THIRD SPACE LEARNING

8th Grade Arkansas State Practice Math Test

Arkansas Practice Test Grade 8

Grade 8

Questions

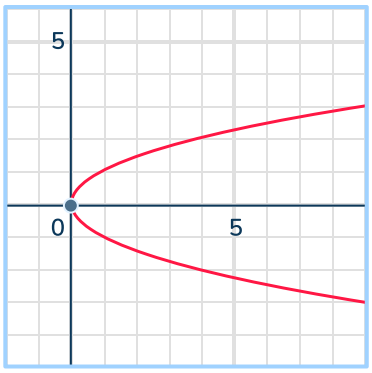
Name: ..... Class: .....

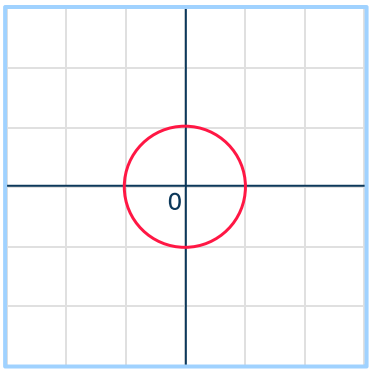
Date: ..... Score: .....

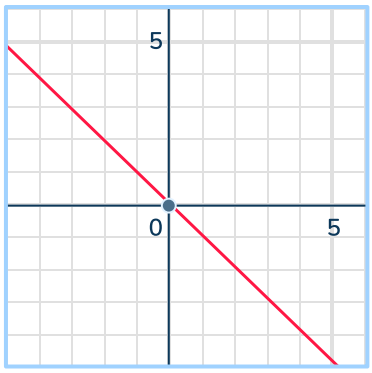
SESSION 1:
No Calculator

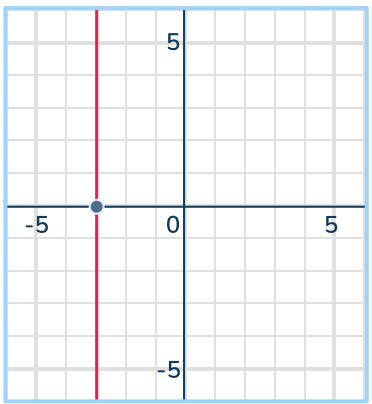
Standard: 8.F.A.1
DOK 1

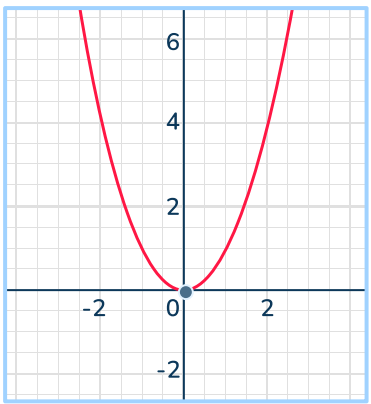
1 Select the graphs that show y to be a function of x?

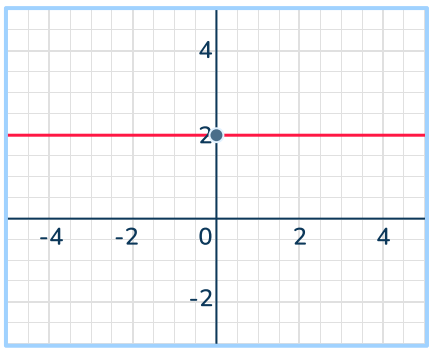
☐ 

☐ 

☐ 

☐ 

☐ 

☐ 

Standard: 8.EE.A.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.A.1
DOK 1

3 Select the set of points that does 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.NS.A.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.A.2
DOK 2

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

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

SESSION 2:
Calculator Permitted

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.B.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 $0.75 < 0.5$.
☐ The rate of change of Function A is greater than the rate of change of Function B because $1.75 > 1.5$.

