

Name: _____

Algebra 2 Honors Summer Assignment 2025

Graphing is an integral part of the Algebra 2 curriculum. There are 3 functions in particular from Algebra 1 that you should already be familiar with: linear functions, absolute value functions and quadratic functions. If you are not familiar with these functions, then this assignment will certainly bring you up to speed! In addition to knowing how to graph these common algebraic functions, I would like you to be familiar with transformations of these graphs as well. I will be inviting you to join my Google Classroom at some point, which is where you will be able to upload your work and solutions to this assignment *if* you do not wish *or* are unable to bring it into the school. However, I would prefer you bring it to school. The main office will put them in my mailbox.

This assignment is due **on or before Thursday August 28, 2025***. Since there will be teachers in the building on Wednesday August 27 and Thursday August 28, you could drop your summer assignment off then. Something else to keep in mind is that the school is not open on Fridays during the summer.

The summer assignment will be your first summative assessment (aka test grade) of MP 1. All problems will be graded for accuracy BUT I will stop counting after 75. Basically, this means you can get 6 problems incorrect without penalty. When we return to school, I will review the solutions to these problems and answer any questions that you may have. You will then be given a quiz on these problems that will be worth a total of 25 points.

The total point value for this assignment is 100 points.

*If for any reason your assignment is turned in late, then 10 points will be deducted for each day after August 28, 2025. If you do not turn in the assignment until the first day of school, Tuesday September 2, 2025, then the highest grade that you will be able to earn on that part of the assignment is 35 points. Keep in mind that summative assessments are worth 60% of your marking period grade.

Something else to consider: you have many resources to help you as you work on this assignment. Some suggestions would be Khan Academy, Desmos and/or a free online graphing calculator like the TI-84.

You may contact me via e-mail with questions:

nduffy@hopatcongschools.org; however, I do not expect there to be any major questions. If you do not hear back from me within a week, e-mail me again!

DO NOT wait until the last minute to start/complete this assignment.

Good Luck and Enjoy Your Summer!!!

A SPECIAL NOTE FROM THE GUIDANCE DEPARTMENT:

As schedules are not finalized, we recommend that students not begin the summer assignment until they have confirmed their schedules with their school counselor.

Table of Contents: (to help you navigate through this assignment)

page 1: parent graph of the linear function with a table of values included.

page 2: special transformations of linear functions defined for you.

pages 3-4: complete problems #1 – 12 as instructed at the top of page 3.

pages 5-6: complete problems #1 – 12 as instructed.

page 7: parent graph of the absolute value function with a table of values included.

page 8: special transformations of absolute value functions defined for you.

page 9: complete problems #1 – 16 as instructed at the top of the page.

page 10: complete problems #1 – 9 as instructed.

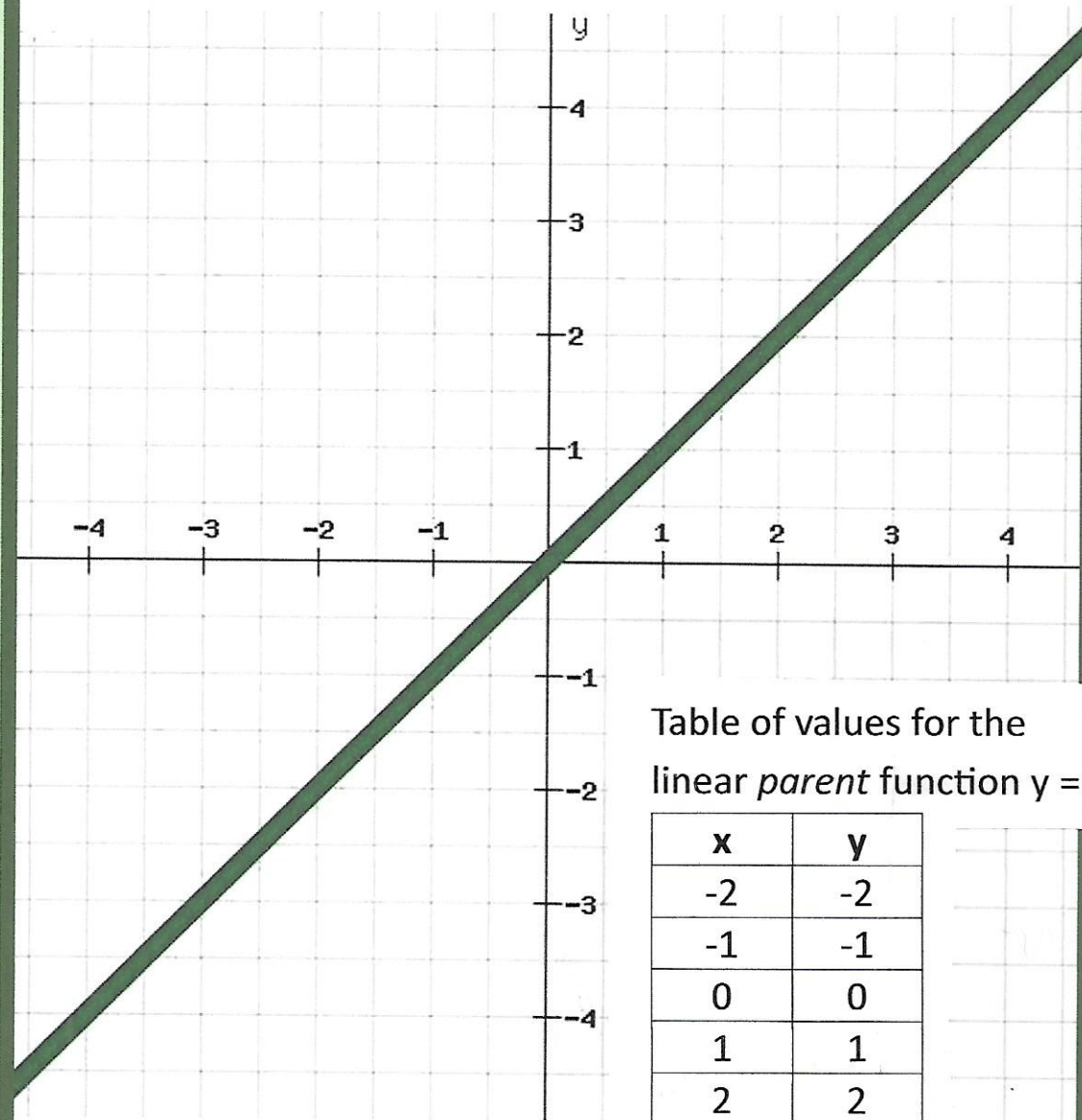
page 11: parent graph of the quadratic function with a table of values included.

page 12: special transformations of quadratic functions defined for you.

page 13: complete problems #1 – 16 as instructed at the top of the page.

pages 14-15: complete problems #1 – 16 as instructed.

Linear Function



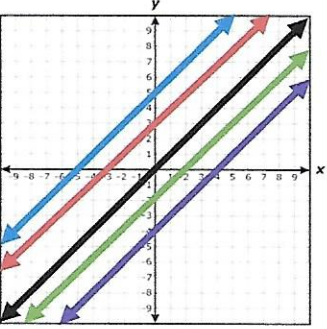
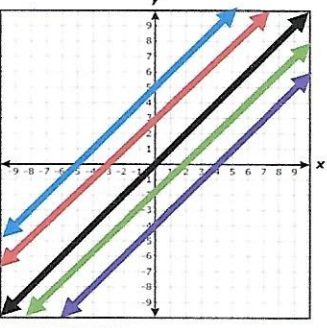
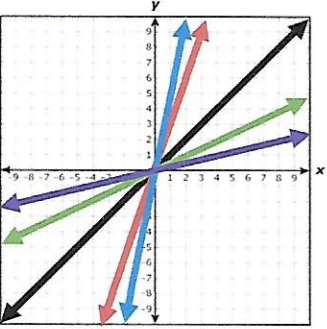
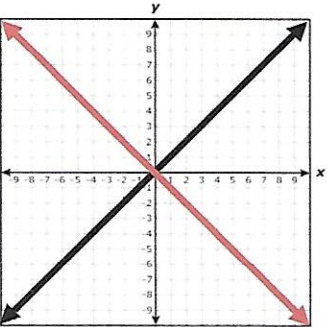
$$f(x) = x \quad \text{OR} \quad y = x$$

