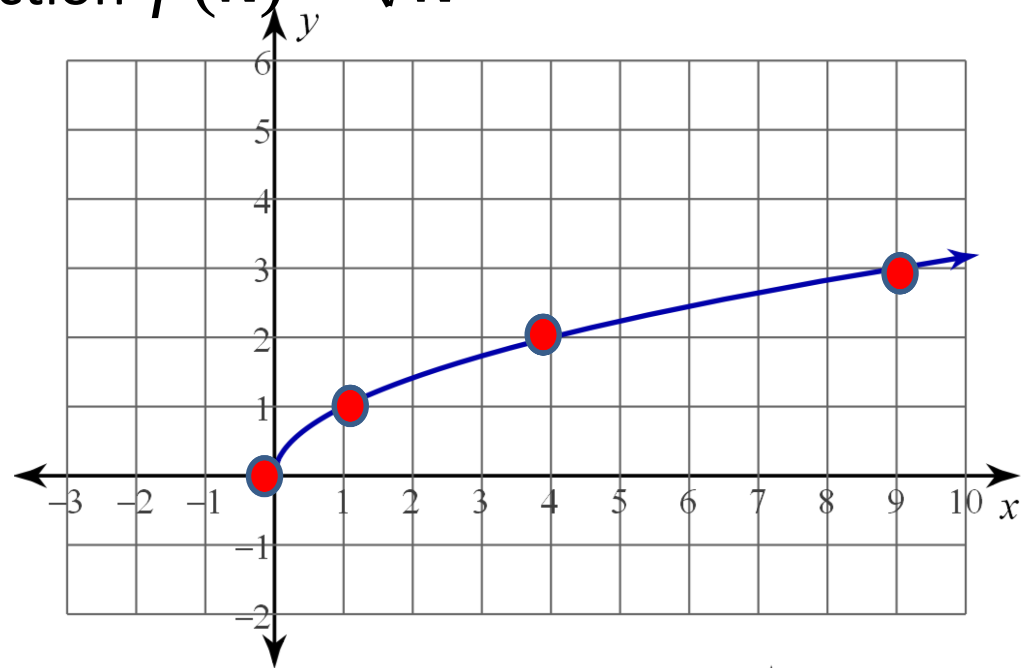
Math-2A
Lesson 6-1

Cube, and Cubed Root Functions.

Square Root Function $f(x)=\sqrt{x}$

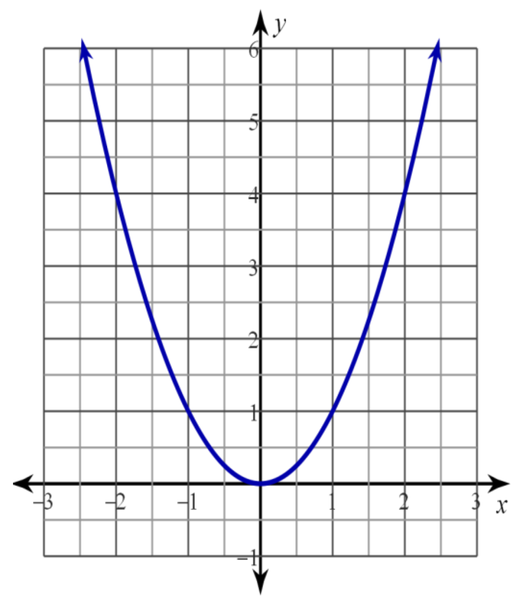
x	y
9	3
4	2
1	1
0	0



Square Function (quadratic function)

$$g(x)=x^2$$

x	y
-2	3
-1	2
0	1
1	0
2	4



What is a power?

Power: An expression formed by repeated Multiplication of the same factor.

$$3x^4$$

Exponent

Coefficient

Base

The base is used as a factor the exponent number of times.

$$3*x*x*x*x$$

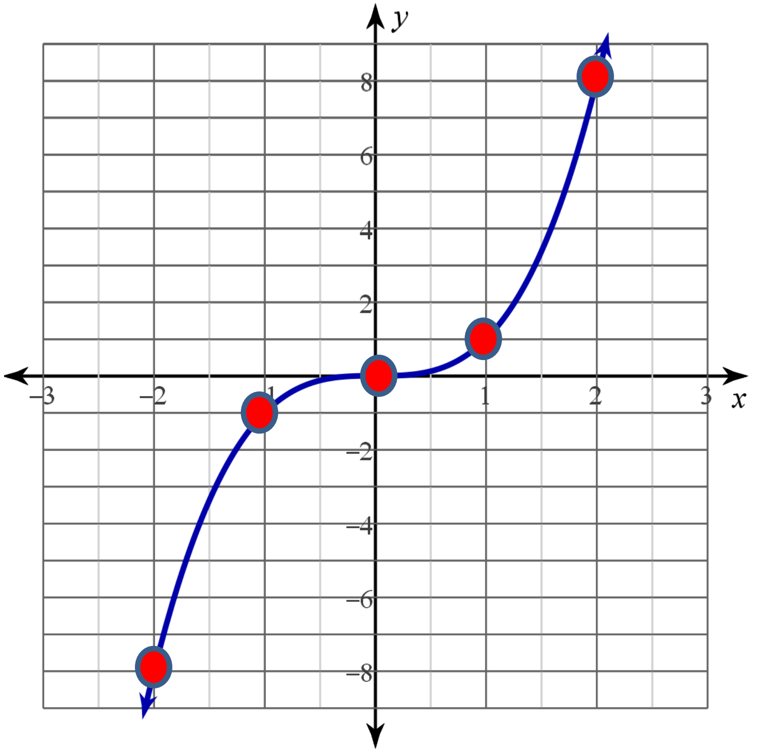
The Cube Function

$$f(x) = x^3$$

Build a table of values for each equation for domain elements: -2, -1, 0, 1, 2.

