THIRD SPACE LEARNING

8th Grade Ohio State Practice Math Test

Ohio Practice Test Grade 8

Grade 8

Questions

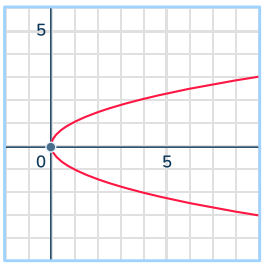
Name: ..... Class: .....

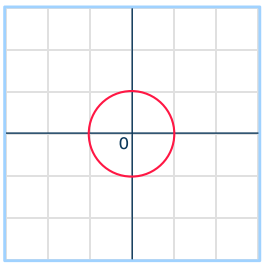
Date: ..... Score: .....

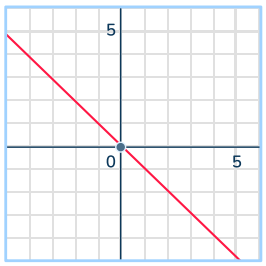
Standard: 8.F.2

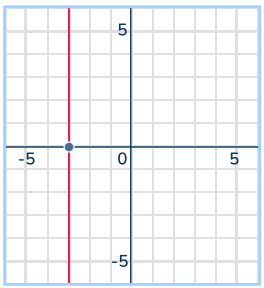
DOK 1

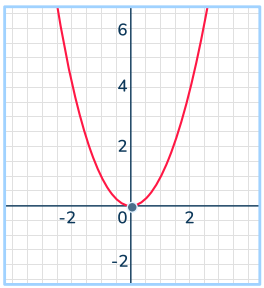
1 Select the graphs that show y to be a function of x.

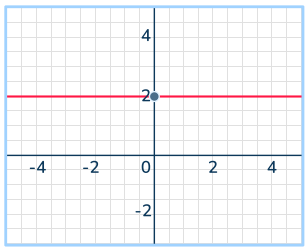
☐ 

☐ 

☐ 

☐ 

☐ 

☐ 

Standard: 8.EE.1

DOK 2

2 Select the expressions that have a value of $\frac{1}{64}$.

- ☐ 2^6
- ☐ $(2^3)^{-3}$
- ☐ $(2^5)^{-1}$
- ☐ $(2^3)^{-2}$
- ☐ 2^{-6}

Standard: 8.F.2
DOK 1

3 Select all the equations that are **nonlinear** functions.

- ☐ $y = x^2 - 5$
- ☐ $y = 5x - 6$
- ☐ $y = \frac{4}{x} - x$
- ☐ $y = 3x^2 - 5x$
- ☐ $y = x - 9 + 6x$

Standard: 8.NS.2
DOK 2

4 What is a possible value for a in the inequality below?

$$6.2 < \sqrt{a} < 8.9$$

Answer:_____

Standard: 8.EE.2
DOK 2

5 Select the solution(s) to $x^2 = 100$.

- ☐ No solution
- ☐ 50
- ☐ -50
- ☐ 10
- ☐ -10

Standard: 8.G.B.8
DOK 2

6 The points A(-1, 2) and B(3, -8) are plotted on the coordinate plane. What is the distance between the points?

Answer

Standard: 8.F.4

DOK 3

7 The table and the equation both show a different relationship between y and x.

Function A

x	y
2	3.5
3	5.25
5	8.75

Function B

$y = \frac{3}{2}x$

Select the statement about the functions that is true.

☐ The rate of change of Function A is less than the rate of change of Function B because $1.75 < 1.5$.

☐ The rate of change of Function A is greater than the rate of change of Function B because $1.75 > 1.5$.

☐ The rate of change of Function A is less than the rate of change of Function B because $0.75 < 0.\overline{5}$.

☐ The rate of change of Function A is greater than the rate of change of Function B because $0.75 > 0.5$.

