Common Core Math II Name Date

Square Root Function

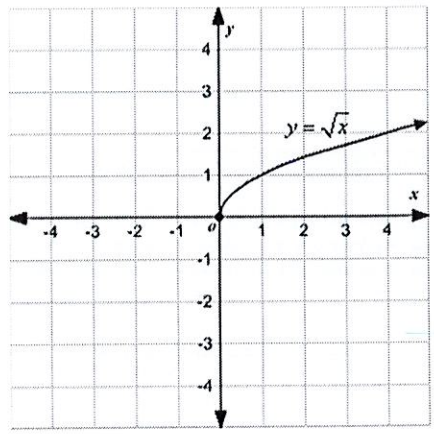
The parent square root function is:

$$y = \sqrt{x}$$

As with all other functions we have learned, square root functions can be transformed.

Key Features of Square Root Functions

Characteristic Points for $y = \sqrt{x}$



Domain:

Range:

Intercept:

Fill in the table below with a description of what happens to the parent function when the following transformations are performed.

Parent Function	$y = \sqrt{x}$

Description	**Transformation**
	$y = \sqrt{x + h}$
	$y = \sqrt{x - h}$
	$y = \sqrt{x} + k$
	$y = \sqrt{x} - k$
	$y = -\sqrt{x}$
	$y = a\sqrt{x}$

Let's look at the following example.

The graph on the right represents a transformation of the graph of

$$y = -3\sqrt{x}$$

The description is as follows:

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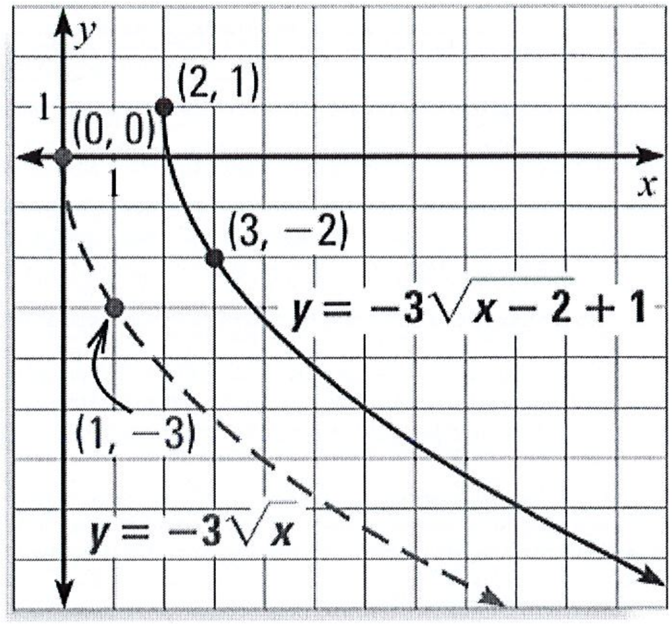

<u>Domain:</u>

<u>Range:</u>

The graph on the right represents a transformation of the graph of

$$y = -3\sqrt{x-2} + 1$$

The description is as follows:

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-
-
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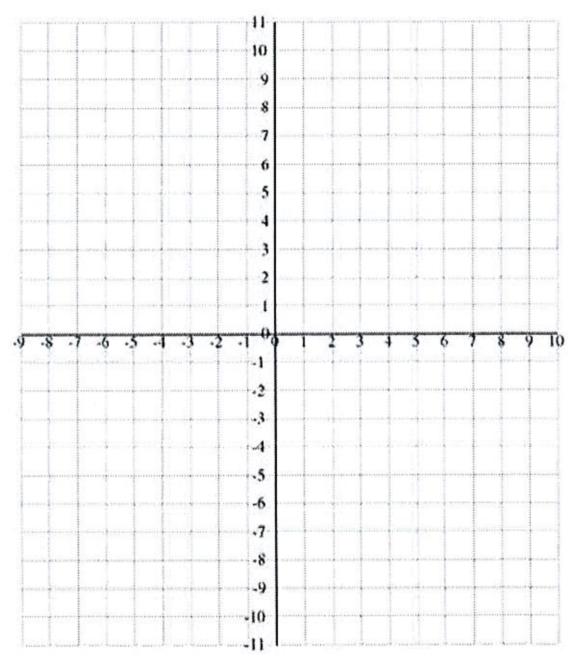
<u>Domain:</u>

