorrect. The student reverses of the vertical and horizontal changes. C. Incorrect. The student determines the slope as the number of gallons used during the number of minutes the *y*-intercept indicates. D. Incorrect. The student determines the reciprocal of the slope as the number of gallons used during the number of minutes the *y*-intercept indicates.

Number 21	
Alignment	M.8.F.B.5
Depth of Knowledge	1
Key(s)	B
Points	1
Annotations	The question asks the student to analyze a graph to describe the functional relationship between two quantities qualitatively. A. Incorrect. The student chooses the *x*-value of the lowest part of the graph. B. Correct. A line representing the time when the temperature remained the same would have a slope of 0. The horizontal part of the graph is from 4 to 7 on the *x*-axis, which represents 3 minutes. C. Incorrect. The student chooses the *x*-value at which the temperature starts having a slope of 0. D. Incorrect. The student subtracts 14 from 9, which is the time during which the temperature change increases the least.

Number 22	
Alignment	M.8.EE.C.8a
Depth of Knowledge	1
Key(s)	-2
Points	1
Annotations	The question asks the student to find the *y*-value of the solution to a system of equations. To receive full credit, the student must enter -2 or an equivalent value.

Number 23	
Alignment	M.8.G.C.9
Depth of Knowledge	2
Key(s)	C
Points	1
Annotations	The question asks the student to know the relationship between the formula for the volume of a cone and the formula for the volume of a cylinder (given the same height and diameter) and use them to solve a real-world problem. A. Incorrect. The student calculates the comparison between the volume of the cone and the volume of the cylinder but doesn't consider that the cone is emptied twice. B. Incorrect. The student calculates the volume of the cone as being $\frac{1}{4}$ that of the cylinder, then doubles the cone's volume to get $\frac{1}{2}$. C. Correct. The volume of a cone is $\frac{1}{3}$ the volume of a cylinder (given the same height and diameter). Since the cone is filled twice and emptied into the cylinder twice, $\frac{1}{3} + \frac{1}{3}$ equals $\frac{2}{3}$. D. Incorrect. The student calculates the volume of the cone as being $\frac{1}{2}$ that of the cylinder, then doubles the cone's volume to get 1.

Number 24	
Alignment	M.8.F.A.3
Depth of Knowledge	2
Key(s)	B
Points	1
Annotations	The question asks the student to interpret the equation $y = mx + b$ as defining a linear function. A. Incorrect. The student notices only the two variables and does not consider whether one input gives exactly one output. B. Correct. The equation would be $3.75x + 2.50y = 12$. When y is isolated, the equation becomes $y = -1.5x + 4.8$, which shows the rate of change is -1.5. C. Incorrect. The student believes all linear functions must go through the origin. D. Incorrect. The student believes a linear function must have a rate of change with a positive value.

Mathematics
Practice Test
Grade 8