x	y
-2	-8
-1	-1
0	0
1	1
2	8

$$y = (-2)^3$$
$$y = (-1)^3$$
$$y = (0)^3$$
$$y = (1)^3$$
$$y = (2)^3$$



Cubing Function

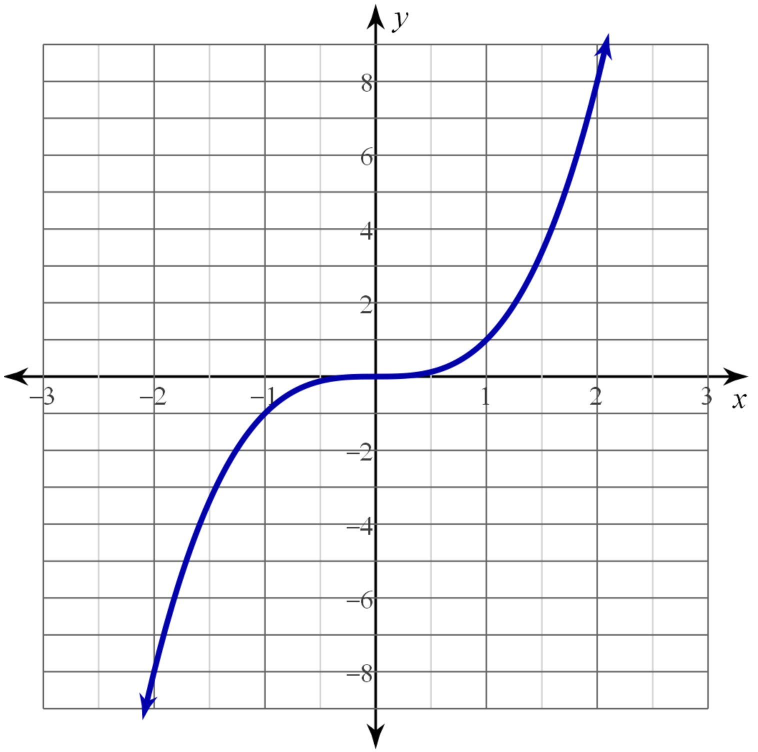
$$f(x) = x^3$$

What is the domain of the function?

All real numbers.

What is the range of the function?

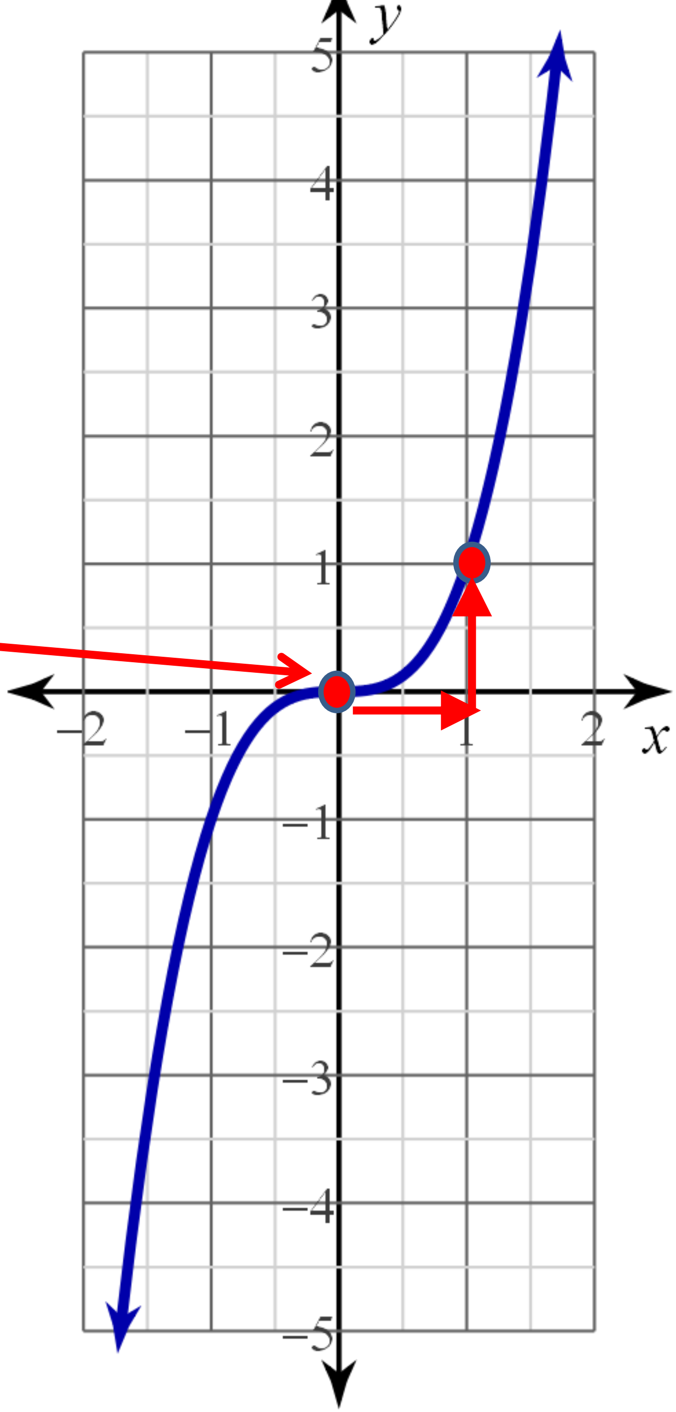
All real numbers.



$$f(x) = x^3$$

Inflection Point: the point where the shape of the graph changes from “concave down” (curving downward) to “concave up” (curving upward) or vice versa.