Transformations of Linear Functions

How do the constants **a**, **c**, and **d** affect the graph of the linear parent function?

$$f(x) = x$$

$$f(x) = a(x \pm c) \pm d$$

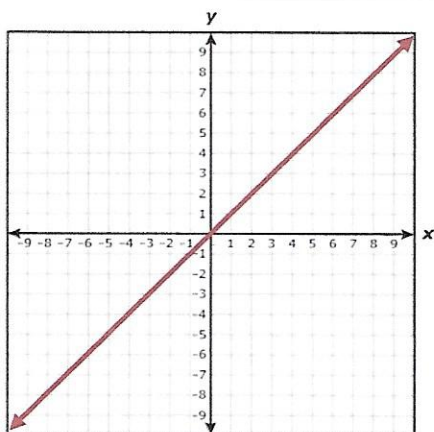
Constant	Examples (Graph these...)	Visual Representation	Describe what changed...
d	$f(x) = x$ $g(x) = x + 3$ $h(x) = x + 5$ $j(x) = x - 2$ $k(x) = x - 4$		Changing the value of d shifts the graph <u>up</u> or <u>down</u> . If d is positive the graph shifts <u>up</u> , if d is negative the graph shifts <u>down</u> .
c	$f(x) = x$ $g(x) = (x + 3)$ $h(x) = (x + 5)$ $j(x) = (x - 2)$ $k(x) = (x - 4)$		Changing the value of c shifts the graph <u>left</u> or <u>right</u> . If c is positive the graph shifts <u>left</u> , if c is negative the graph shifts <u>right</u> .
a	$f(x) = x$ $g(x) = 3x$ $h(x) = 5x$ $j(x) = \frac{1}{2}x$ $k(x) = \frac{1}{4}x$		Changing the value of a makes the graph <u>steeper</u> or <u>flatter</u> . If a > 1 , the graph stretches (<u>steeper</u>), if 0 < a < 1 the graph compresses (<u>flatter</u>).
±	$f(x) = x$ $g(x) = -x$		A negative sign in front of the equation will reflect (<u>flip</u>) the graph over the <u>x</u> -axis.

Transformations of Linear Functions

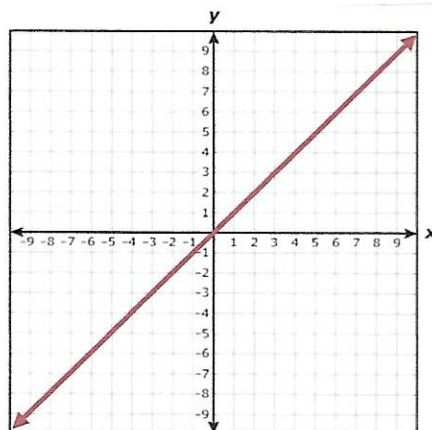
Use the graph of the linear parent function $f(x) = x$ as a guide to graph the new function. Then, describe the resulting transformation(s).

aka means "also known as"

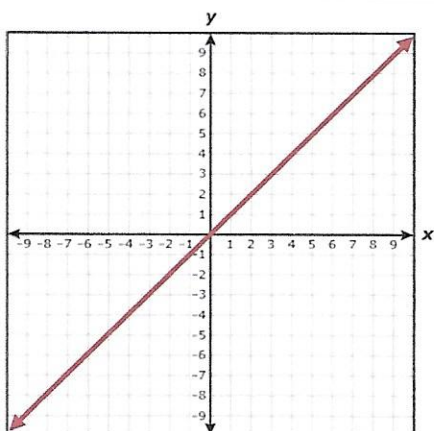
1. $g(x) = f(x) + 2$ aka $g(x) = x + 2$



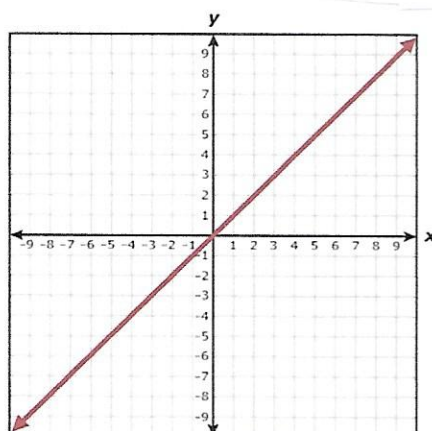
2. $g(x) = f(x) - 6$ aka $g(x) = x - 6$



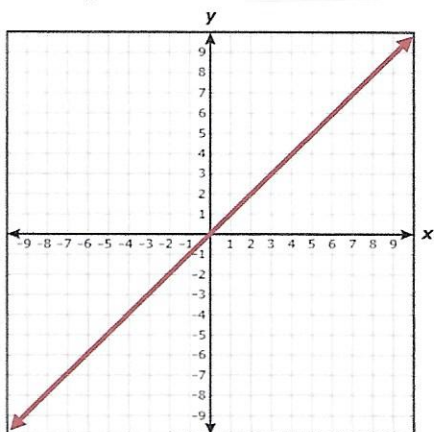
3. $g(x) = f(x - 1)$ aka $g(x) = (x - 1)$



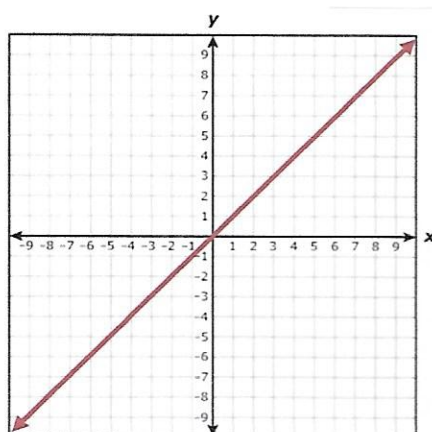
4. $g(x) = f(x + 5)$ aka $g(x) = (x + 5)$



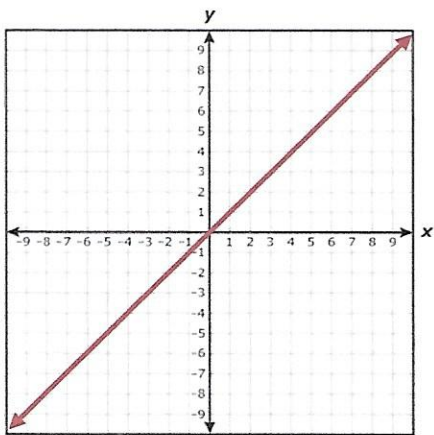
5. $g(x) = \frac{1}{3} \cdot f(x)$ aka $g(x) = \frac{1}{3}x$



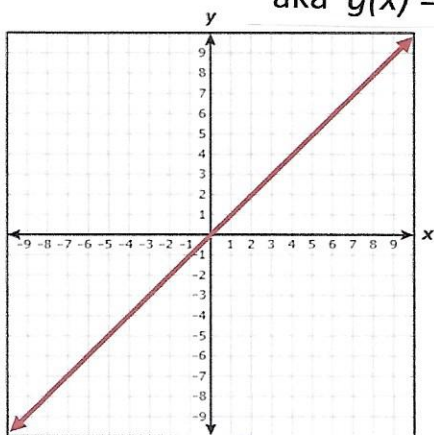
6. $g(x) = 4 \cdot f(x)$ aka $g(x) = 4x$



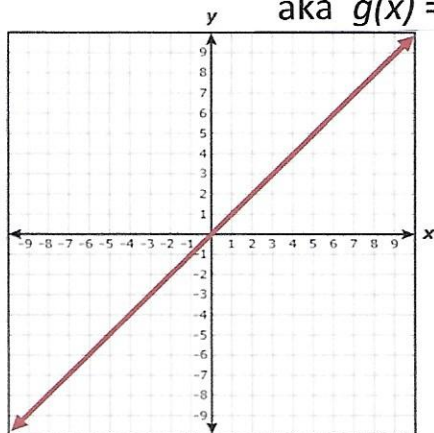
7. $g(x) = -3 \cdot f(x)$ aka $g(x) = -3x$