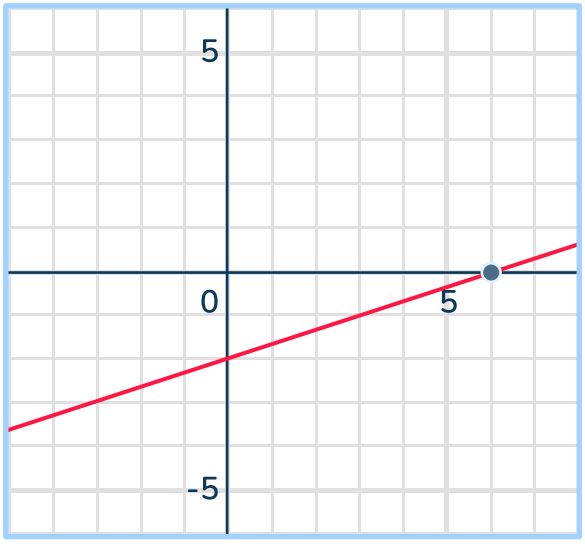
Standard: 8.G.C.9
DOK 2

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.B.6
DOK 2

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



Answer:_____

Standard: 8.F.B.4
DOK 2

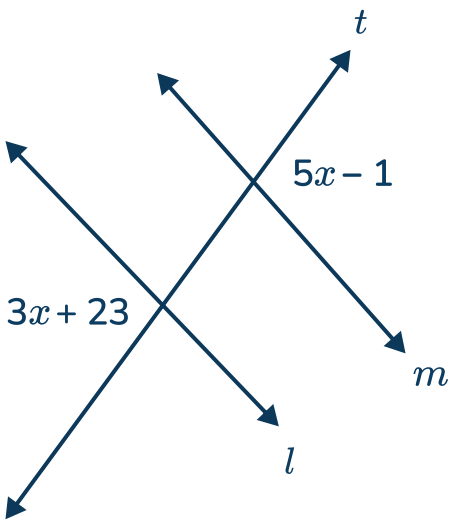
10 Gina runs her family's home repair service. The table below shows the service charges for the amount of hours worked. Create a linear equation that represents the information in the table.

