

Name:

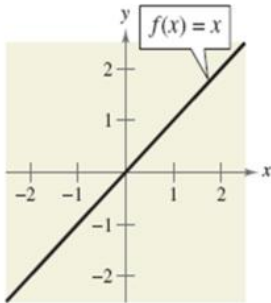
Period:

Date:

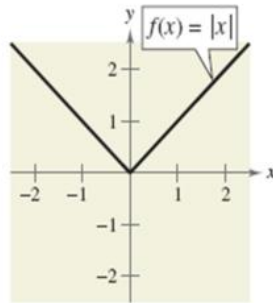
Math Lab: Investigating Radical Functions

Parent Graphs

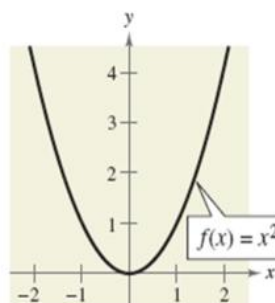
A parent graph is the most basic graph of a function. So far this year we have studied the graphs of linear, quadratic, absolute value, and cubic functions. Today we will expand the family of parent graphs to square root and cube root functions.



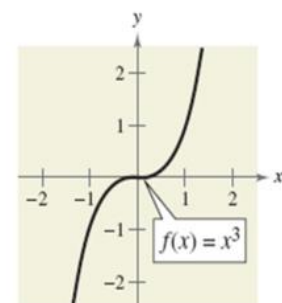
Type:
Domain:
Range:



Type:
Domain:
Range:



Type:
Domain:
Range:



Type:
Domain:
Range:

1] Complete the table of ordered pairs and sketch the parent graphs of the square root and cube root functions. Then state their domain and range.

Square Root	
x	$y = \sqrt{x}$
-9	
-4	
-1	
0	
1	
4	
9	

Domain: _____ Range: _____

Cube Root	
x	$y = \sqrt[3]{x}$
-8	
-1	
0	
1	
8	

Domain: _____ Range: _____

2] What two points do all six of the parent graphs have in common?

3] All parent graphs have the same domain, except for which function?

4] Which parent graphs have the same range?

5] Which parent graphs have symmetry about the y-axis? (If you fold the graph along the y-axis, you get a mirror image on both sides.)

6] Which parent graphs have symmetry about the origin? (If you rotate the graph 180 degrees, you get the same graph you started with.)

7] Which parent graph has no symmetry?

Graphing Using Transformations

When we studied quadratic and absolute value graphs earlier in the year, we learned that they can be graphed quickly using transformations from the equation on the parent graph. Square root and cube root graphs can be sketched the same way. Use what you learned from graphing absolute value and quadratic functions to complete the table of information and examples below.

Linear
 $y = a(x - h) + k$

Quadratic
 $y = a(x - h)^2 + k$

Cubic
 $y = a(x - h)^3 + k$

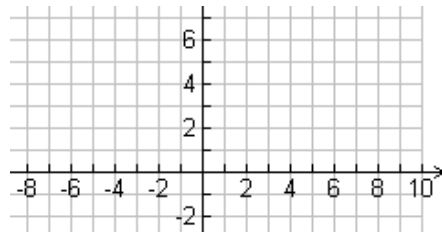
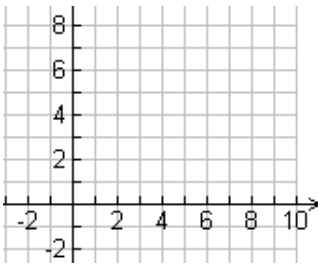
Absolute Value
 $y = a|x - h| + k$

Square Root
 $y = a\sqrt{x - h} + k$

Cube Root
 $y = a\sqrt[3]{x - h} + k$

The function tells you the _____	$+k$ translates (shifts) the graph _____ k units
$a < 0$ reflects the graph over the _____	$-k$ translates (shifts) the graph _____ k units
$x < 0$ reflects the graph over the _____	$x + h$ translates (shifts) the graph _____ k units
a is the slope from _____ to the next point	$x - h$ translates (shifts) the graph _____ k units

Find all characteristics of the graph, and then make a sketch.

