

Essential Questions: What do the graphs of a square root, cubic, cube root and absolute value functions look like? How do we graph these functions?

GRAPHING SQUARE ROOT FUNCTIONS

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

(a) Create a table of values for input values of x for which you can find rational square roots.

x	0	1	4	9
$f(x) = \sqrt{x}$	0	1	2	3

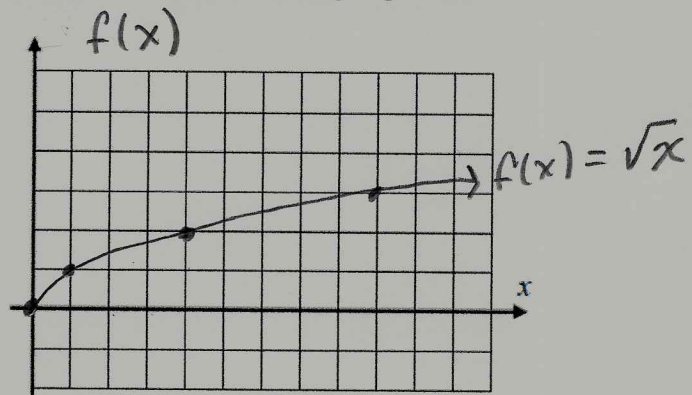
(c) What is the domain of this function?

$[0, \infty)$

(d) What is the range of this function?

$[0, \infty)$

(b) Graph the function on the grid provided.



(e) Circle the correct choice below that characterizes $f(x) = \sqrt{x}$. Justify your answer.

$f(x)$ is always decreasing

$f(x)$ is always increasing

Remember!

A square root function can be graphed using a table of values.

Choose input values that will create a perfect squares under the square root sign $\sqrt{\quad}$.

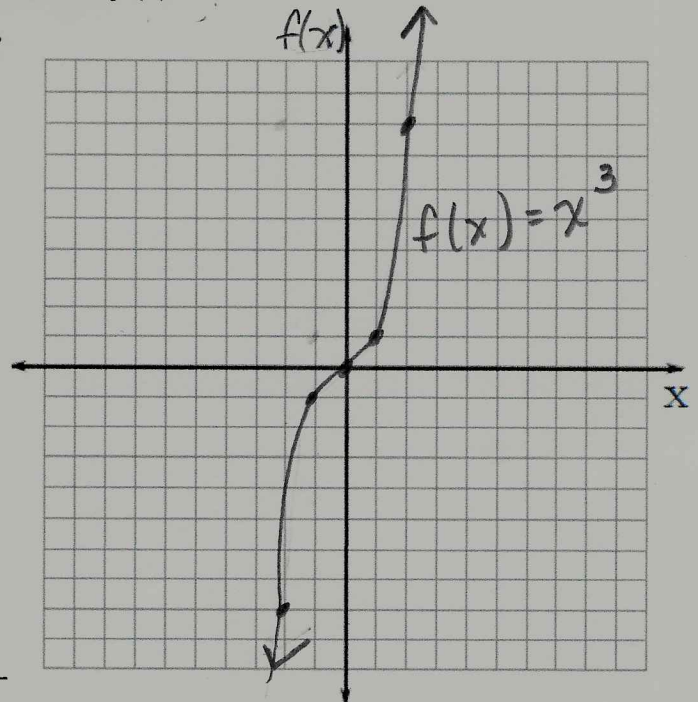
GRAPHS OF CUBIC FUNCTIONS

Complete the table of values for the cubic function, $f(x) = x^3$.
Use the table to create the graph.

x	$f(x) = x^3$
-2	-8
-1	-1
0	0
1	1
2	8

Domain:
 $(-\infty, \infty)$

Range:
 $(-\infty, \infty)$

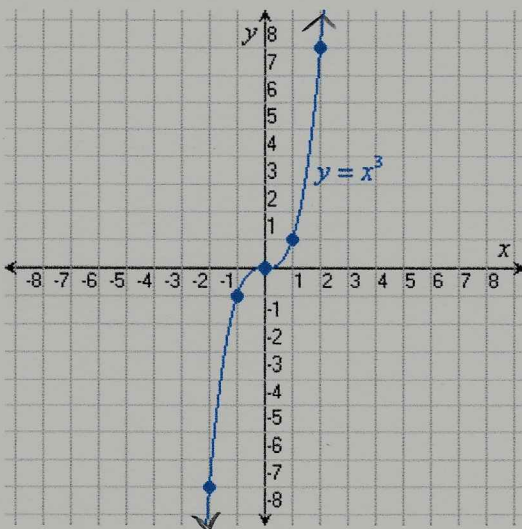


A cubic function has an equation whose highest degree is 3.