<u>Range:</u>

TRY NOW

Graph the following function on the graph at right. Describe each transformation, give the domain and range, and identify any asymptotes.



$$y = 0.5\sqrt{x-3} + 2$$

Description:

Domain:

Range:

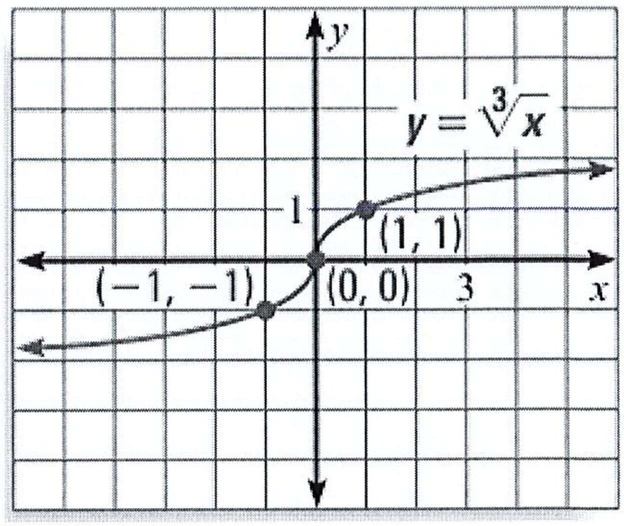
Cube Root Function

The parent cube root function is:

$$y = \sqrt[3]{x}$$

As with all other functions we have learned, cube root functions can be transformed.

Key Features of Cube Root Functions



Characteristic Points for $y = \sqrt[3]{x}$

Domain:

Range:

Intercept:

Fill in the table below with a description of what happens to the parent function when the following transformations are performed.

Parent Function	$y = \sqrt[3]{x}$

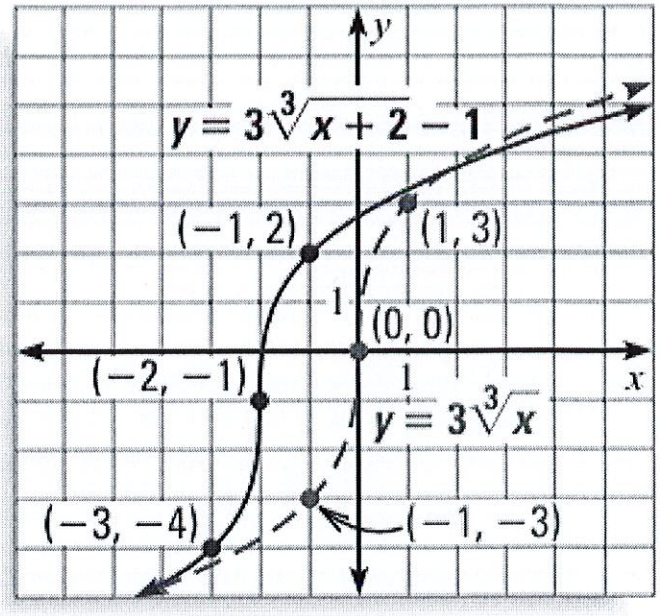
Description	**Transformation**
	$y = \sqrt[3]{x + h}$
	$y = \sqrt[3]{x - h}$
	$y = \sqrt[3]{x} + k$
	$y = \sqrt[3]{x} - k$
	$y = -\sqrt[3]{x}$
	$y = a\sqrt[3]{x}$

Let's look at the following example.

The graph on the right represents a transformation of the graph of

$$y = 3\sqrt[3]{x}$$

The description is as follows:



Domain:

Range:

The graph on the right represents a transformation of the graph of

$$y = 3\sqrt[3]{x+2} - 1$$

The description is as follows:

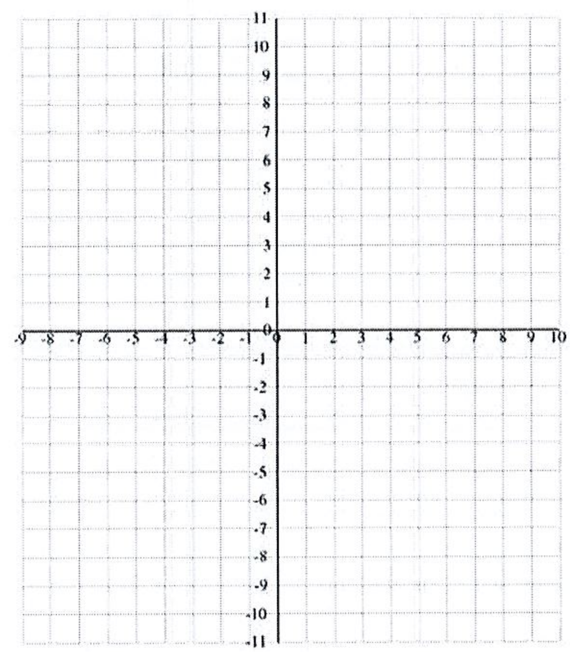
Domain:

Range:

Now it's your turn to find key features and translate logarithmic functions.

TRY NOW

Graph the following function on the graph at right. Describe each transformation, give the domain and range, and identify any asymptotes.



$$y = 0.5\sqrt[3]{x-1} + 3$$

Description:

Domain:

Range:

Core 2

Name________________________________

Graphing Square and Cube Root Functions

Identify the domain and range of each. Then sketch the graph.

1) $y = \sqrt{x} + 4$

2) $y = -\sqrt{x} - 3$

3) $y = 3 + \sqrt{x + 3}$

4) $y = -\sqrt{x - 1} - 3$

5) $y = \sqrt{x}$

6) $y = \sqrt{x - 2} + 1$

7) $y = \sqrt{x - 1}$

8) $y = \sqrt{x - 2} + 2$

9) $y = 3 + \sqrt{x - 2}$

10) $y = \sqrt{x} + 4$

11) $y = -5 + \sqrt[3]{x}$

12) $y = \sqrt[3]{x - 3}$

13) $y = \sqrt[3]{x}$

14) $y = \sqrt[3]{x + 4}$

15) $y = \sqrt[3]{x + 3}$

16) $y = \sqrt[3]{x - 2} - 3$

17) $y = \sqrt[3]{x + 3} - 1$

18) $y = \sqrt[3]{64x}$

19) $y = \sqrt[3]{x} + 5$

20) $y = 2\sqrt[3]{x - 4}$

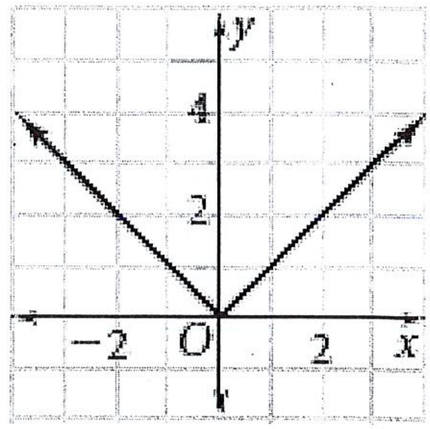
Absolute Value Function

The parent Absolute Value function is:

$$y = |x|$$

As with all other functions we have learned, Absolute value functions can be transformed.

Key Features of Absolute Value Functions



Characteristic Points for $y = |x|$

Domain:

Range:

Intercept:

Fill in the table below with a description of what happens to the parent function when the following transformations are performed.

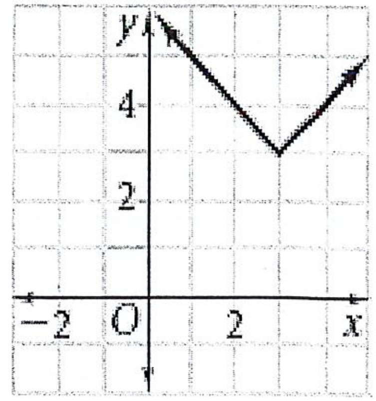
Parent Function	$y = \|x\|$

Description	**Transformation**
	$y = \|x + h\|$
	$y = \|x - h\|$
	$y = \|x\| + k$
	$y = \|x\| - k$
	$y = -\|x\|$
	$y = a\|x\|$

Let's look at the following example.