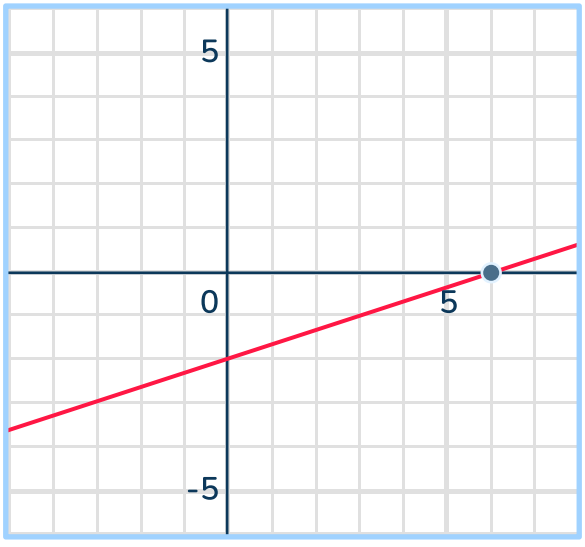
Standard: 8.G.9
DOK 2

8 A water bottle is in the shape of a cylinder that has a diameter of 4 inches and a height of 9 inches. Create an equation that can be used to find the volume of the water bottle in cubic inches.

Answer:_____

Standard: 8.EE.6
DOK 2

9 Write an equation that represents the line on the coordinate plane.



Answer:_____

Standard: 8.F.1
DOK 1

10 Which set of coordinates do not represent a function?

- ☐ {(9, 0), (0, 9), (6, 5)}
- ☐ {(1, 1), (2, 1), (3, 1)}
- ☐ {(0, 0), (7, 1), (-6, 1)}
- ☐ {(5, 2), (-5, -2), (5, 10)}

Standard: 8.G.3
DOK 2

11 If point A (9, 3) is reflected over the x-axis and then translated 3 units up and 4 units left, what are the coordinates of the final image?

Answer:_____

Standard: 8.F.4
DOK 2

12 Gina runs her family's home repair service. The table below shows the service charges for the amount of hours worked. Create a linear function that represents the information in the table.

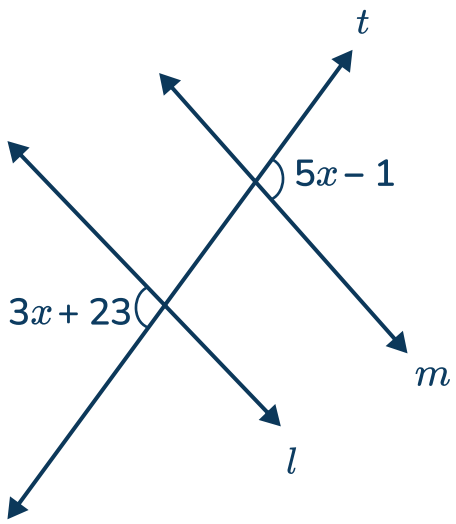
Hours worked, x	Total amount of money charged, y
0	$80
1	$105
3	$155
5	$205

Answer:_____

Standard: 8.G.5

DOK 1

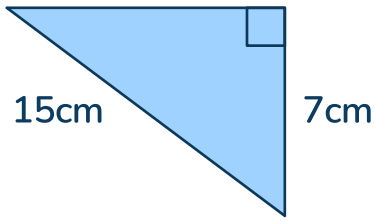
13 In the figure, lines l and m are parallel and t is the transversal. What is the value of x?