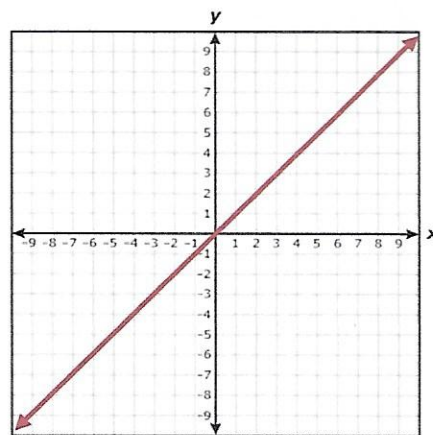
9. $g(x) = -1 \cdot f(x - 4)$
aka $g(x) = -1(x - 4)$



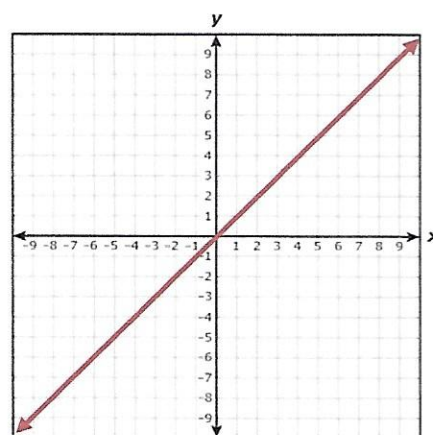
11. $g(x) = \frac{1}{3} \cdot f(x + 5)$
aka $g(x) = \frac{1}{3}(x + 5)$



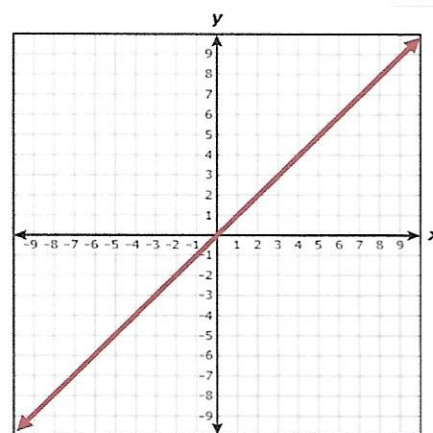
8. $g(x) = \frac{1}{2} \cdot f(x) + 2$ aka $g(x) = \frac{1}{2}x + 2$



10. $g(x) = 2 \cdot f(x) - 5$ aka $g(x) = 2x - 5$



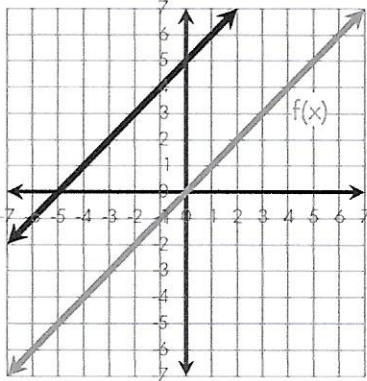
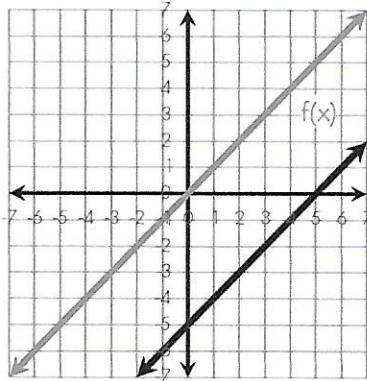
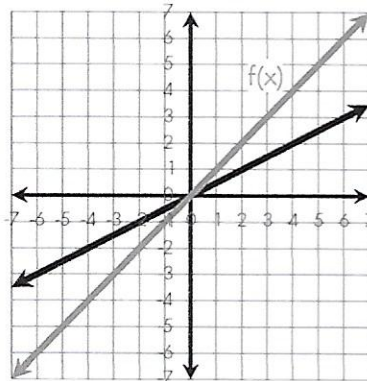
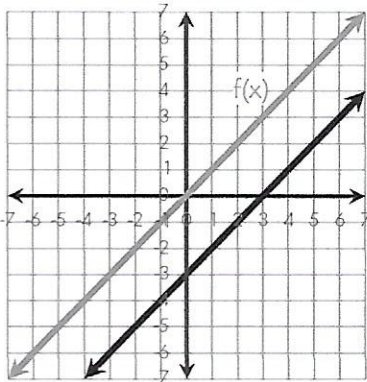
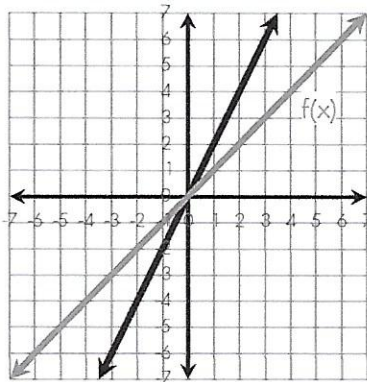
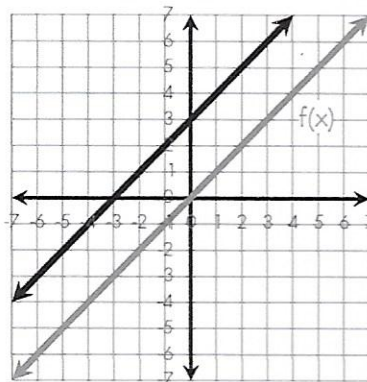
12. $g(x) = 4 \cdot f(x) + 1$ aka $g(x) = 4x + 1$



TRANSFORMATIONS OF LINEAR FUNCTIONS – INTRO

Worksheet

The linear parent function $f(x) = x$ is transformed 6 times below. Match the functions to their matching verbal descriptions and graphs by writing the matching letter in the blank.

1. $f(x + 5)$ Verbal: _____ Graph: _____	2. $f(x) - 3$ Verbal: _____ Graph: _____	3. $2f(x)$ Verbal: _____ Graph: _____	4. $f(x - 5)$ Verbal: _____ Graph: _____	5. $\frac{1}{2}f(x)$ Verbal: _____ Graph: _____	6. $f(x) + 3$ Verbal: _____ Graph: _____
A. Translation up 3		B. Translation left 5		C. The graph is steeper than the graph of $f(x) = x$	
D. Translation right 5		E. The graph is less steep than the graph of $f(x) = x$		F. Translation down 3	
G.	H.		I.		
					
J.	K.		L.		
					

7. The graph of $f(x)$ is transformed to create $g(x)$, which has a less steep slope. Select TWO answers that match this description.

☐ $g(x) = f(x) + \frac{1}{4}$

☐ $g(x) = 0.3f(x)$

☐ $g(x) = -f(x)$

☐ $g(x) = f(x) - 3$

☐ $g(x) = \frac{9}{10}f(x)$

8. The graph of $f(x)$ is transformed to create $g(x)$, which has a y-intercept that has been shifted down. Select TWO answers that match this description.

☐ $g(x) = f(x) - 0.2$

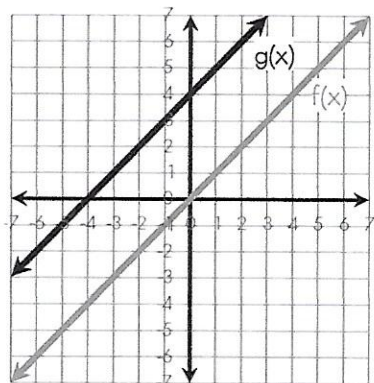
☐ $g(x) = -f(x)$

☐ $g(x) = f(x) + 0.01$

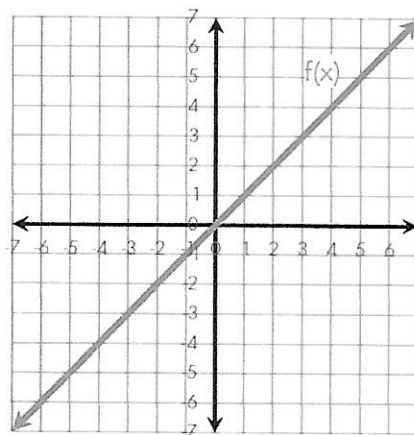
☐ $g(x) = f(x) - \frac{20}{3}$

☐ $g(x) = \frac{3}{4}f(x)$

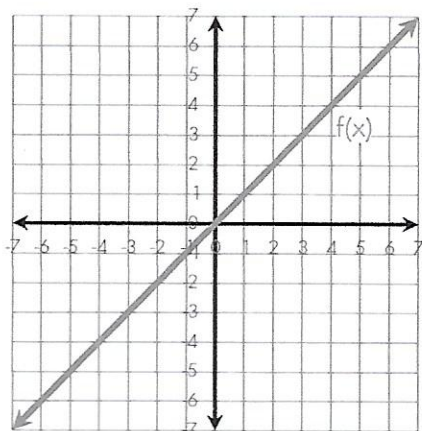
9. The graph of $f(x) = x$ and $g(x) = f(x) + a$ is shown on the grid. What is the value of a ?