Inflection point: (0, 0)



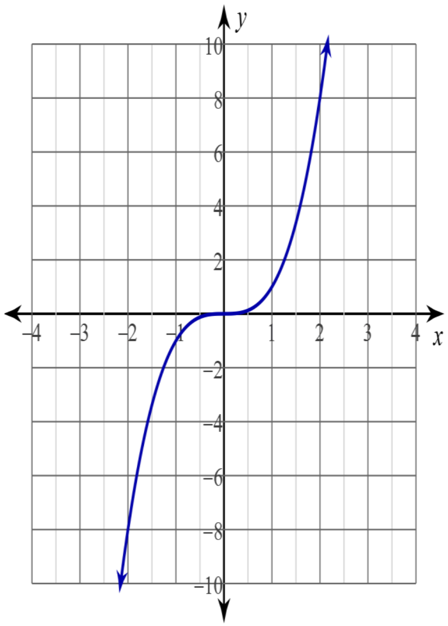
Not vertically stretched:
“right 1, up 1”
From the “inflection point”

Left/right and up/down transformations move the inflection point (and the whole graph)

Reflection across the x-axis and vertical stretching affects the shape of the graph.

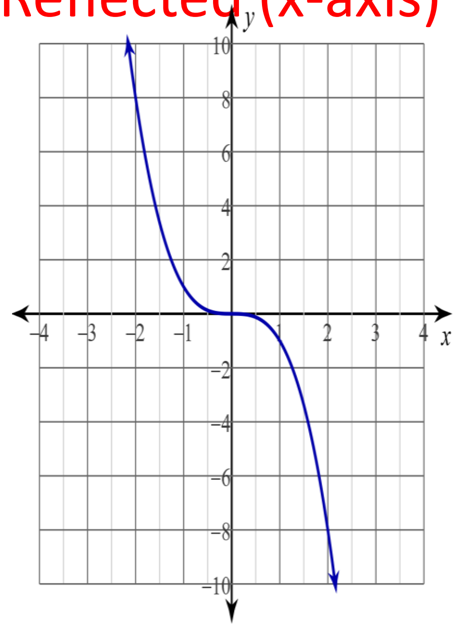
Describe the transformations of the parent function given by:

$$f(x) = x^3$$



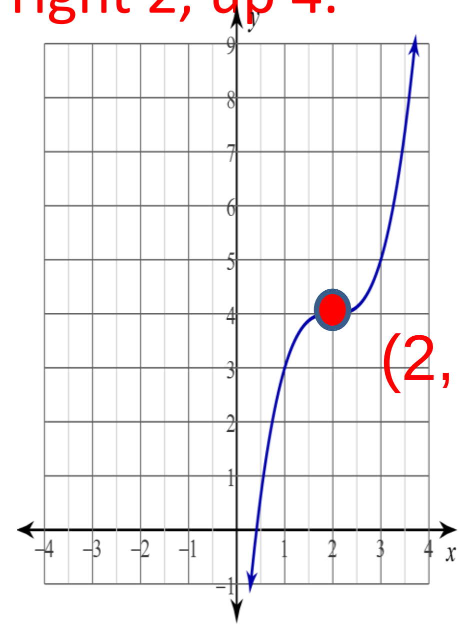
$$g(x) = -x^3$$

Reflected (x-axis)



$$k(x) = (x-2)^3 + 4$$

right 2, up 4.

