

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

For each equation below, state the parent graph and the transformations of the parent graph that is described by the equation.

1. $f(x) = 2x + 3$

- Linear
- Vertical Stretch by 2
- Translate vertically up 3

2. $f(x) = 2x^3 + 3$

- cubic
- vertical stretch by 2
- Translate vertically up 3

3. $f(x) = 2|x| + 3$

- Absolute Value
- vertical stretch by 2
- Translate vertically up 3

4. $f(x) = \sqrt{x-1}$

- square root
- Translate horizontally to right 1

5. $f(x) = |x-1|$

- Absolute Value
- Translate horizontally right 1

6. $f(x) = 2^x - 1$

- exponential
- Translate vertically down 1

7. $f(x) = -|x| + 7$

- Absolute Value
- Reflect over x-axis
- Translate vertically up 7

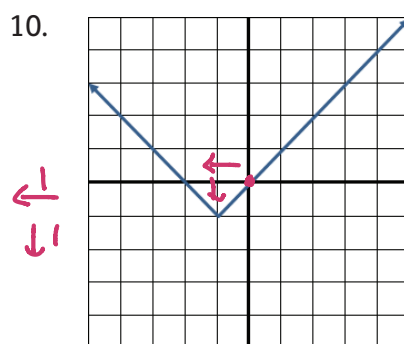
8. $f(x) = -x^2 + 7$

- Quadratic
- reflect over x-axis
- Translate vertically up 7

9. $f(x) = -x + 7$

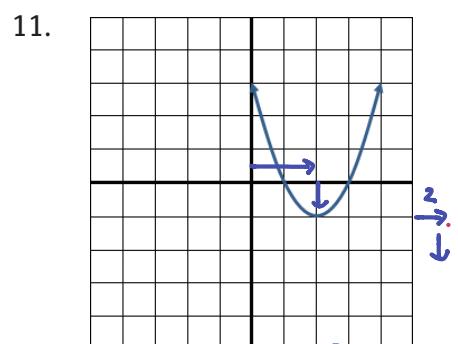
- Linear
- reflect over x-axis
- Translate vertically up 7

Write an equation for each graph below. Then use at least three values of x to check your equation. Plot those points in your graph.



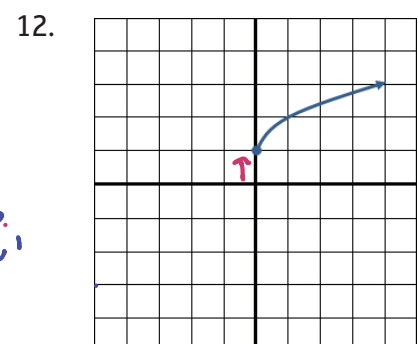
$$y = |x+1| - 1$$

$$\begin{aligned} f(0) &= |0+1| - 1 & f(-2) &= |-2+1| - 1 \\ f(0) &= 0 \checkmark & f(-2) &= 0 \checkmark \\ f(-1) &= |-1+1| - 1 & & \\ f(-1) &= -1 \checkmark & & \end{aligned}$$



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

* Check 3 values (show work)



$$y = \sqrt{x} + 1$$

Check 3 values (show work)

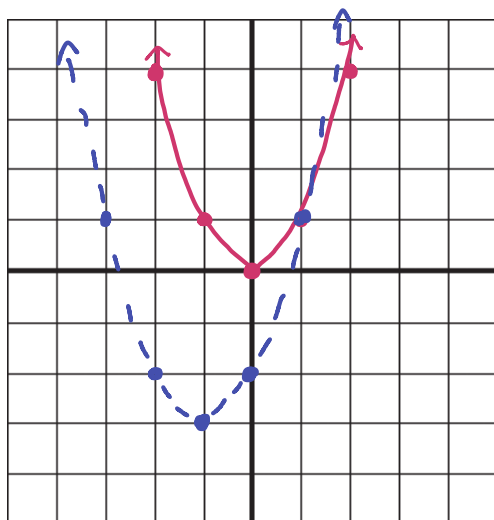
Graph the parent graph of each with a solid curve. State the transformation described by each equation and then graph the equation with a dotted curve. Check your graph by choosing two or three values of x and substituting them into the equation to find the y -value.

13. $f(x) = (x + 1)^2 - 3$ $\leftarrow 1 \downarrow 3$

Transformation:

Translate Horizontally left 1
Translate Vertically down 3

Checked with points:

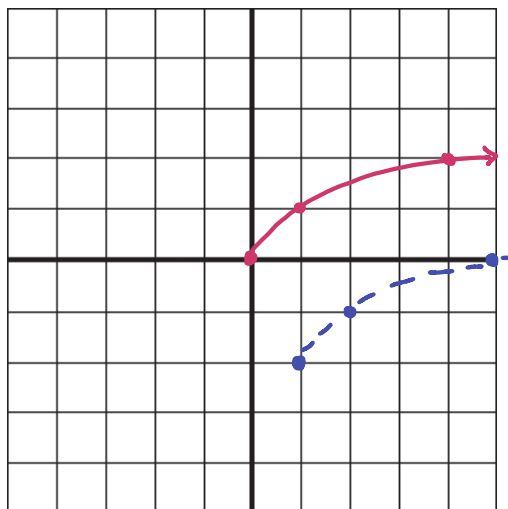


14. $f(x) = \sqrt{x - 1} - 2$ $\rightarrow 1 \downarrow 2$

Transformation:

Translate Horizontally right 1
Translate Vertically down 2

Checked with points:



Checked points

$$f(-1) = (-1+1)^2 - 3$$

$$(0)^2 - 3 = -3$$

$$(-1, -3) \checkmark$$

$$f(0) = (0+1)^2 - 3$$

$$(1)^2 - 3 = -2$$

$$(0, -2) \checkmark$$

Checked Points

$$f(1) = \sqrt{1-1} - 2$$

$$= \sqrt{0} - 2 = -2$$

$$(1, -2) \checkmark$$

$$f(5) = \sqrt{5-1} - 2$$

$$= \sqrt{4} - 2 =$$

$$= 2 - 2 = 0$$

$$(5, 0) \checkmark$$

15. $f(x) = (x - 1)^3 + 1 \xrightarrow{1} \uparrow 1$

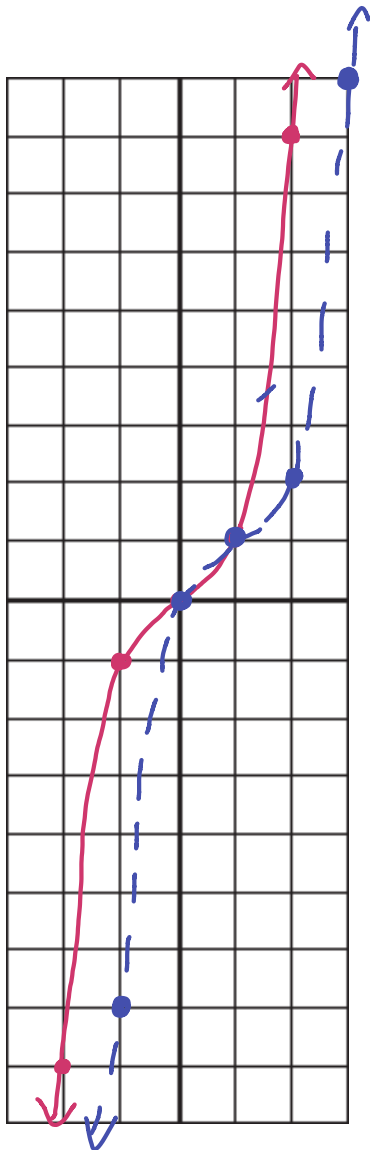
Transformation:

Translate Horizontally right 1
 Translate Vertically up 1

Checked with points:

$$f(0) = (0-1)^3 + 1 = 0 \quad (0,0) \checkmark$$

$$f(1) = (1-1)^3 + 1 = 1 \quad (1,1) \checkmark$$



16. $f(x) = |x| - 4$

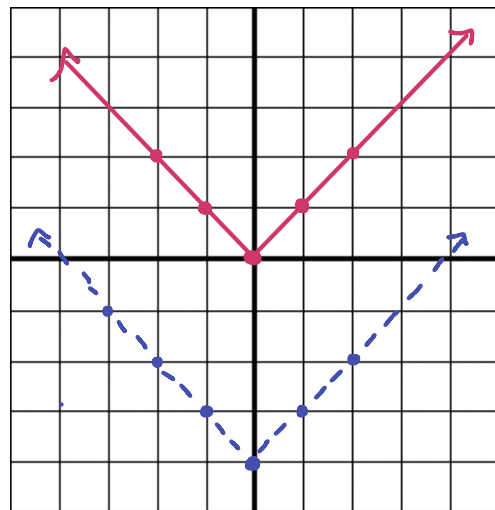
Transformation:

Translate Vertically down 4

Checked with points:

$$f(0) = |0| - 4 = -4 \quad (0,-4) \checkmark$$

$$f(1) = |1| - 4 = -3 \quad (1,-3) \checkmark$$



$$17. f(x) = -(x-3)^2 + 1 \quad \xrightarrow{3} 2x \quad \uparrow 1$$

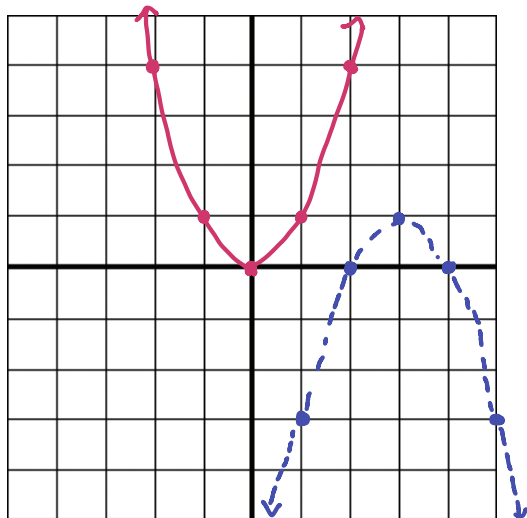
Transformation:

Translate horizontally right 3
reflect over x-axis
Translate vertically up 1

Checked with points:

$$\begin{aligned} f(2) &= -(2-3)^2 + 1 \\ &= -(-1)^2 + 1 \\ &= 0 \quad (2,0) \checkmark \end{aligned}$$

$$\begin{aligned} f(3) &= -(3-3)^2 + 1 \\ &= -(0)^2 + 1 = 1 \\ &\quad (3,1) \checkmark \end{aligned}$$



$$18. f(x) = -\sqrt{x+2} + 1 \quad \leftarrow 2 \quad 2x \quad \uparrow 1$$

Transformation:

Translate horizontally left 2
reflect over x-axis
Translate vertically up 1

Checked with points:

$$\begin{aligned} f(-2) &= -\sqrt{-2+2} + 1 \\ &= -\sqrt{0} + 1 = (0,1) \checkmark \end{aligned}$$

$$\begin{aligned} f(-1) &= -\sqrt{-1+2} + 1 \\ &= -\sqrt{1} + 1 = 0 \quad (-1,0) \checkmark \end{aligned}$$