10. The graph of $f(x) = x$ is shown on the grid. It is transformed to create $g(x) = f(x) - 6$. Graph $g(x)$.

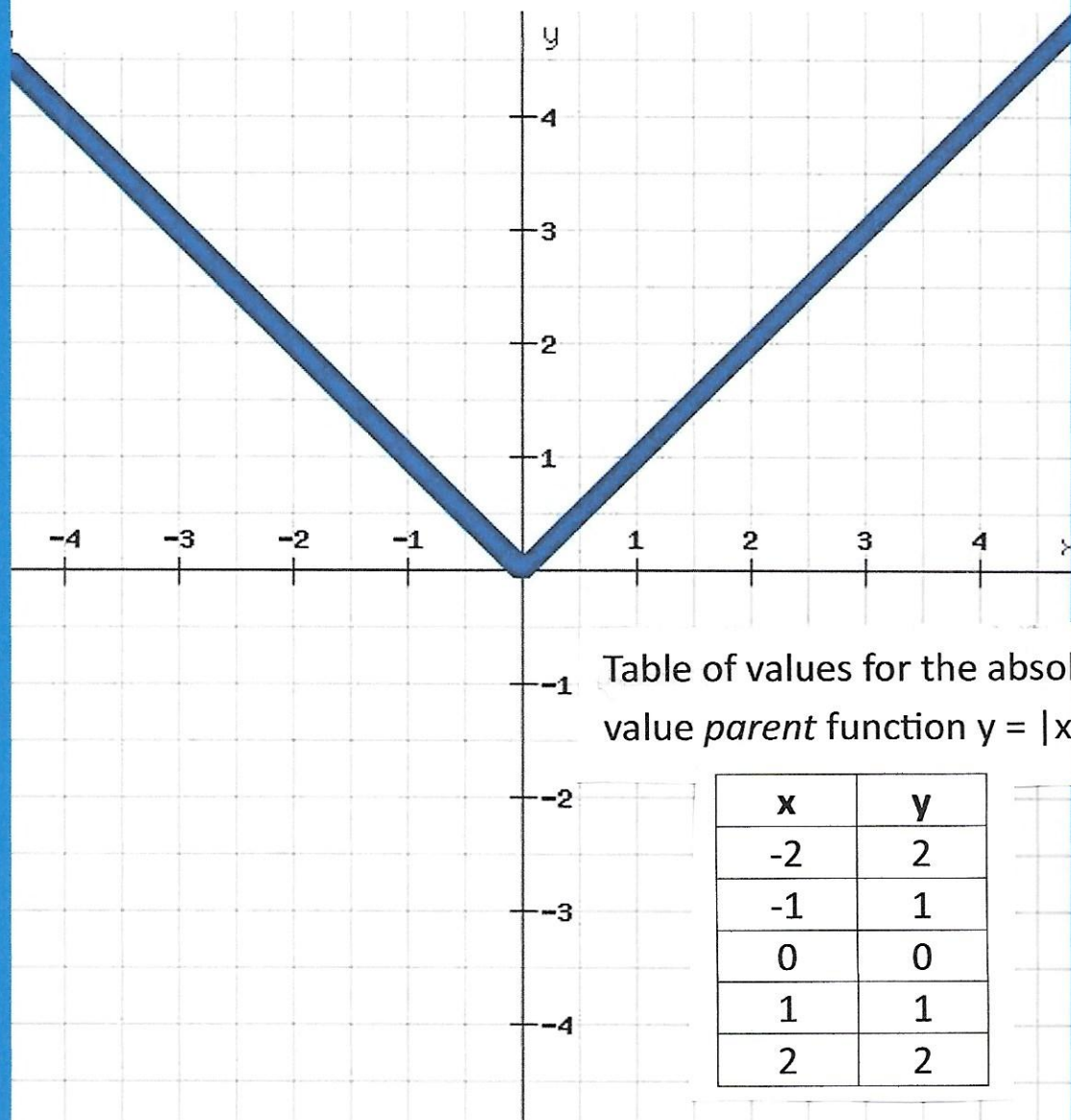


11. The graph of $f(x) = x$ is shown on the grid. It is transformed to create $g(x) = -f(x)$. Graph $g(x)$.



12. A linear function $f(x) = x$ is transformed to create $g(x) = \frac{8}{7}f(x)$. Mia thinks the transformed function $g(x)$ will have a less steep slope since $f(x)$ is multiplied by a fraction. Is Mia correct? Why or why not? Explain with at least one complete sentence.

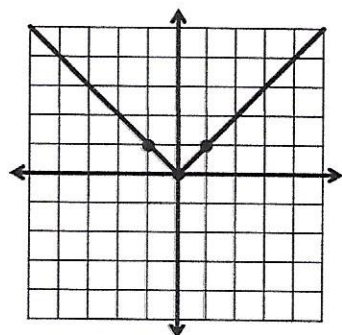
Absolute Value Function



$$f(x) = |x| \quad \text{OR} \quad y = |x|$$

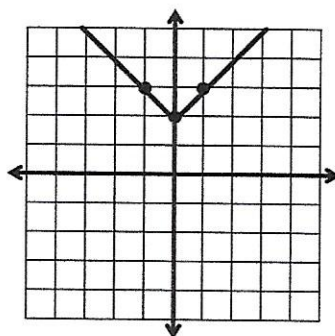
Transformations and Translations of the Absolute Value Function