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

Answer:_____

Standard: 8.G.A.5
DOK 1

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

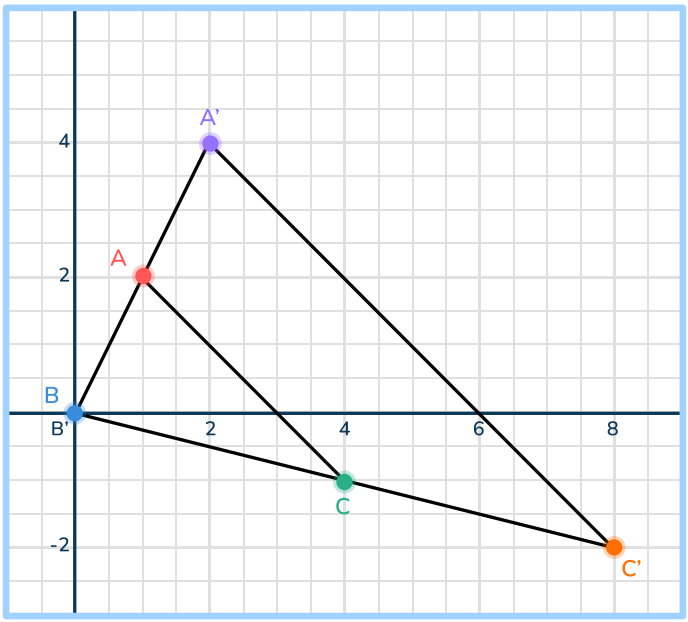


Answer

Standard: 8.G.A.3
DOK 2

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

Answer:_____



Answer:_____

Standard: 8.F.B.4
DOK 3

13 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.A.2
DOK 2

14 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.B.6
DOK 2

15 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.C.7
DOK 2

16 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.C.8

DOK 1

17 Find the solution to the system of equations.

$3x - 3y = 1$

$6x = 6y + 2$

Answer

Standard: 8.NS.A.1
DOK 1

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

Answer:_____

Standard: 8.G.B.7
DOK 3

19 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

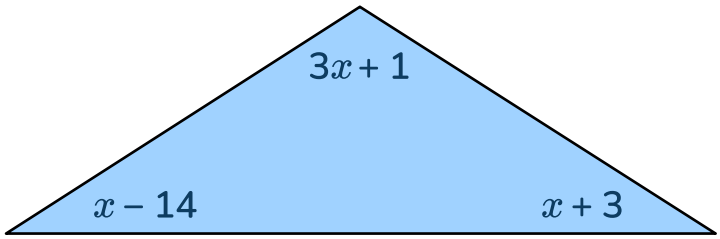
Standard: 8.EE.A.4
DOK 3

20 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.A.5
DOK 1

21 What is the value of x?



Answer:_____

Standard: 8.EE.C.7
DOK 3

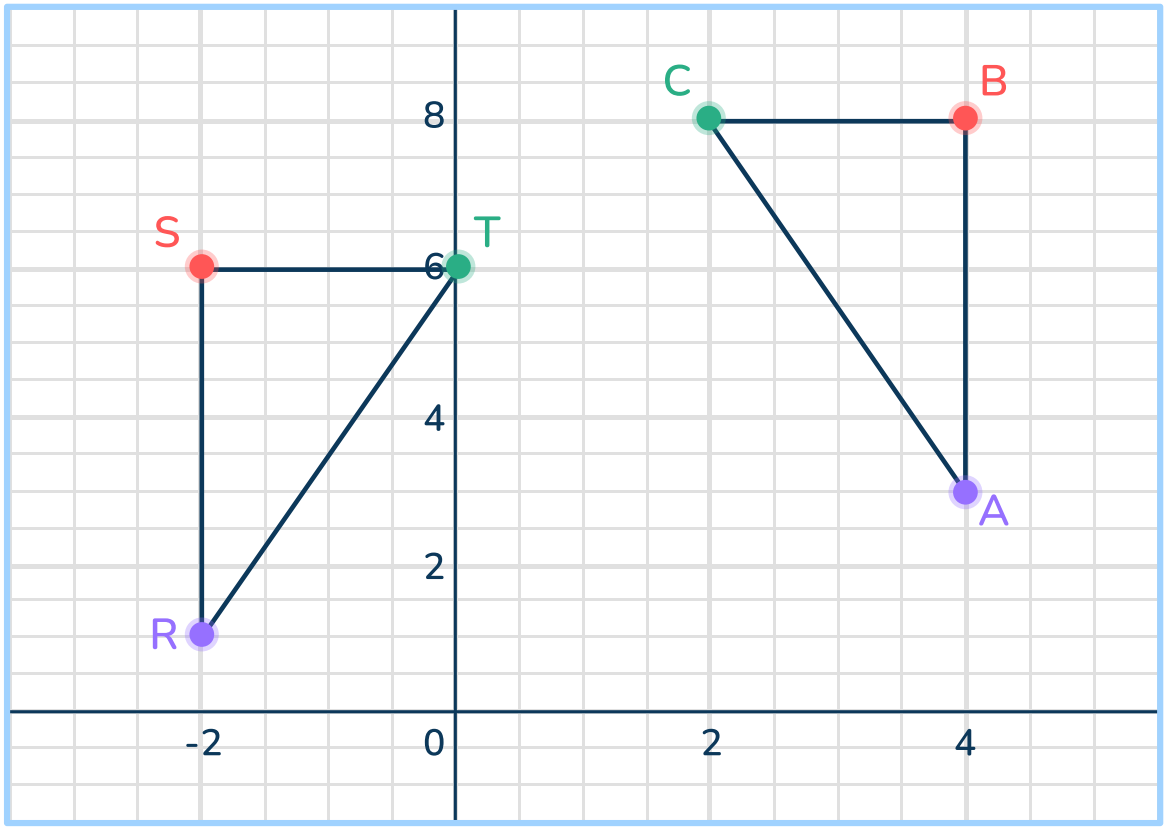
22 What value for k will make the equation have no solution?

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

Answer

Standard: 8.G.A.2
DOK 3

23 Select the sequence of transformations that maps triangle RST to triangle ABC.



☐ Reflection over the line $y = x$ followed by a 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.

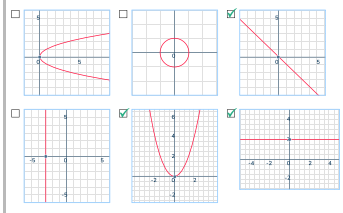
☐ Reflection over the x-axis followed by a translation of 2 units up and 2 units right.