Answer

Standard: 8.G.7
DOK 1

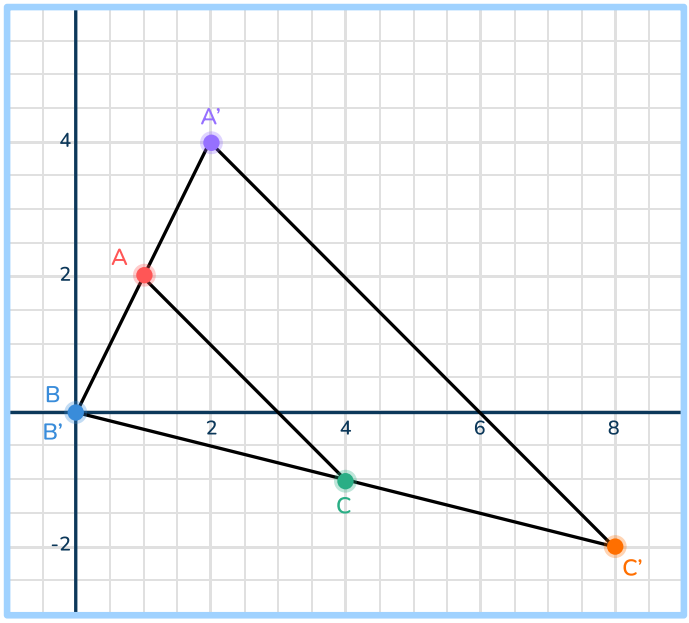
14 Select the value that represents the missing side of the right triangle rounded to the nearest tenth.



- ☐ 13.3 cm
- ☐ 14.3 cm
- ☐ 16.6 cm
- ☐ 15.5 cm

Standard: 8.G.3
DOK 2

15 Kelly plotted triangle ACB and then performed a dilation that mapped triangle ACB to triangle A'C'B'. What is the scale factor of the dilation she performed?



Answer:_____

***Standard:* 8.F.4**
***DOK* 3**

16 Daniella runs her own tutoring business. Due to the fact that gas prices are on the rise, Daniella charges all of her customers a $5.00 fee plus $60 an hour. Create a function of x that models the situation.

Answer:_____

***Standard:* 8.SP.2**
***DOK* 2**

17 Which is the best statement to describe the data in a scatter plot where the y-values are increasing as the x-values are decreasing?

- ☐ The data can be modeled by a horizontal line.
- ☐ The data cannot be modeled by a line.
- ☐ The data can be modeled by a line with a negative slope.
- ☐ The data can be modeled by a line with a positive slope.

Standard: 8.EE.6
DOK 2

18 On the coordinate plane, the graph of a line passes through the origin and the point (-8, 5). Write the equation of the line in slope intercept form.

Answer:_____

Standard: 8.EE.7.a
DOK 2

19 Select the box that represents the type of solution for each equation.

Equation	No solution	1 solution	Infinite solutions
$2.5\ (3x - 2) = 2x + 0.5$			
$-4\ (x + 5) - 3x = -7x - 9$			
$2(3x - 7)\ -x = -1(-5x + 14)$			

Standard: 8.EE.8.a
DOK 1

20 State the set of solutions to the system of equations.

$$3x - 3y = 1$$
$$6x = 6y + 2$$

Answer

Standard: 8.NS.1
DOK 1

21 Write $0.\overline{41}$ as a fraction.

Answer:_____

Standard: 8.G.7
DOK 3

22 Johanna is building a fence around her garden. She has 27 feet of fencing to enclose the right triangle shaped garden. If the two shorter sides of the triangular shaped garden are both 8 feet, will she have enough fencing to fully enclose the garden? Be sure to show all of your work in the space provided.

Answer

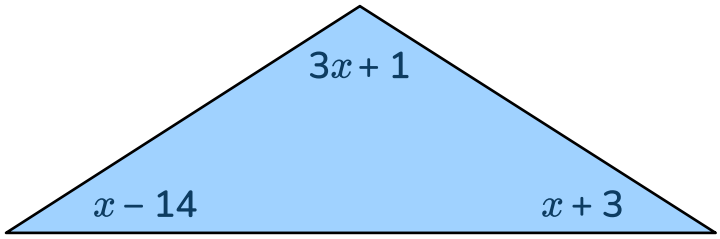
Standard: 8.EE.4
DOK 3

23 Saturn is 8.86×10^8 miles from the sun. Mercury is about 2.86×10^7 miles from the sun. What is the difference between Mercury's and Saturn's distance from the sun? Express your answer in scientific notation.