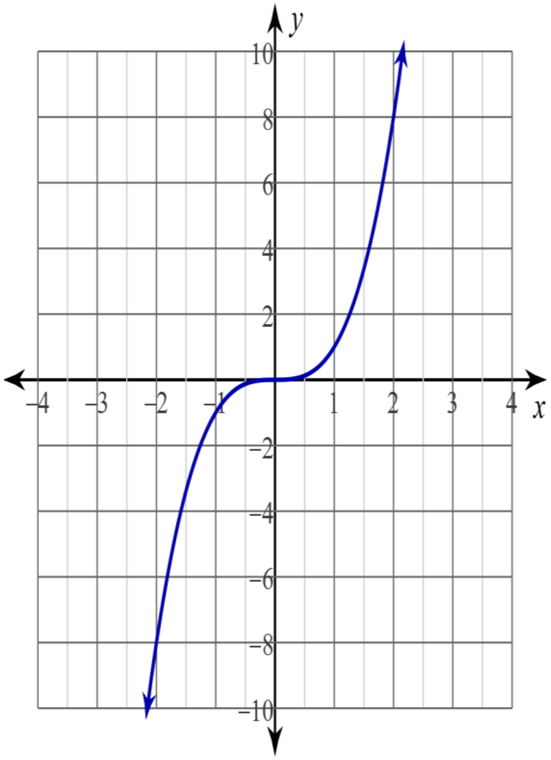


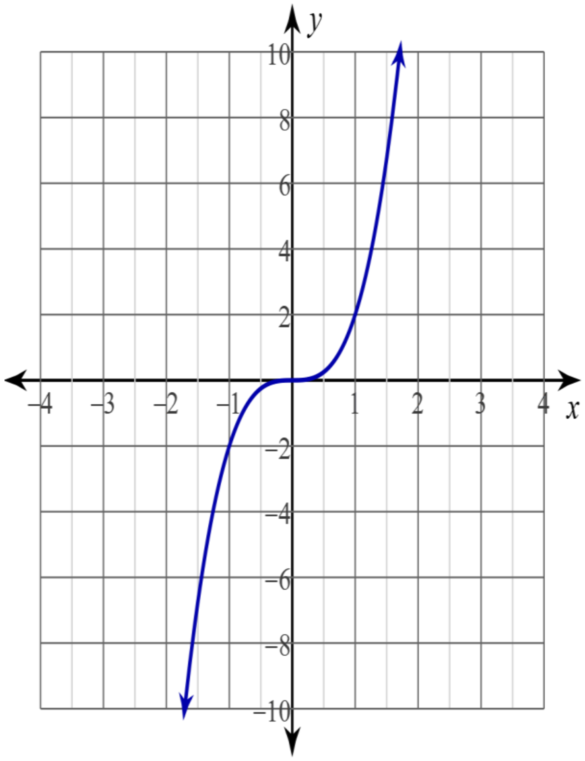
(2, 4)

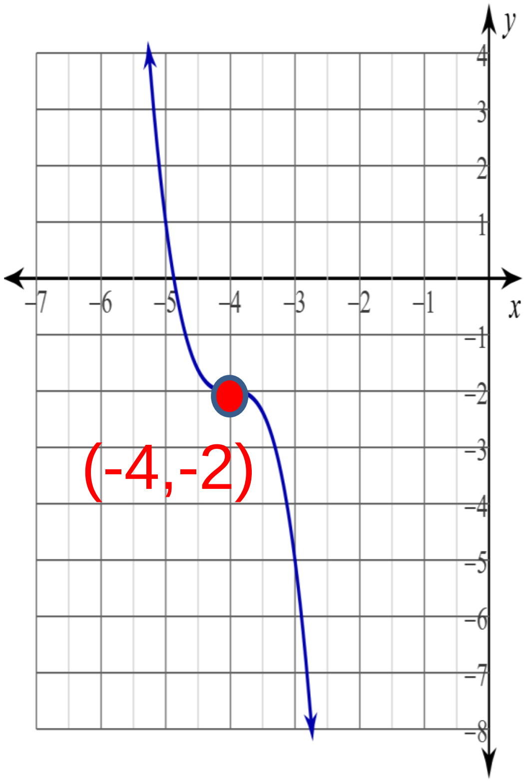
Describe the transformations of the parent function given by:

$f(x) = x^3$ $g(x) = 2x^3$ $k(x) = -3(x+4)^3 - 2$

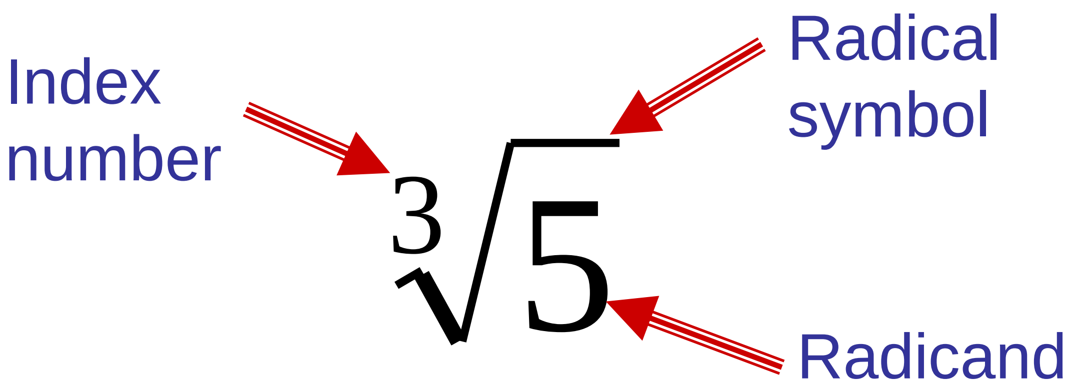
VSF =2 . left 4, down 2, Reflect x-axis, VSF=3.







Cubed Root (or 3rd root)



Cubed Root function: $f(x) = \sqrt[3]{x}$

Build a table of values for the “nice” domain elements: -8, -1, 0, 1, 8.