1. $y = |x|$



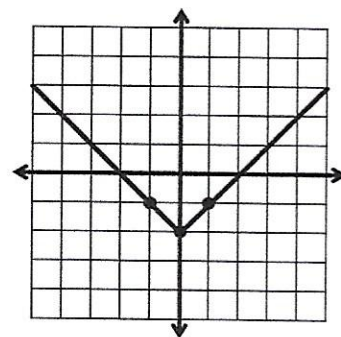
Parent Function
 $y = f(x)$

2. $y = |x| + 2$



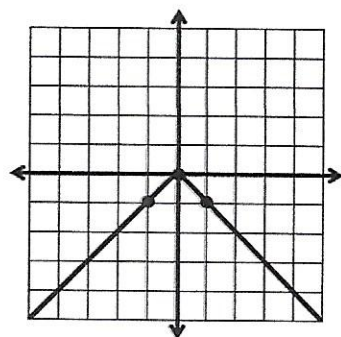
Translated up 2
 $y = f(x) + 2$

3. $y = |x| - 2$



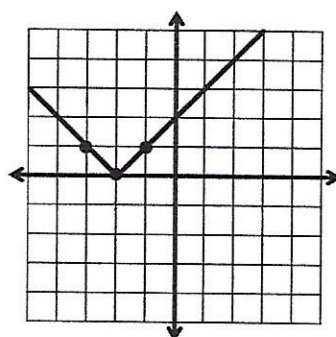
Translated down 2
 $y = f(x) - 2$

4. $y = -|x|$



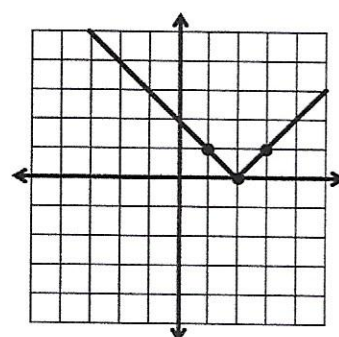
Reflected over the x-axis
 $y = -f(x)$

5. $y = |x + 2|$



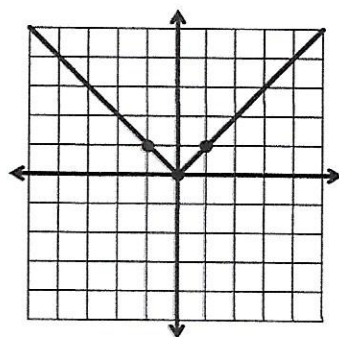
Translated left 2
 $y = f(x + 2)$

6. $y = |x - 2|$



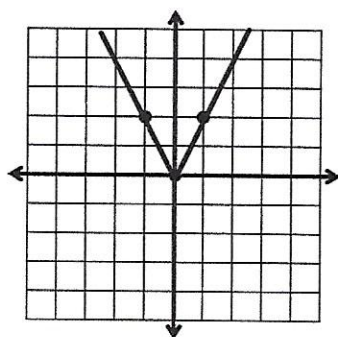
Translated right 2
 $y = f(x - 2)$

7. $y = |-x|$



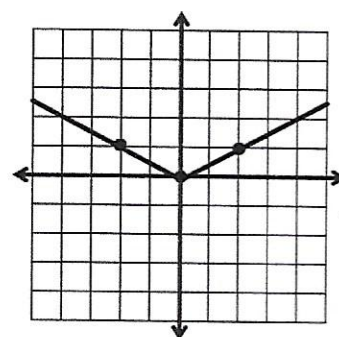
Reflected over the y-axis
 $y = f(-x)$

8. $y = 2|x|$



Stretched by a factor of 2
 $y = 2f(x)$

9. $y = \frac{1}{2}|x|$



Shrunk by a factor of $\frac{1}{2}$
 $y = \frac{1}{2}f(x)$

Use what you know about transformations to write the equation of each graph.

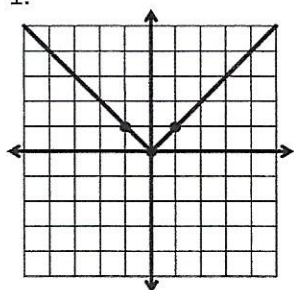
Below are your choices:

$$y = 2|x - 2| + 1; y = -|x| - 2; y = |x|; y = -|x + 2| + 2; y = |x| - 2; y = -|x|; y = |x + 2|;$$

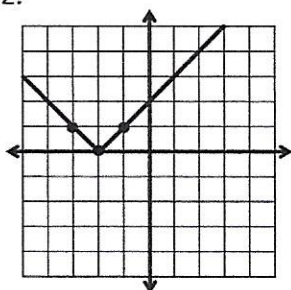
$$y = -\frac{1}{2}|x - 2| - 1; y = |x| + 2; y = \frac{1}{2}|x|; y = -|x - 2| + 3; y = 2|x|; y = -|x - 3| - 1; y = |x - 2|;$$

$$y = |x + 2| + 1; y = -\frac{1}{2}|x + 2| - 1;$$

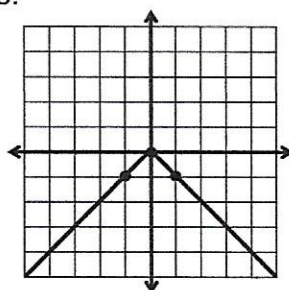
1.



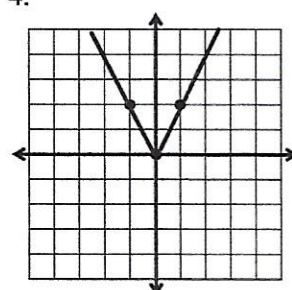
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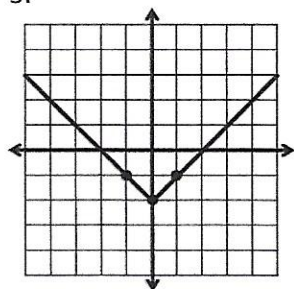
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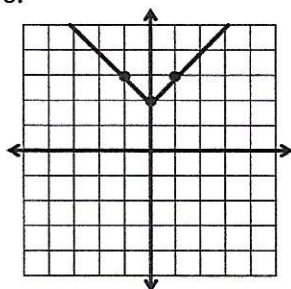
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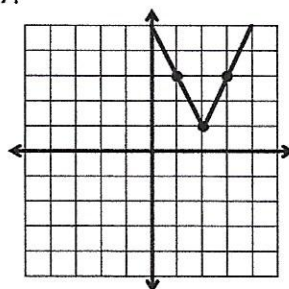
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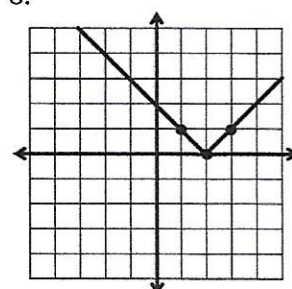
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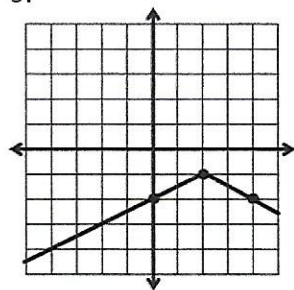
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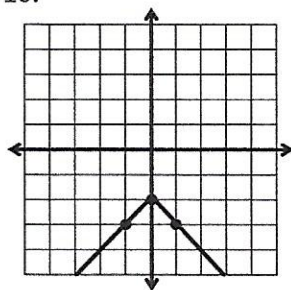
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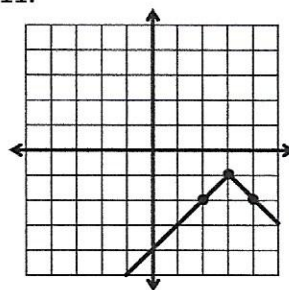
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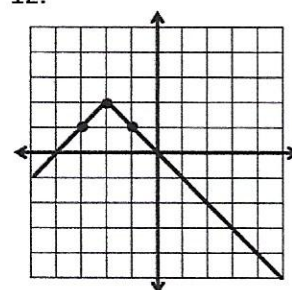
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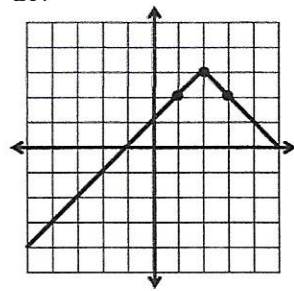
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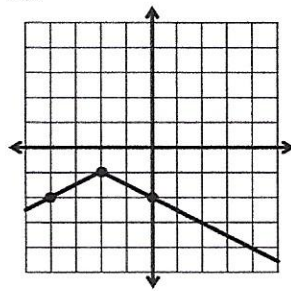
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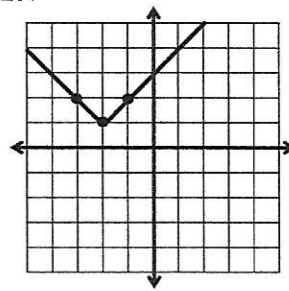
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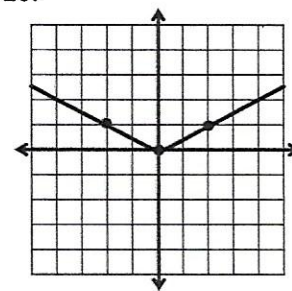
14.



15.

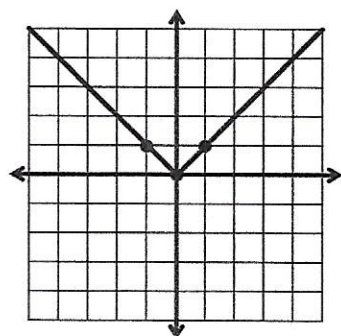


16.



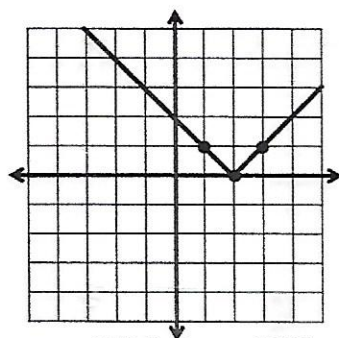
Write the equation of the graph and describe the transformation.

1. $y =$



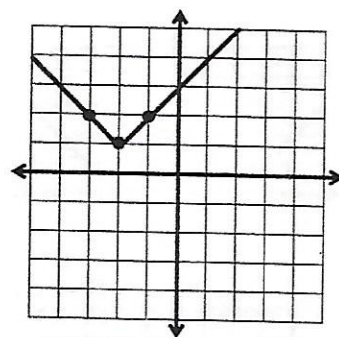
Parent Function

2.