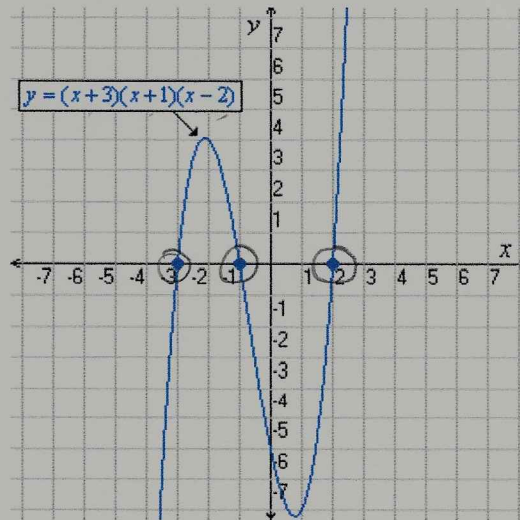
The "basic" (parent) cubic function is $f(x) = x^3$.

Other cubic functions come in the form of $f(x) = ax^3 + bx^2 + cx + d$.

Parent Function: $y = x^3$



Cubic Function: $y = x^3 + 2x^2 - 5x - 6$



How many roots does the function have? 3 roots
 $x = \{-3, -1, 2\}$

What do you notice about the roots and the factored form of the function?

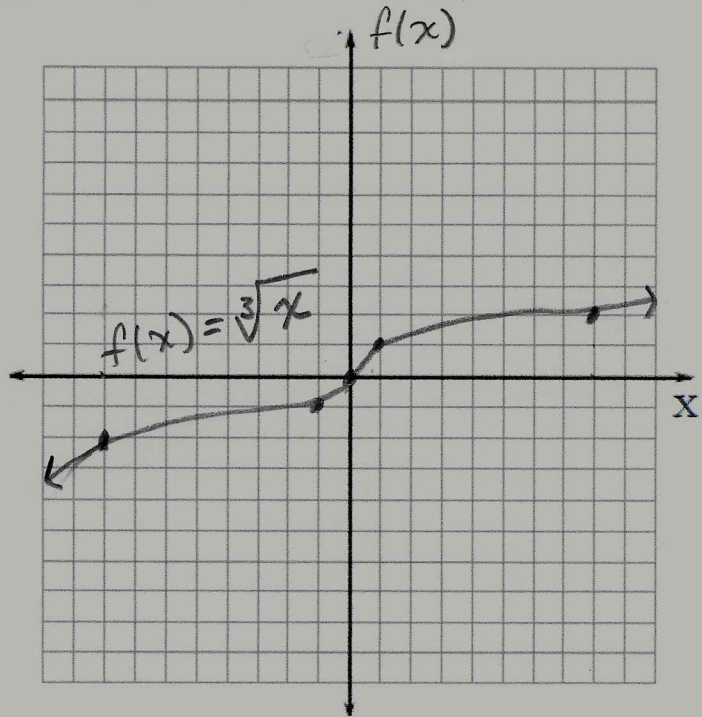
GRAPHS OF CUBE ROOT FUNCTIONS

A cube root function has an equation that involves a $\sqrt[3]{x}$.

Complete the table of values for the parent cube root function, $f(x) = \sqrt[3]{x}$.

Use the table to create the graph.

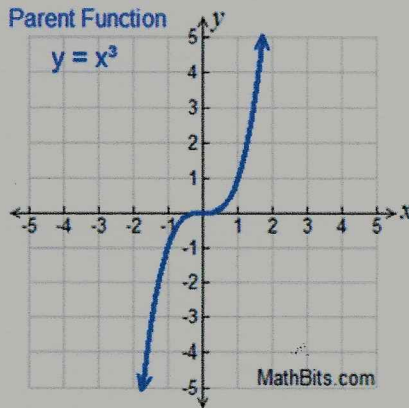
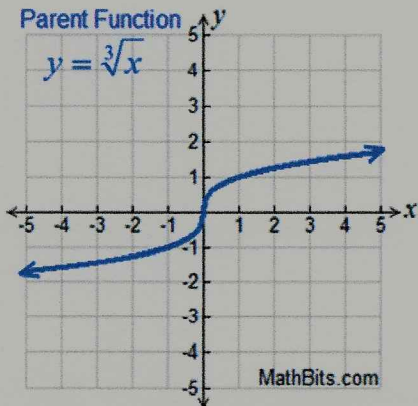
x	$f(x) = \sqrt[3]{x}$
-8	-2
-1	-1
0	0
1	1
8	2



Domain: $(-\infty, \infty)$

Range: $(-\infty, \infty)$

What's the relationship between the cubic and cube root parent functions?