Answer

Standard: 8.G.5
DOK 1

24 What is the value of x?



Standard: 8.EE.7.b
DOK 3

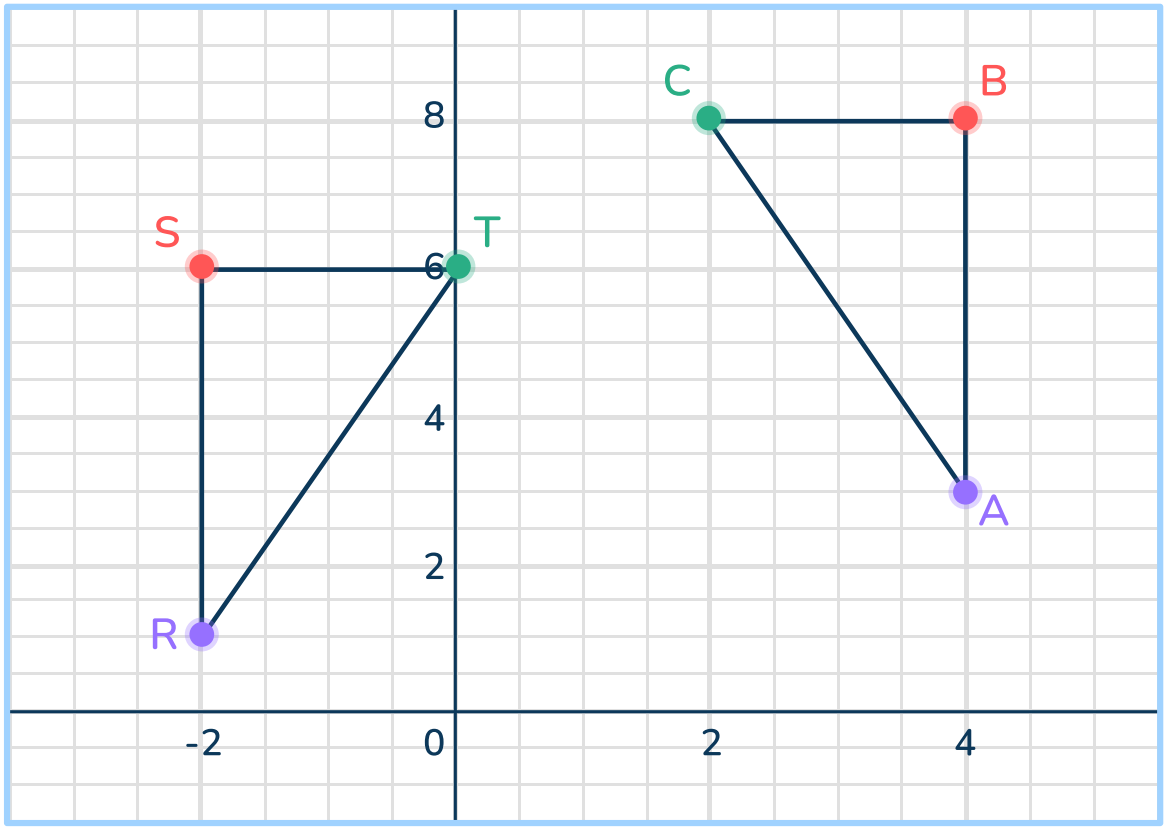
25 What value for k will the equation have no solution?

$12x - 26 + 2 = k(3x - 9)$

Answer

Standard: 8.G.2
DOK 3

26 Select the sequence of transformations that maps triangle RST to triangle ABC?



☐ Reflection over the line $y = x$ followed by translation of 2 units up and 2 units right.

☐ Translation of 2 units right and 2 units up followed by a reflection over the y-axis.