x	y
-8	-2
-1	-1
0	0
1	1
8	2

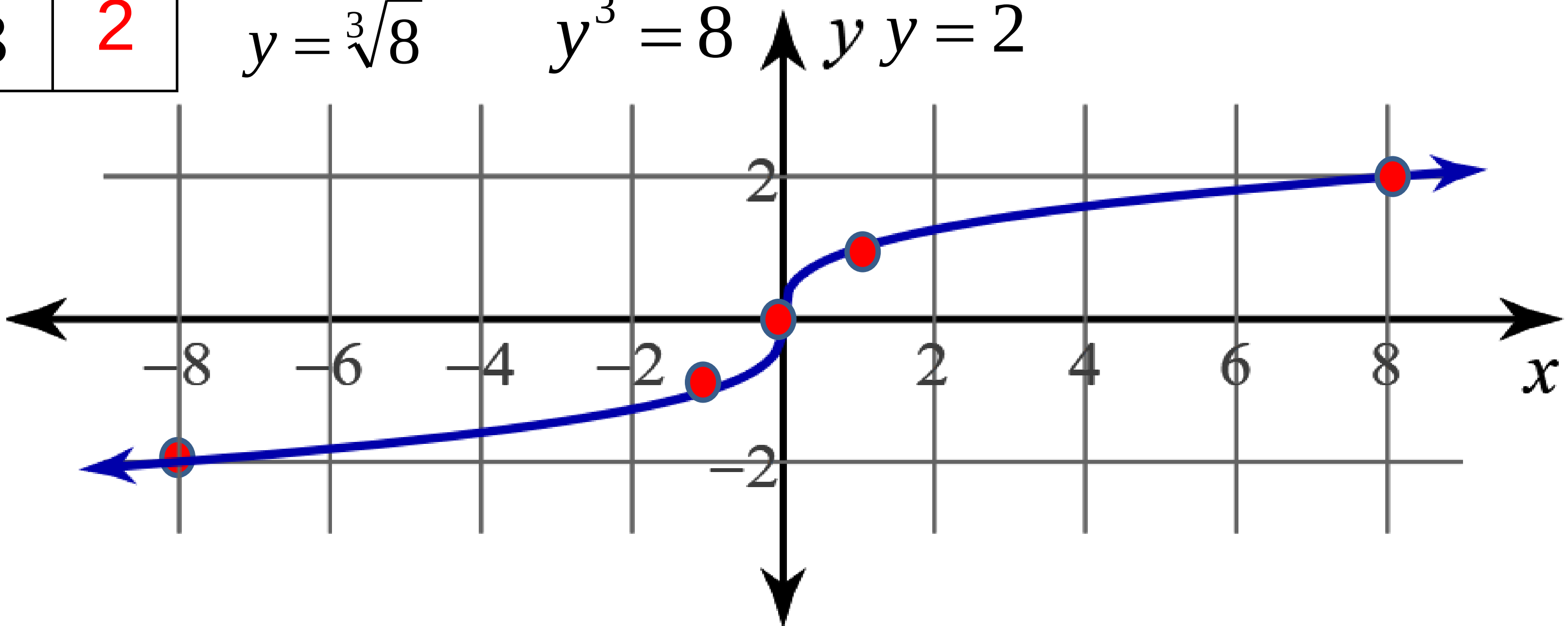
$y = \sqrt[3]{-8}$ $\quad y^3 = -8$ $\quad y = -2$

$y = \sqrt[3]{-1}$ $\quad y^3 = -1$ $\quad y = -1$

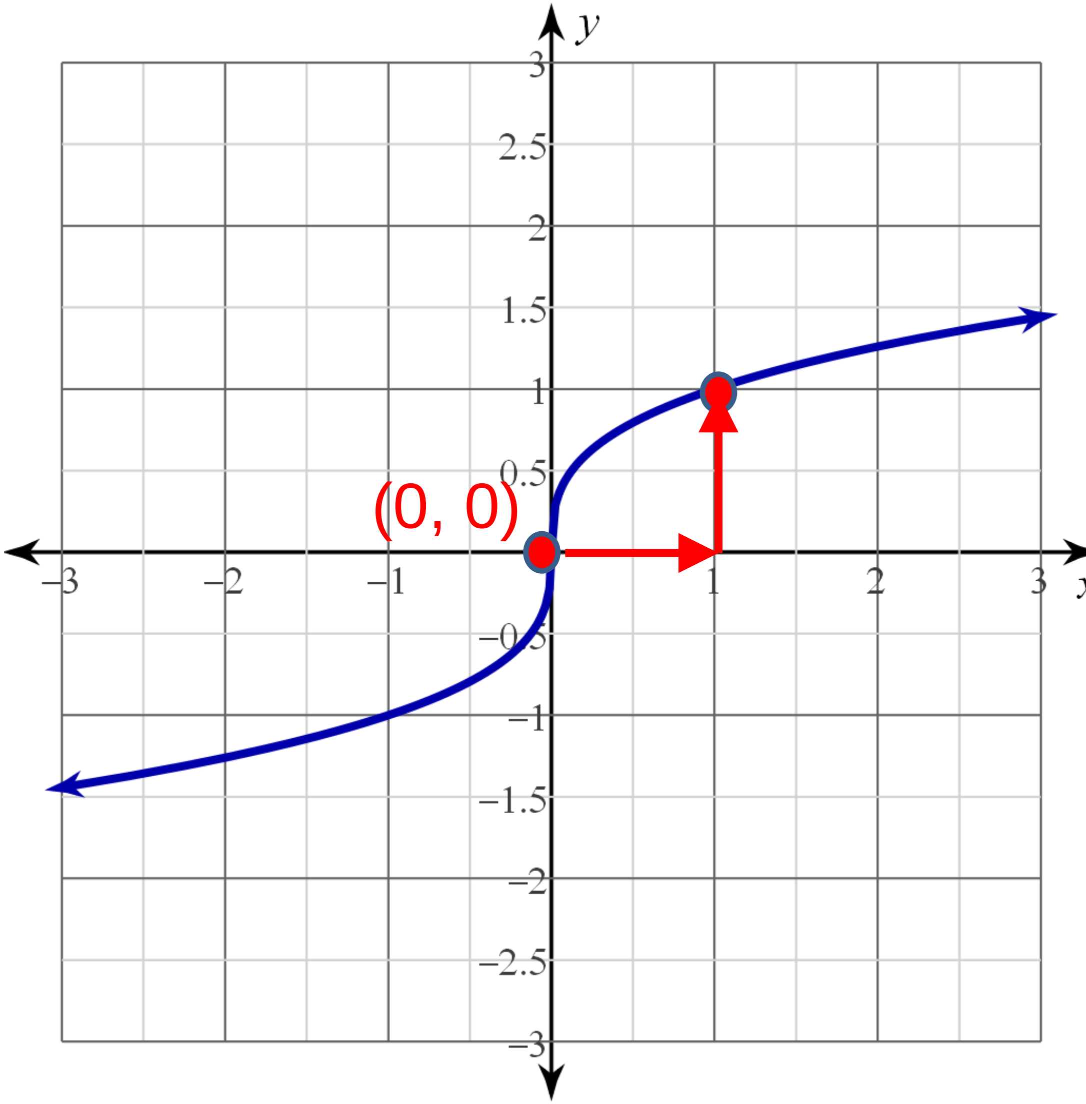
$y = \sqrt[3]{0}$ $\quad y^3 = 0$ $\quad y = 0$