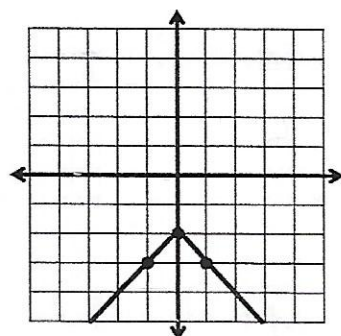
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3.



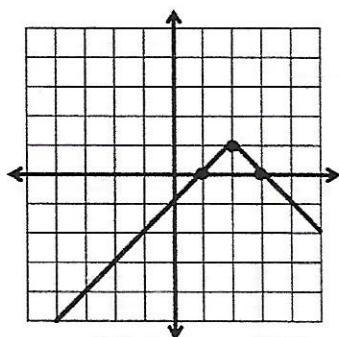
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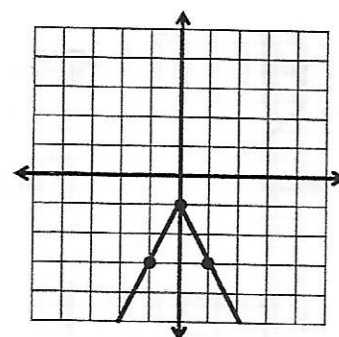
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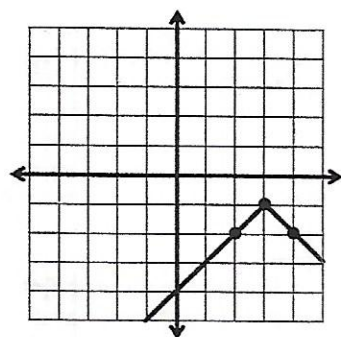
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6.



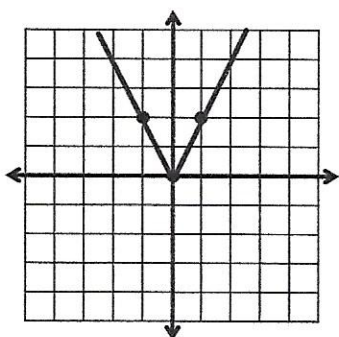
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7.

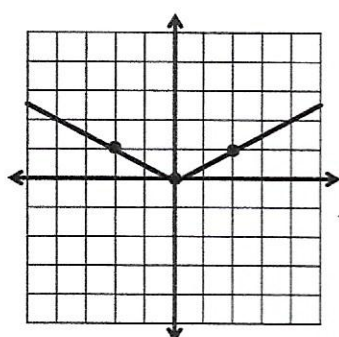


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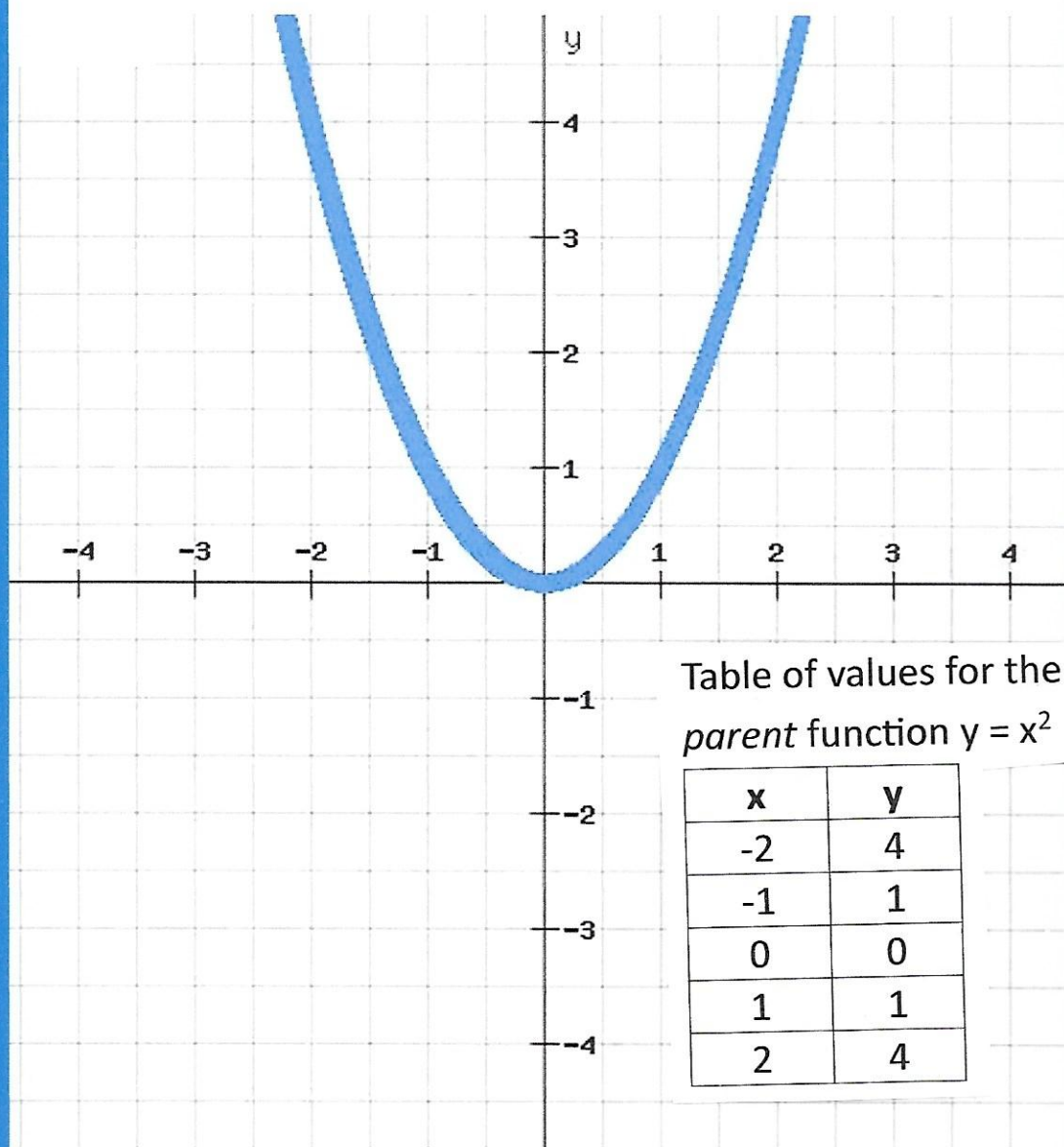
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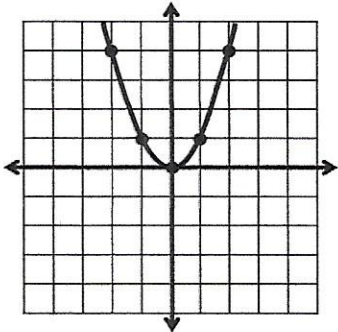
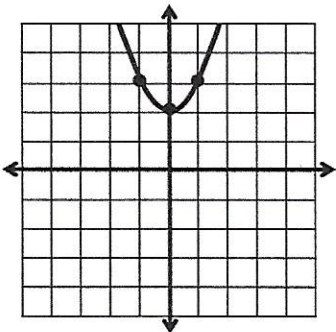
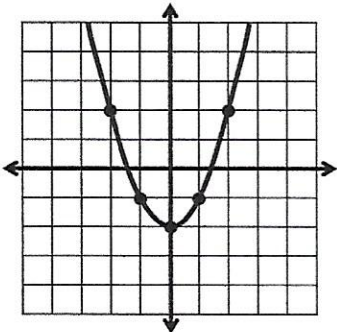
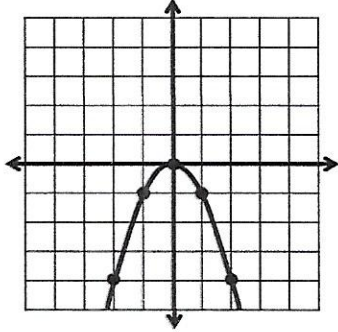
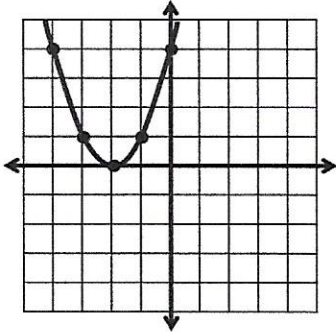
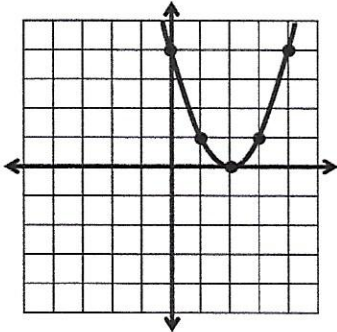
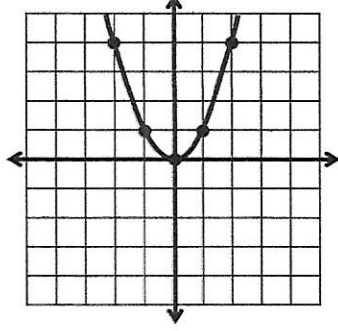
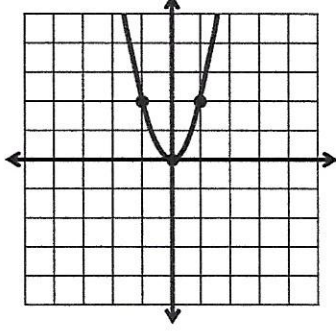
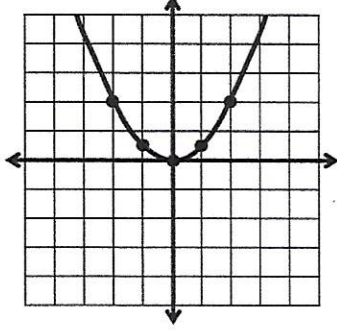