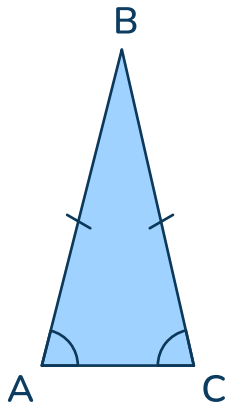
☐ Reflection over the y-axis followed by a translation of 2 units up and 2 units right.

☐ Reflection over the x-axis followed by a translation of 2 units up and 2 units right.

Standard: 8.G.3

DOK 2

27 Triangle ABC, was reflected to be Triangle XYZ.
Select the statements that are true about Triangle XYZ.



- ☐ Angle X = Angle Z
- ☐ Angle X = Angle Y
- ☐ XY = XZ
- ☐ ZY = XY
- ☐ Angle Z = Angle Y

Standard: 8.EE.4

DOK 3

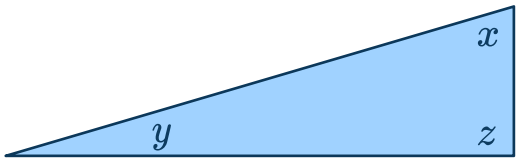
28 What is the value of p and q in the equation below?

$(8.2 \times 10^3)(p \times 10^q) = 4.1 \times 10^{12}$

Answer: p = _____ q = _____

Standard: 8.G.5
DOK 3

29 Create an equation for z in terms of x and y.



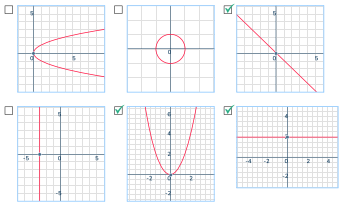
Answer: z = _____

Standard: 8.F.4
DOK 2

30 Write the equation of a line that contains the points (2, 2) and (6, -4).

Answer:_____

Rationales

Item	KEY	Rationale
1		The diagonal line, parabola opened up and the horizontal line are all functions because they represent relations where for every x value there is only one y value. In other words, there is no repetition of x values.

Item	KEY	Rationale
2	$(2^3)^{-2}$ 2^{-6}	$(2^3)^{-2} = 2^{-6} = \frac{1}{2^6} = \frac{1}{64}$ $2^{-6} = \frac{1}{2^6} = \frac{1}{64}$

Item	KEY	Rationale
3	$y = x^2 - 5$ $y = \frac{4}{x} - x$ $y = 3x^2 - 5x$	$y = x^2 - 5$ is nonlinear because the degree or highest exponent is 2, linear functions have a highest exponent of 1. $y = \frac{4}{x} - x$ is nonlinear because the exponent is raised to the negative 1 power (because it is in the denominator). $y = 3x^2 - 5x$ is nonlinear because the degree or highest exponent is 2.

Item	KEY	Rationale
4	$a = 49$ or 64	If $a = 49$, then $\sqrt{a}$ is $\sqrt{49} = 7$ If $a = 64$, then $\sqrt{a}$ is $\sqrt{64} = 8$

Item	KEY	Rationale
5	$x = \pm 10$	$x^2 = 100$ $\sqrt{x^2} = \sqrt{100}$ $x = \pm 10$

Item	KEY	Rationale
6	10.8 units	The student can use the distance formula or the Pythagorean Theorem to calculate the distance between the points. $\sqrt{(-1 - 3)^2 + (2 - (-8))^2}$ $\sqrt{(-4)^2 + (10)^2}$ $\sqrt{16 + 100} = \sqrt{116} = 10.8$

Item	KEY	Rationale
7	The rate of change of Function A is greater than the rate of change of Function B because 1.75 > 1.5.	The rate of change of Function A is: $\frac{3.5 - 5.25}{2-3} = \frac{-1.75}{-1} = 1.75$ The rate of change of Function B is: $y = \frac{3}{2}x$ $\frac{3}{2}$ or 1.5 Rate of change is the slope.