$y = \sqrt[3]{1}$ $\quad y^3 = 1$ $\quad y = 1$

$y = \sqrt[3]{8}$ $\quad y^3 = 8$ $\quad y = 2$

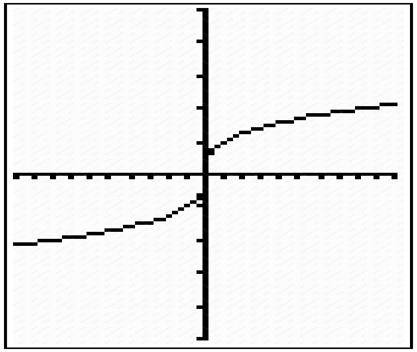


Where is the inflection point? $f(x) = \sqrt[3]{x}$



Not vertically stretched:
"right 1, up 1"
From the inflection point

Cubed Root Function $f(x) = \sqrt[3]{x}$



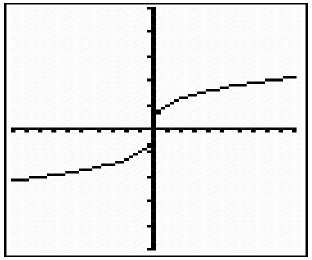
So you can "take" the 3rd root of a negative number.

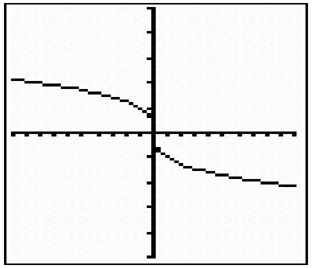
What is the domain of the function? All real numbers.

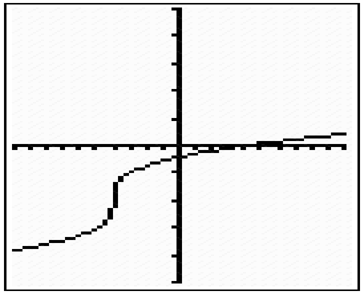
What is the range of the function? All real numbers.

What is the transformation of the parent function?

$$f(x) = \sqrt[3]{x} \qquad f(x) = -\sqrt[3]{x} \qquad f(x) = -2 + \sqrt[3]{x+4}$$





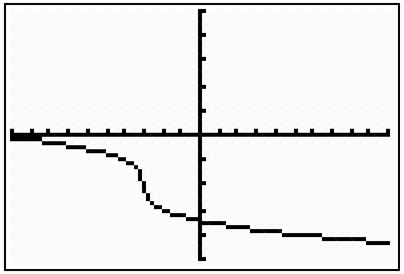


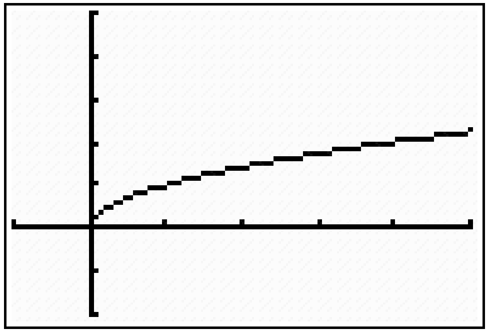
Reflected across x-axis.

Left 4, down 2

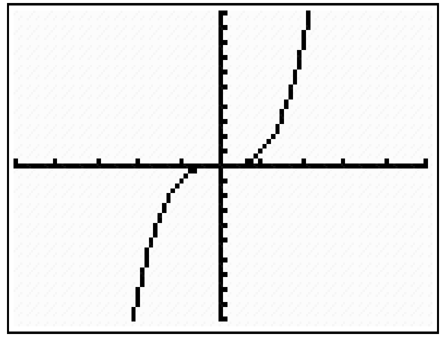
Graph the following equation (without a calculator).