Quadratic Function



$$f(x) = x^2 \quad \text{OR} \quad y = x^2$$

Transformations and Translations of the Quadratic Function.

<p>1. $y = x^2$</p>  <p>Parent Function $y = f(x)$</p>	<p>2. $y = x^2 + 2$</p>  <p>Translated up 2 $y = f(x) + 2$</p>	<p>3. $y = x^2 - 2$</p>  <p>Translated down 2 $y = f(x) - 2$</p>
<p>4. $y = -x^2$</p>  <p>Reflected over the x-axis $y = -f(x)$</p>	<p>5. $y = (x + 2)^2$</p>  <p>Translated left 2 $y = f(x + 2)$</p>	<p>6. $y = (x - 2)^2$</p>  <p>Translated right 2 $y = f(x - 2)$</p>
<p>7. $y = (-x)^2$</p>  <p>Reflected over the y-axis $y = f(-x)$</p>	<p>8. $y = 2x^2$</p>  <p>Stretched by a factor of 2 $y = 2f(x)$</p>	<p>9. $y = \frac{1}{2}x^2$</p>  <p>Shrunk by a factor of 1/2 $y = \frac{1}{2}f(x)$</p>

Use what you know about transformations to write the equation of each graph.

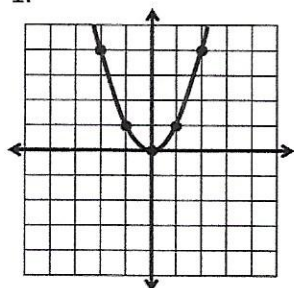
Below are your choices:

$$y = -(x + 2)^2; y = (x - 2)^2 - 1; y = (x - 1)^2 + 2; y = -x^2; y = -2(x + 1)^2 - 1; y = x^2 + 2;$$

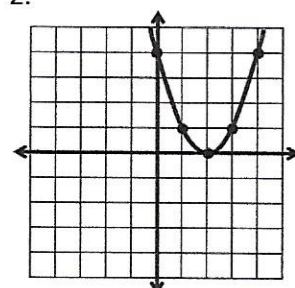
$$y = -\frac{1}{2}(x - 2)^2 + 1; y = x^2 - 2; y = -(x - 2)^2 + 1; y = (x - 2)^2; y = (x + 2)^2; y = 2x^2 - 1; y = \frac{1}{2}x^2;$$

$$y = x^2; y = 2x^2; y = 2(x + 2)^2 - 1$$

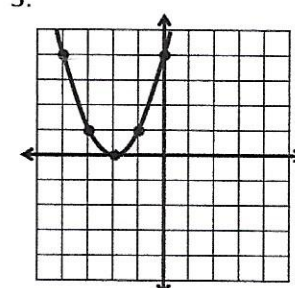
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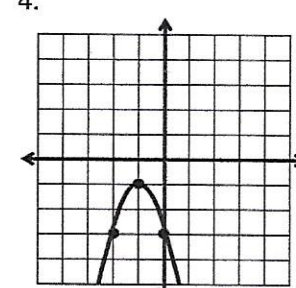
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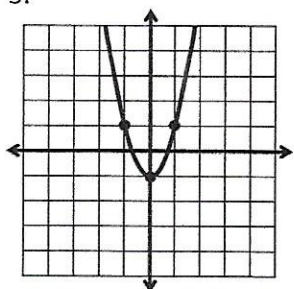
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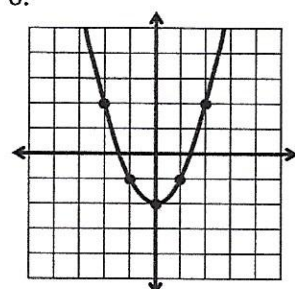
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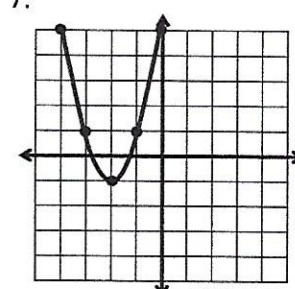
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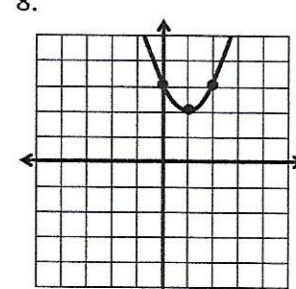
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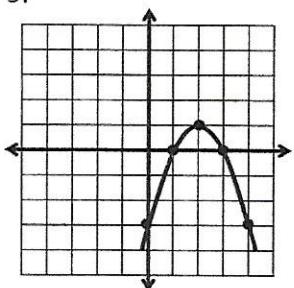
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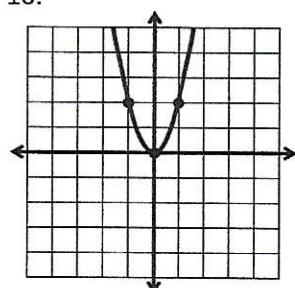
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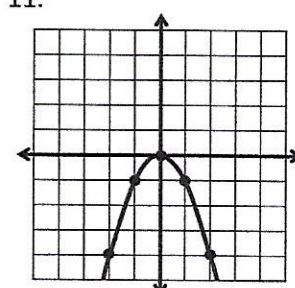
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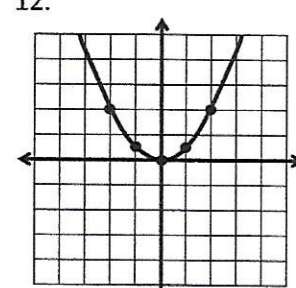
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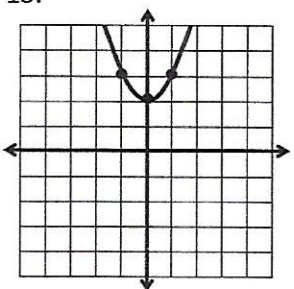
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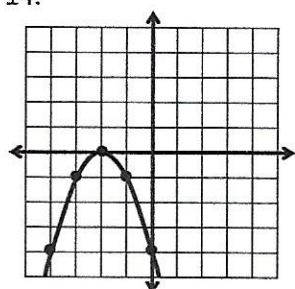
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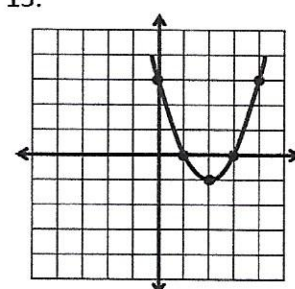
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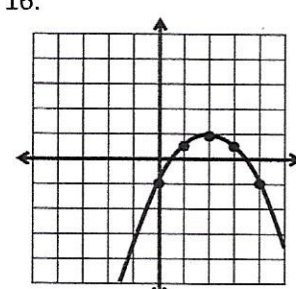
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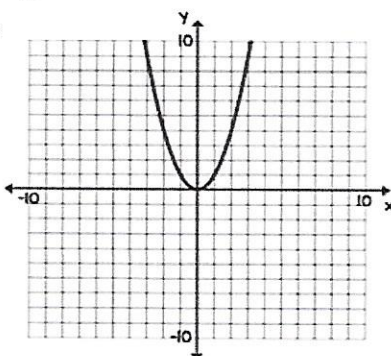