Item	KEY	Rationale
8	$V = \pi (2)^2 (9)$	The volume of a cylinder is $V = \pi (r^2)(h)$ The radius in this case is 2 and the height is 9. $V = \pi (2)^2(9)$

Item	KEY	Rationale
9	$y = \frac{1}{3}x - 2$	The slope is $\frac{2}{6} = \frac{1}{3}$ and the y-intercept is -2. $y = \frac{1}{3}x - 2$

Item	KEY	Rationale
10	{(5, 2), (-5, -2), (5, 10)}	This relation does not represent a function because there cannot be any repeat of the x-coordinate or the relation will fail the vertical line test. In other words, for every input (x) value there is a unique output (y) value. In this case, that is not true because 5 is an input value for two different output values. {(5, 2), (-5, -2), (5, 10)}

Item	KEY	Rationale
11	(5, 0)	(9, 3) reflected over the x-axis becomes (9, -3). (9, -3) translated 3 units up and 4 units left is (9 - 4, -3 + 3)=(5, 0)

Item	KEY	Rationale
12	$y = 25x + 80$	Selecting 2 points from the table, (0,80) and (1, 105) the slope is $\frac{105-80}{1-0} = \frac{25}{1} = 25$ The y-intercept is identified as (0, 80). So the equation is $y = 25x + 80$

Item	KEY	Rationale
13	$x = 12$	The angles represented by the algebraic expressions are alternate exterior angles which are congruent or equal when the lines are parallel. $5x - 1 = 3x + 23$ $2x = 24$ $x = 12$

Item	KEY	Rationale
14	13.3 cm	Using the Pythagorean Theorem to find the missing side: $15^2 = 7^2 + x^2$ $225 = 49 + x^2$ $176 = x^2$ $\sqrt{176} = x$ $13.2664 = x$

Item	KEY	Rationale
15	Scale factor is 2.	Comparing the points you can see the scale factor is 2 because each point from triangle ACB when multiplied by 2 will land on the points of triangle A'C'B'. A(1, 2) → x 2(1,2) = A'(2, 4) C(4, -1) → x 2(4,-1)= C'(8, -2) B(0, 0) → x 2(0,0) = B'(0, 0)

Item	KEY	Rationale
16	$y = 60x + 5$	The starting or initial fee is \$5 which is the y-intercept. Then there is a cost of \$60 per hour which represents the rate or the rate of change or the slope. So, the function is $y = 60x + 5$.

Item	KEY	Rationale
17	The data can be modeled by a line with a negative slope.	When the x-values decrease as the y-values increase the points will form a line that has a negative slope.

Item	KEY	Rationale
18	$y = -\frac{5}{8}x$	The equation of a line in slope intercept form is $y = mx + b$ where m is the slope and b is the y-intercept. Find the slope: $\frac{5-0}{-8-0} = -\frac{5}{8}$ Since the line passes through the origin, the origin is the y-intercept. Another way to find the equation is to plot the origin and the point (-8, 5) on a graph. Starting at the origin, which is the y-intercept, count the vertical movement and the horizontal movement until you get to the point (-8, 5) The equation is: $y = -\frac{5}{8}x$

Item	KEY	Rationale
19	$2.5(3x - 2) = 2x + 0.5$ has 1 solution.	$2.5(3x - 2) = 2x + 0.5$ $7.5x - 5 = 2x - 0.5$ $5.5x = -5.5$ $x = 1$
	$-4(x + 5) - 3x = -7x - 9$ has no solution.	$-4(x + 5) - 3x = -7x - 9$ $-4x - 20 - 3x = -7x - 9$ $-7x - 20 = -7x - 9$ $-20 = -9$ Not true so no solution.
	$2(3x - 7) - x = -1(-5x + 14)$ has infinite solutions	$2(3x - 7) - x = -1(-5x + 14)$ $6x - 14 - x = 5x - 14$ $5x - 14 = 5x - 14$ $-14 = -14$ True so infinite solutions.