Let's compare the set of points of the two functions. What do you notice?

x	$y = x^3$
-2	-8
-1	-1
0	0
1	1
2	8

x	$y = \sqrt[3]{x}$
-8	-2
-1	-1
0	0
1	1
8	2

The parent cubic and cube root functions are inverse functions.

The **inverse** of a function has all the same points as the original function, except the x 's and y 's have been reversed.

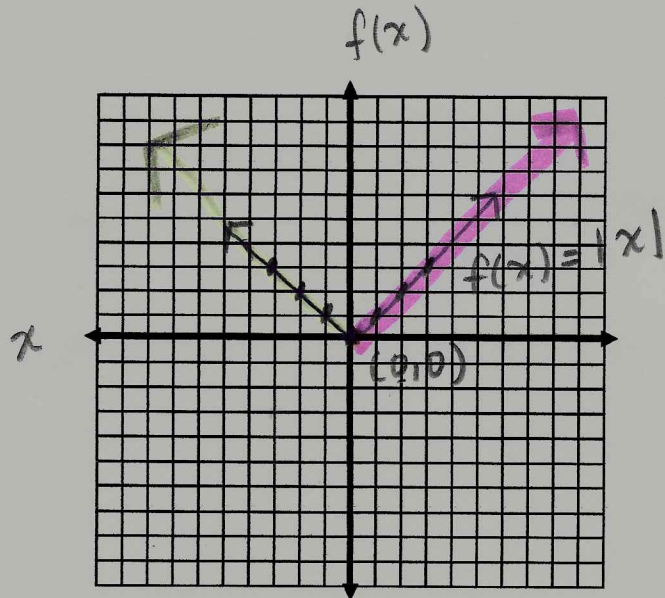
Absolute Value Functions.

Complete the table of values for the parent function, $f(x) = |x|$

$|x|$ is found under the MATH Key: MATH \rightarrow NUM \rightarrow 1:abs.

Use the table of values to complete the graph.

x	$f(x) = x $
-3	3
-2	2
-1	1
0	0
1	1
2	2
3	3



What is the minimum value of the function? 0



State the domain: $(-\infty, \infty)$

State the range: $y \geq 0$ $[0, \infty)$

State the *interval* over which the function is **increasing**. $(0, \infty)$

State the *interval* over which the function is decreasing. $(-\infty, 0)$

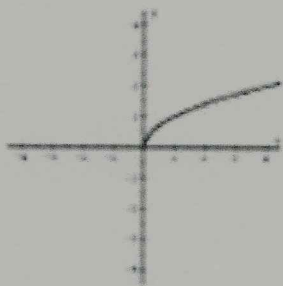
When finding the **range** of an absolute value function, look at the vertex (h,k) .

If a value is positive	Graph turns up 	Range: $y \geq k$
If a value is negative	Graph turns down 	Range: $y \leq k$

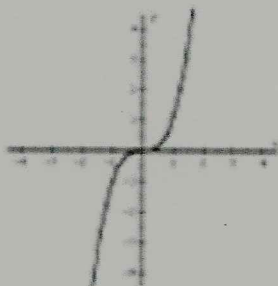
The **rate of change** is constant on each **straight line** section (ray) of the graph.



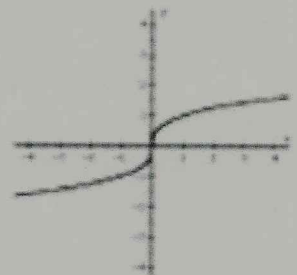
The graphs of basic functions are recognizable. Identify each graph as linear, quadratic, square root, cubic, cube root or absolute value.



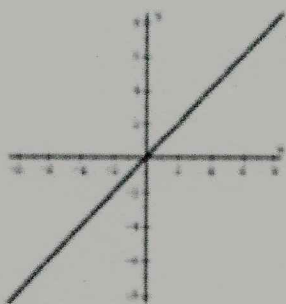
square root



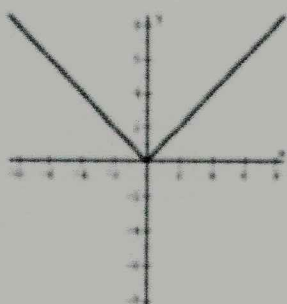
cubic



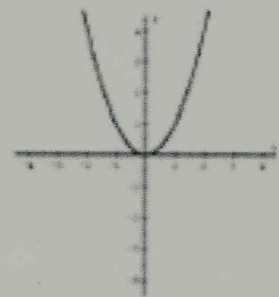
cube root



linear



absolute value



quadratic