1 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = x^2 - 1$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

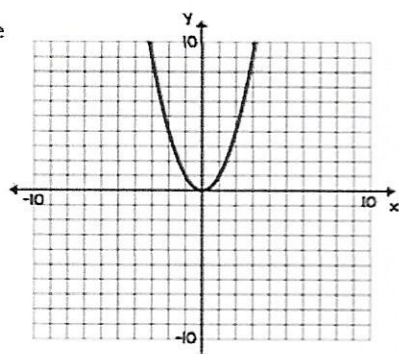


2 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = 3x^2$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

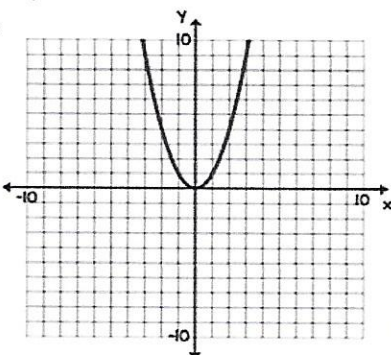


3 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = (x + 2)^2$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

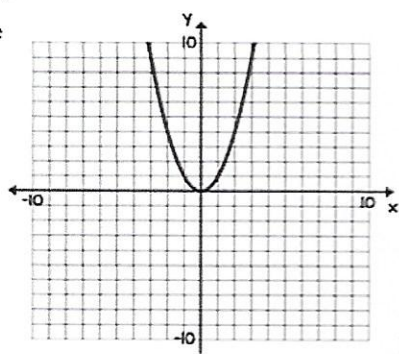


4 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = \frac{1}{3}x^2$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

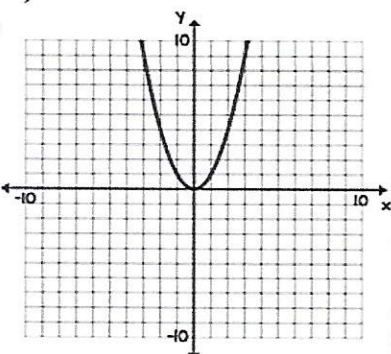


5 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = (x - 5)^2$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
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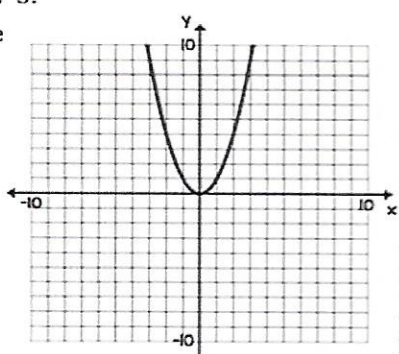


6 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = x^2 + 3$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
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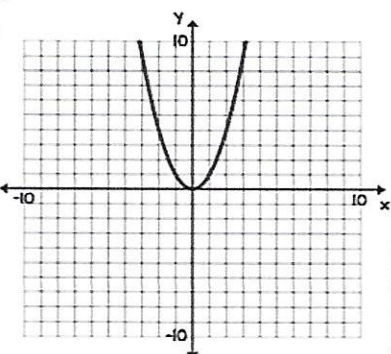


7 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = -x^2$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
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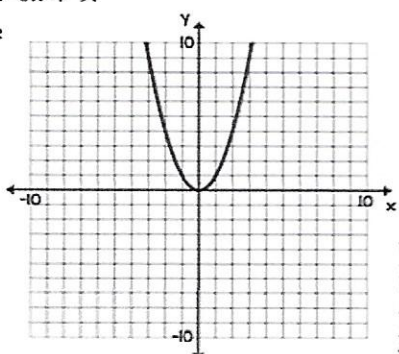


8 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = x^2 + 6x + 9$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
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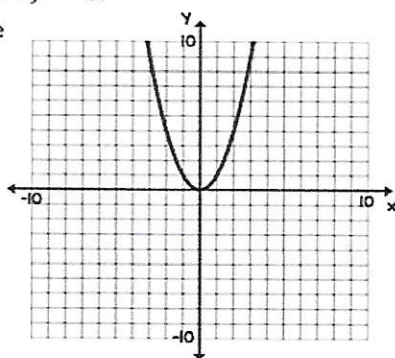


9 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = (x + 5)^2 - 3$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
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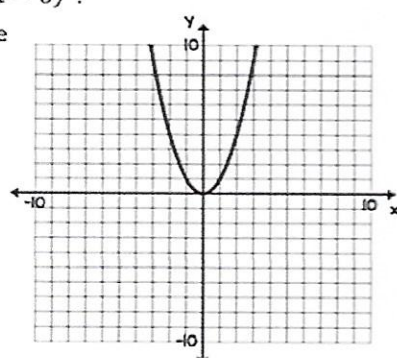


10 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = -(x - 6)^2$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
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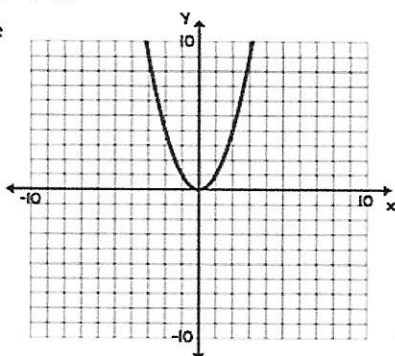


11 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = -3x^2 + 1$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
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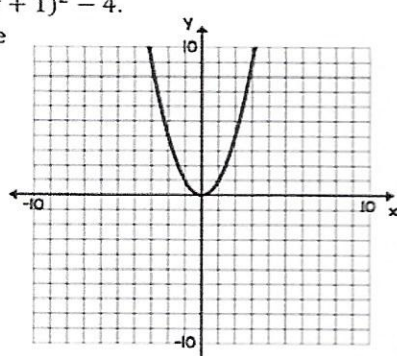


12 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = \frac{5}{2}(x + 1)^2 - 4$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

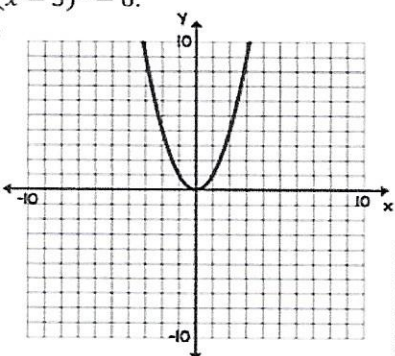


13 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = -\frac{1}{2}(x - 5)^2 - 6$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

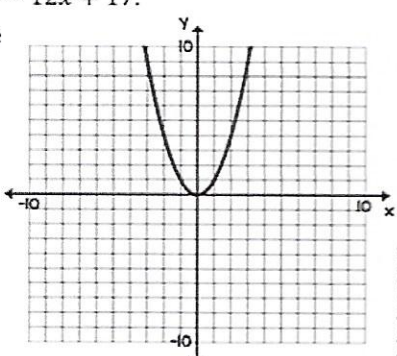


14 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = 3x^2 - 12x + 17$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

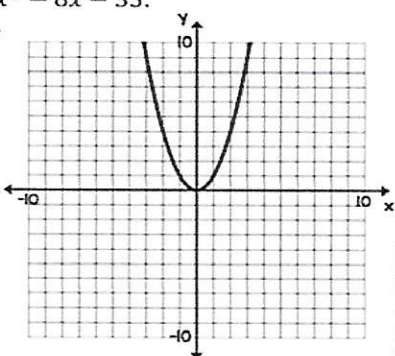


15 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = -\frac{1}{2}x^2 - 8x - 35$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right



16 The graph of the parent of the Quadratic Function $f(x) = x^2$ is shown.

Sketch the graph of $g(x) = -4x^2 + 7$.

Check the boxes which describe the transformation/s.

- ☐ Narrower
- ☐ Wider
- ☐ Reflected Across the X-Axis
- ☐ Translated/Shifted Up
- ☐ Translated/Shifted Down
- ☐ Translated/Shifted Left
- ☐ Translated/Shifted Right