$$f(x) = -2 - \sqrt[3]{x+3}$$

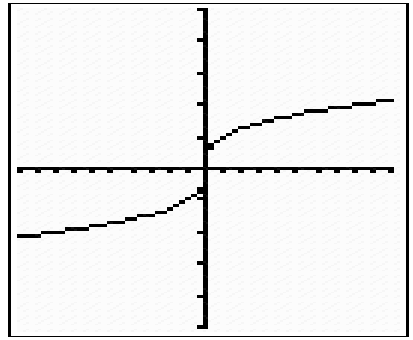




$$f(x)=\sqrt{x}$$



$$f(x)=x^3$$



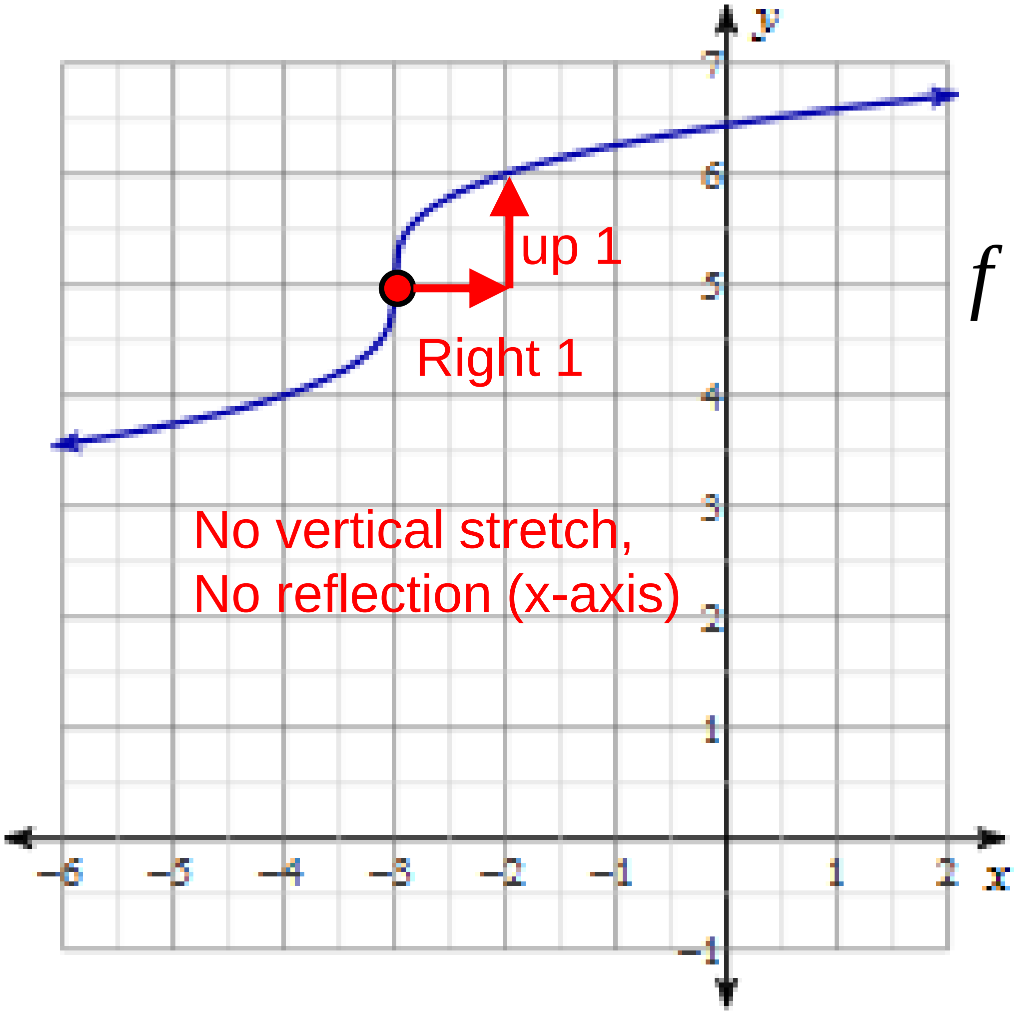
$$f(x)=\sqrt[3]{x}$$

$$y=(-1)a\sqrt{x-h}+k$$

$$y=(-1)a(x-h)^3+k$$

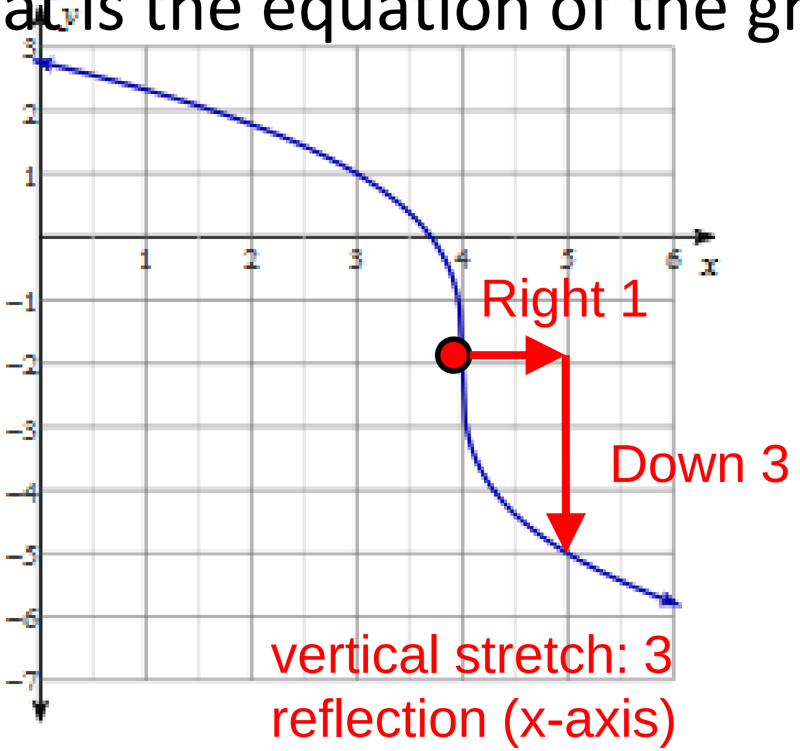
$$y=(-1)a\sqrt[3]{x-h}+k$$

What is the equation of the graph?