The graph on the right represents a transformation of the graph of

$$y = |x - 3| + 3$$



The description is as follows:

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-
-
-

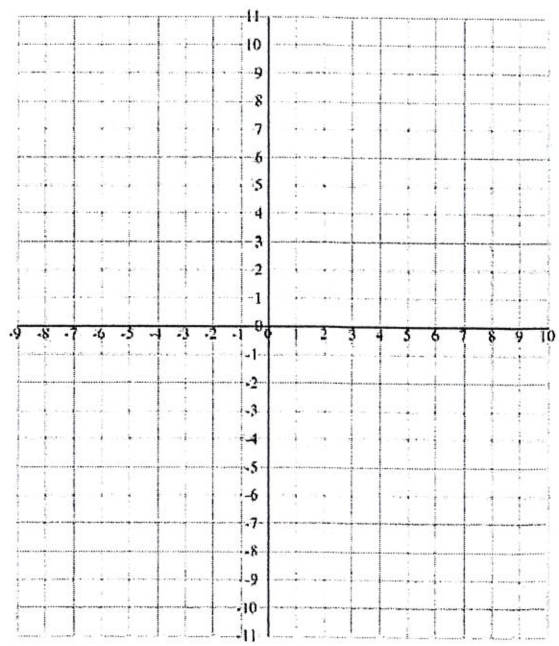
Domain:

Range:

TRY NOW

Graph the following function on the graph at right. Describe each transformation, give the domain and range, and identify any asymptotes.

$$y = 2|x + 2| - 5$$



Description:

Domain:

Range:

Name______________________________ Class_______________ Date_______________

Practice 2-6

Vertical and Horizontal Translations

Describe each translation of $f(x) = |x|$ as vertical, horizontal, or diagonal. Then graph each translation.

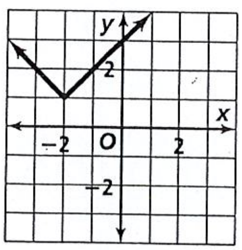
1. $f(x) = |x + 2|$
2. $f(x) = |x + 4|$
3. $f(x) = |x| - 5$
4. $f(x) = |x + 1| - 1$
5. $f(x) = |x - 2| + 1$
6. $f(x) = \left|x - \frac{3}{2}\right|$
7. $f(x) = |x| - \frac{1}{3}$
8. $f(x) = \left|x - \frac{5}{2}\right|$
9. $f(x) = \left|x + \frac{1}{2}\right| + \frac{3}{2}$

Write an equation for each translation.

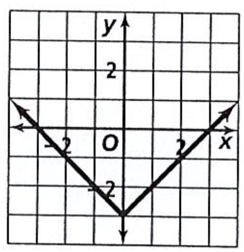
10. $y = |x|$, 1 unit up, 2 units left
11. $y = |x|$, 4 units right
12. $y = -|x|$, 3 units up, 1 unit right
13. $y = -|x|$, $\frac{3}{2}$ units down, $\frac{1}{2}$ unit right
14. $y = |x|$, 2 units down, 3 units left
15. $y = -|x|$, $\frac{3}{5}$ unit up

Write the equation of each translation of $y = x$ or $y = |x|$.

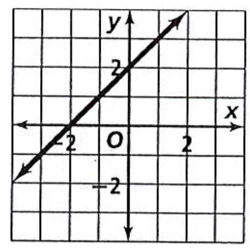
16.



17.

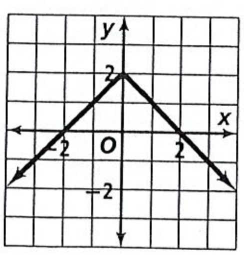


18.

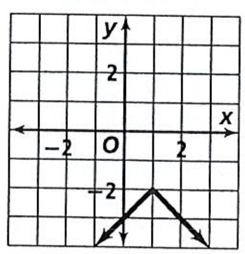


Each graph shows a translation of $y = -|x|$. State the values of h and k.

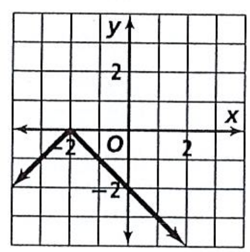
19.



20.



21.



Graph each equation.

22. $y = |x - 1| + 2$
23. $y = -\left|x + \frac{1}{2}\right|$
24. $y = -|x + 3| - 1$
25. $y = |-x - 1|$
26. $y = -|x - 2| + 4$
27. $y = |x + 2| - 1$