Item	KEY	Rationale
20	Infinite solutions	Solving the system using elimination: $3x - 3y = 1$ $6x = 6y + 2$ $3x - 3y = 1$ $6x - 6y = 2$ $2(3x - 3y = 1)$ $6x - 6y = 2$ $6x - 6y = 2$ $6x - 6y = 2$ These lines coincide meaning there are infinite solutions.

Item	KEY	Rationale
21	$\frac{41}{99}$	Let $0.\overline{41}$ be $x = 0.414141...$ Multiply both sides of the equation by 100: $100x = 41.141414...$ Subtract the two equations: $100x - x = 41.414141... - 0.414141 ...$ $99x = 41$ Solve the equation for x: $x = \frac{41}{99}$

Item	KEY	Rationale
22	She will not have enough fencing	$8^2 + 8^2 = x^2$ $64 + 64 = x^2$ $128 = x^2$ $11.3 = x$ The triangular garden has a perimeter of $8 + 8 + 11.3 = 27.3$ If Johanna only has 27 feet of fencing she will not have enough to enclose the triangular shaped garden.

Item	KEY	Rationale
23	8.574×10^8 miles	$8.86 \times 10^8 - (2.86 \times 10^7)$ Rewrite so they have the same exponent: $88.6 \times 10^7 - (2.86 \times 10^7)$ 85.74×10^7 8.574×10^8 miles

Item	KEY	Rationale
24	$x = 38$	All the angles in a triangle sum to 180. $x - 14 + 3x + 1 + x + 3 = 180$ $5x - 10 = 180$ $5x = 190$ $x = 38$

Item	KEY	Rationale
25	$k = 4$	If $k = 4$ then, $12x - 26 + 2 = k(3x - 9)$ $12x - 26 + 2 = 4(3x - 9)$ $12x - 24 = 12x - 36$ $-24 \neq -36$, so no solution.

Item	KEY	Rationale
26	Reflection over the y-axis followed by a translation of 2 units up and 2 units right.	R(-2, 1) → (2, 1)→ A(4, 3) S(-2, 6)→(2, 6) → B(4, 8) T(0, 6) →(0, 6) → C(2, 8)

Item	KEY	Rationale
27	Angle X = Angle Z ZY = XY	A reflection is a congruent transformation and the vertices of Triangle ABC match up with the vertices of Triangle XYZ. So, the equal angles and sides of triangle ABC will match triangle XYZ. Since AB = CB then ZY = XY and since Angle A = Angle C, then Angle X = Angle Z.

Item	KEY	Rationale
28	p = 0.5 q = 9	For the given equation $(8.2 \times 10^3)(p \times 10^q) = 4.1 \times 10^{12}$ $8.2 \times p = 4.1$ Solving for p by dividing both sides by 8.2: $8.2 \div 8.2 \times p = 4.1 \div 8.2$ $p = 0.5$ Using exponent rules: $3 + q = 12$ Solve for q: $3 + q - 3 = 12 - 3$ $q = 9$

Item	KEY	Rationale
29	$z = 180 - x - y$	The angles in a triangle sum to 180. So, $x + y + z = 180$ Solving that equation for z is: $x + y + z = 180$ $x - x + y - x + z = 180 - x - y$ $z = 180 - x - y$

Item	KEY	Rationale
30	$y = -\frac{3}{2}x + 5$	First find the slope: (2, 2) (6, -4) $m = \frac{-4 - 2}{6 - 2} = \frac{-6}{4} = -\frac{3}{2}$ Substitute $-\frac{3}{2}$ for m: $y = mx + b$ $y = -\frac{3}{2}x + b$ Substitute one of the points in for x and y to find the y-intercept, b: (2, 2) $2 = -\frac{3}{2}(2) + b$ $2 = -3 + b$ $5 = b$ $y = -\frac{3}{2}x + 5$

Breakdown of Assessment				
The Number System	Expressions, Equations, and Inequalities	Functions	Geometry	Statistics and Probability
2%	39%	18%	39%	2%

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