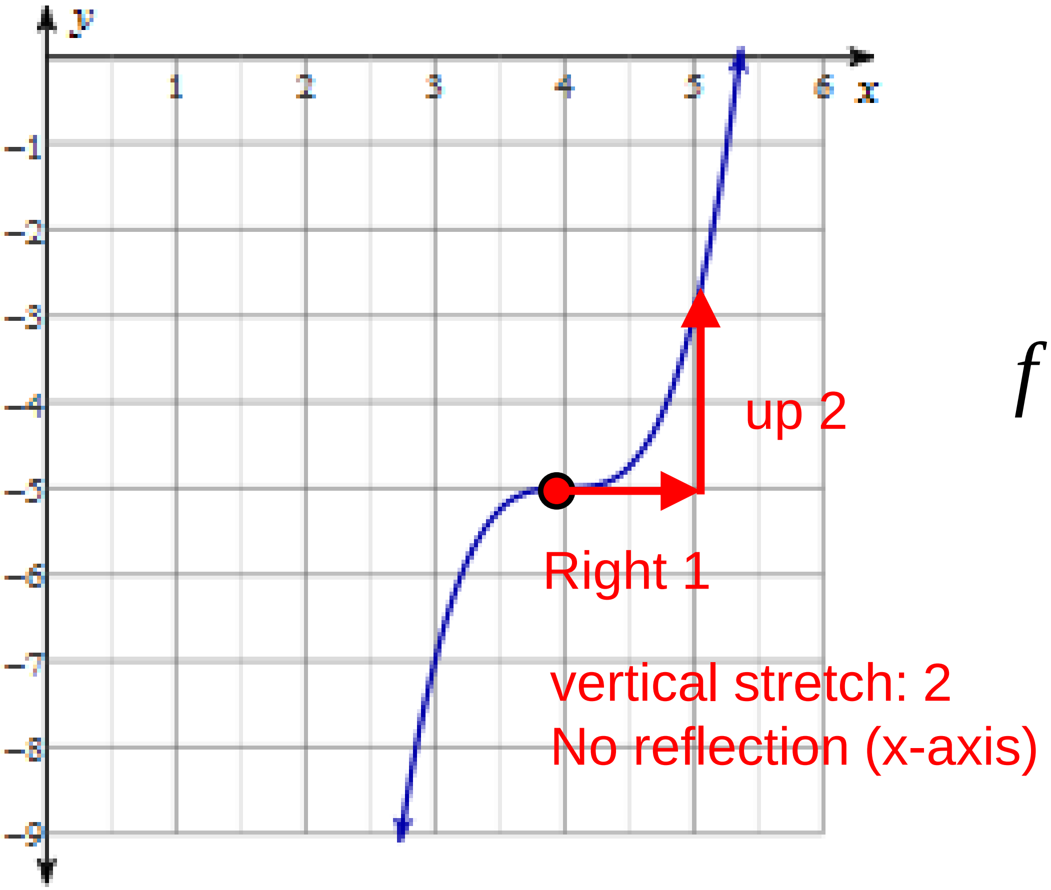
$$f(x) = 5 + \sqrt[3]{x+3}$$

What is the equation of the graph?



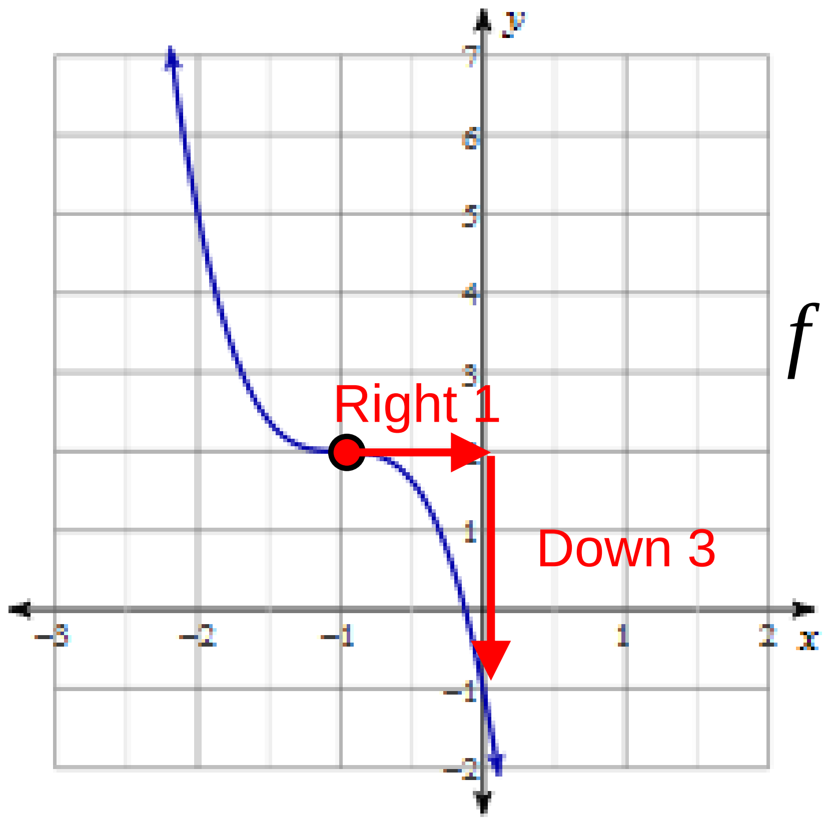
$$f(x) = -2 - 3\sqrt[3]{x-4}$$

What is the equation of the graph?



$$f(x) = 2(x-4)^3 - 5$$

What is the equation of the graph?



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

vertical stretch:3
reflection (x-axis)