Standard: 8.F.A.3
DOK 3

24 Using the three equations below. Identify each one of them as either linear or nonlinear. State a reason why each equation is either linear or nonlinear.

- $y = \frac{x}{4} + 3$
- $y = \frac{10}{x} - 4$
- $y = 2(-x + 4)$

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	{(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 relationship will fail the vertical line test. {(5, 2), (-5, -2), (5, 10)}

Item	KEY	Rationale
4	$a = 49$ or $a = 64$	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	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: $\frac{3.5\text{-}5.25}{2\text{-}3} = \frac{\text{-}1.75}{\text{-}1} = 1.75$ 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	$V = \prod(2)^2(9)$	The volume of a cylinder is $V = \prod(r^2)(h)$ The radius, in this case, is 2 and the height is 9. $V = \prod(2)^2(9)$

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	$y = 25x + 80$	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
11	$x = 12$	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
12	Scale factor is 2.	This is the correct answer. 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'B'C'. A(1, 2) → 2(1,2) = A'(2, 4) C(4, -1) → 2(4,-1)= C'(8, -2) B(0, 0) → 2(0,0) = B'(0, 0)

Item	KEY	Rationale
13	$y = 60x + 5$	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 of change or the slope. So, the function is $y = 60x + 5$

Item	KEY	Rationale
14	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
15	$y = -\frac{5}{8}x$	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: $y = -\frac{5}{8}x + 0$ or $y = -\frac{5}{8}x$

Item	KEY	Rationale
16	2.5 $(3x - 2) = 2x + 0.5$, 1 solution $-4(x + 5) - 3x = -7x - 9$, no solution $2(3x - 7) - x = -1(-5x + 14)$, infinite solutions	$2.5(3x - 2) = 2x + 0.5$ $7.5x - 5 = 2x + 0.5$ $5.5x = 5.5$ $x = 1$ $-4(x + 5) - 3x = -7x - 9$ $-4x - 20 - 3x = -7x - 9$ $-7x - 20 = -7x - 9$ $-20 = -9$ (not true so no solution) $2(3x - 7) - x = -1(-5x + 14)$ $6x - 14 - x = 5x - 14$ $5x - 14 = 5x - 14$ $-14 = -14$ (true so infinite solutions)

Item	KEY	Rationale
17	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
18	$\frac{41}{99}$	$0.\overline{41}$ $x = 0.414141...$ $100x = 41.41414...$ (multiply both sides of the equation by 100) Subtract the two equations. $100x = 41.414141.$ $-x = 0.414141...$ $99x = 41$ (solve the equation for x) $x = \frac{41}{99}$

Item	KEY	Rationale
19	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
20	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
21	$x = 38$	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
22	$k = 4$	This is the correct answer. If $k = 4$ then, $12x - 26 + 2 = k(3x - 9)$ $12x - 26 + 2 = 4(3x - 9)$ $12x - 24 = 12x - 36$, no solution $-24 \neq 36$

Item	KEY	Rationale
23	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
24	$y = \frac{x}{4} + 3$ linear $y = \frac{10}{x} - 4$ nonlinear $y = 2(-x + 4)$ linear	$y = \frac{x}{4} + 3$ → This is a linear equation because it can be rewritten in the form $y = mx + b$, $y = \frac{1}{4}x + 3$. The variable x is to the first power and it is the highest power of the equation meaning that it is linear. When it is graphed, the slope of the line is $\frac{1}{4}$ and the y-intercept is 3. $y = \frac{10}{x} - 4$ → This is a nonlinear equation because x is to the -1 power. $y = 10x^{1} - 4$. Linear equations have a degree of 1 or in other words x has to be to the 1 power. Also the equation cannot be written in the form of $y=mx+b$ $y = 2(-x + 4)$ → This is linear equation because the highest exponent for x is 1. The equation can be rewritten to be $y=-2x + 8$ which is in the form of $y = mx + b$

Breakdown of Assessment				
The Number System	Expressions, Equations, and Inequalities	Functions	Geometry	Statistics and Probability
2%	40%	19%	40%	2%

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