<p>8] $y = \sqrt{x + 6} + 2$</p> <p>Transformations: _____ Two points: _____</p> <p>y-intercept: _____ x-intercept: _____</p> <p>Domain: _____ Range: _____</p> 	<p>9] $y = -\sqrt{x} + 6$</p> <p>Transformations: _____ Two points: _____</p> <p>y-intercept: _____ x-intercept: _____</p> <p>Domain: _____ Range: _____</p> 
--	--

10] $y = 3\sqrt{x} - 6$

Transformations:

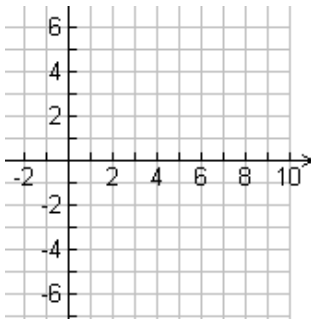
Two points:

y-intercept:

x-intercept:

Domain:

Range:



11] $y = \sqrt{-x} - 4$

Transformations:

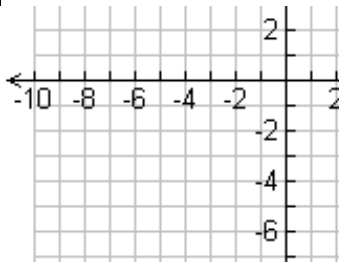
Two points:

y-intercept:

x-intercept:

Domain:

Range:



12] $y = \sqrt[3]{x-6} + 4$

Transformations:

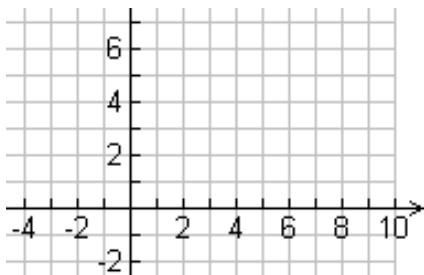
Two points:

y-intercept:

x-intercept:

Domain:

Range:



13] $y = -\sqrt[3]{x} - 6$

Transformations:

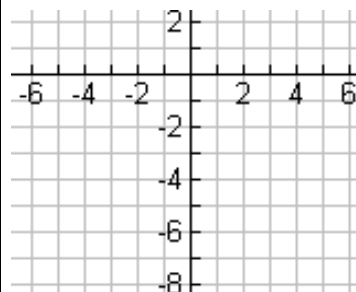
Two points:

y-intercept:

x-intercept:

Domain:

Range:



14] $y = 2\sqrt[3]{x + 4}$

Transformations:

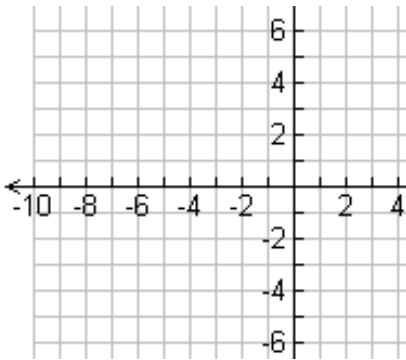
Two points:

y-intercept:

x-intercept:

Domain:

Range:



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

Transformations:

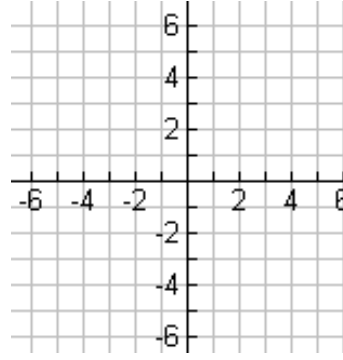
Two points:

y-intercept:

x-intercept:

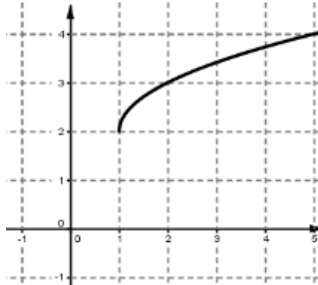
Domain:

Range:



Writing Equations Using the Graph

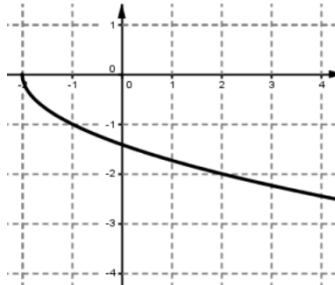
16]



Transformations:

Equation:

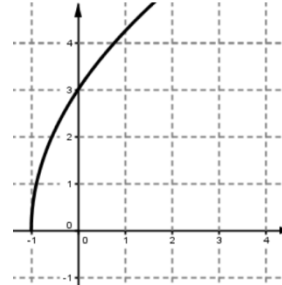
17]



Transformations:

Equation:

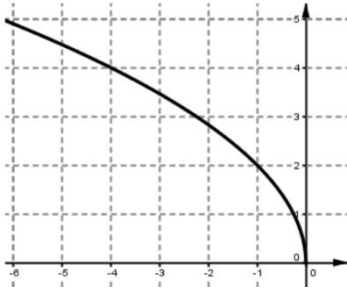
18]



Transformations:

Equation:

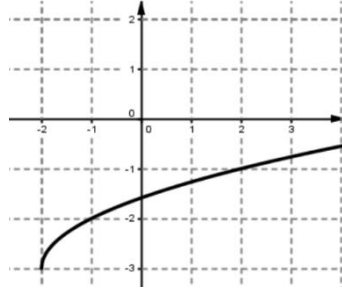
19]



Transformations:

Equation:

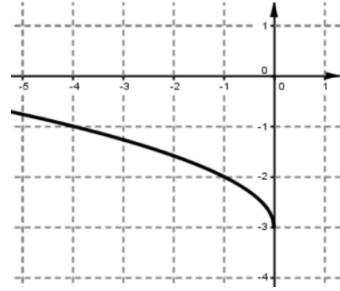
20]



Transformations:

Equation:

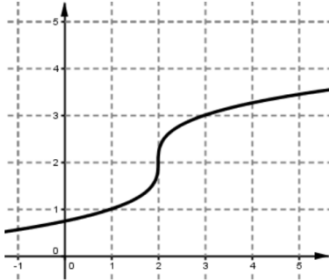
21]



Transformations:

Equation:

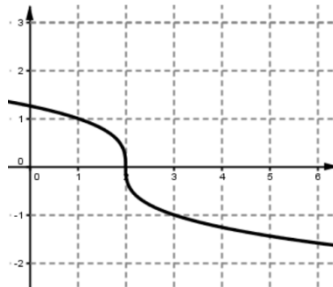
22]



Transformations:

Equation:

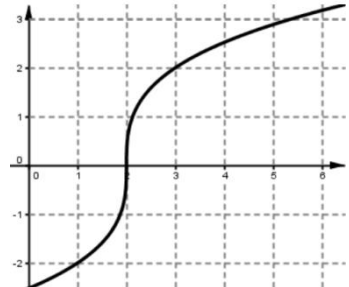
23]



Transformations:

Equation:

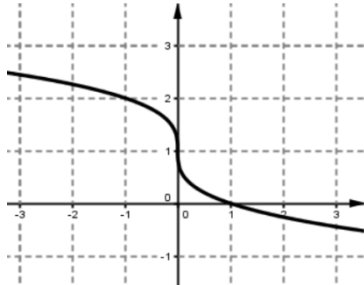
24]



Transformations:

Equation:

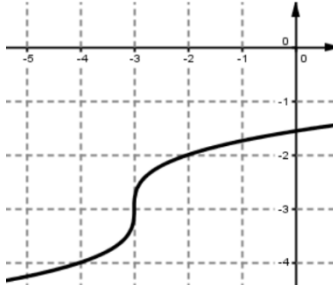
25]



Transformations:

Equation:

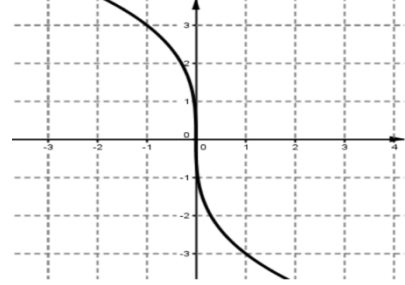
26]



Transformations:

Equation:

27]



Transformations:

Equation:

Writing Equations Using Transformations

29] Write the equation of the square root function that has been translated right 10 units and up 6 units.	34] Write the equation of the cube root function that has been translated left 3 units and down 5 units.
30] Write the equation of the cube root function that has been translated left 4 units and reflected in the x-axis.	35] Write the equation of the square root function that has been translated up 8 units and reflected in the x-axis.
31] Write the equation of the square root function that has been translated left 2 units and reflected in the y-axis.	36] Write the equation of the square root function that has been translated down 9 units and reflected in the y-axis.
32] Write the equation of the square root function that passes through the points (0, 0) and (1, 7).	37] Write the equation of the square root function that passes through the points (0, 0) and (1, -3).
33] Write the equation of the square root function that has a domain of $x \leq -1$ and a range of $y \geq 2$.	38] Write the equation of the square root function that has a domain of $x \geq 3$ and a range of $y \leq 4$.