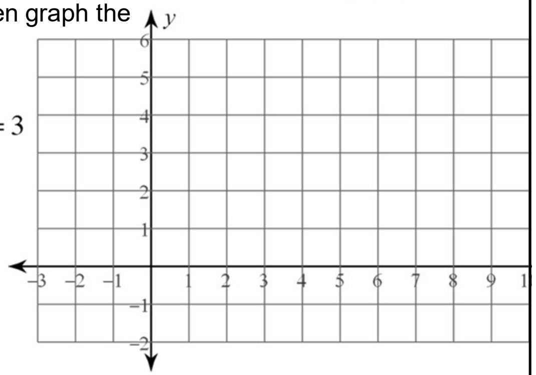
SM2 HANDOUT 4-3: Square Root Function $f(x)=\sqrt{x}$

Fill in the table then graph the function.

x	y
9	3
4	
1	
0	
-1	

$y=\sqrt{x}$

$y=\sqrt{9}=3$



This is the first function, so far, that

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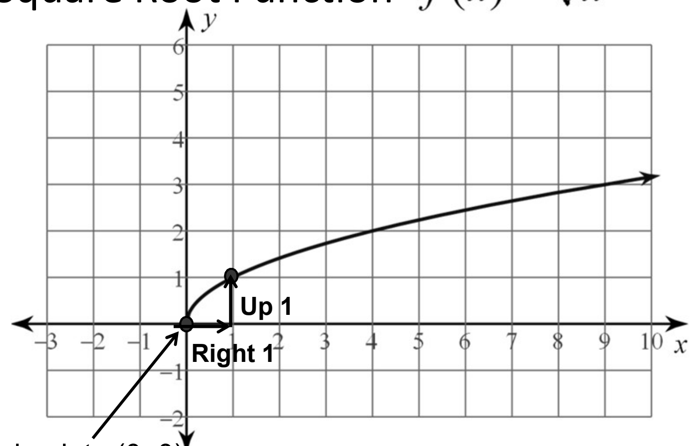
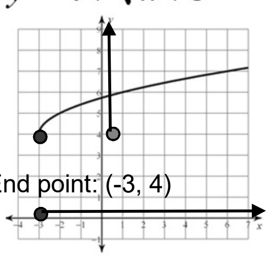
Square Root Function $f(x)=\sqrt{x}$



End point: (0, 0)

Describe the transformations to the parent function:

$y=4+\sqrt{x+3}$



What is the domain?

Hint: Find the endpoint. The x-value of the endpoint and every x-value to the right is in the domain.

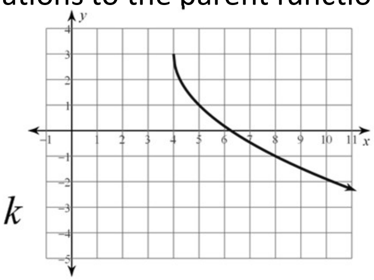
What is the range?

Hint: Find the endpoint. The y-value of the endpoint and every y-value above is in the range.

What is the equation of the graph?

Describe the transformations to the parent function:

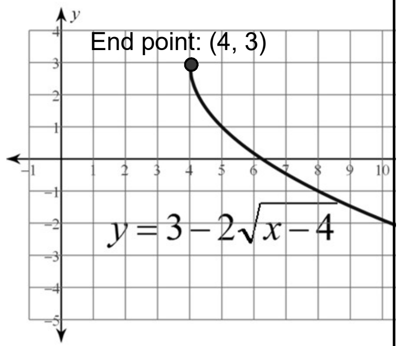
$y=(-1)a\sqrt{x-h}+k$



What is the domain?

$x = [4, \infty)$

Find endpoint: every x-value from the endpoint and to the right is in the domain.



Find endpoint: every y-value from the endpoint and below is in the range.

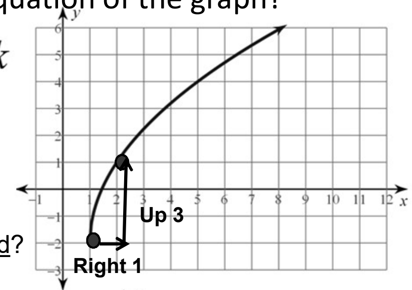
Why is negative infinity the first term in the interval?

It is the minimum y-value in the range

What is the equation of the graph?

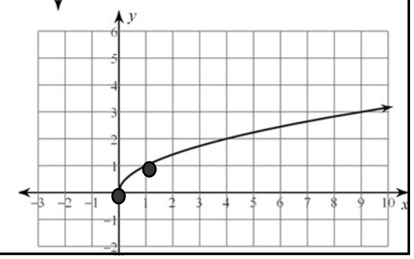
$y = (-1)a\sqrt{x-h} + k$

Endpoint of the parent has been moved right 1, down 2



Has it been vertically stretched?

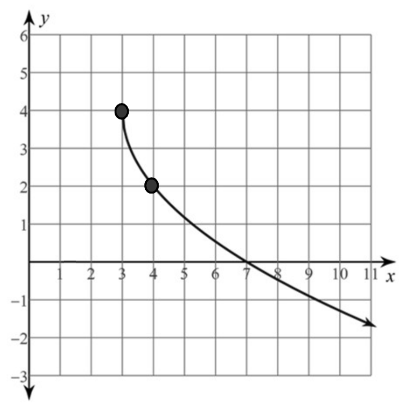
(from endpoint): Right 1, up 3



What is the equation?

What is the domain?

What is the range?



Set-Builder Notation: a way of writing an equation that also defines the input values to use.

$f(x) = \{$ rule , for x = (Inputs ,)$\}$

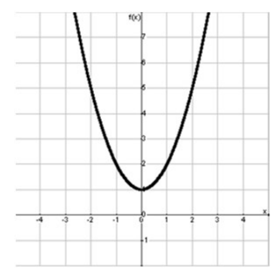
outputs

"French Brackets" → set

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

Domain of f(x) : { x = ???}

Domain : { x = (-∞, ∞)}



$f(x) = \{x^2 + 1, \text{for } x = (-\infty, \infty)\}$

outputs rule Inputs

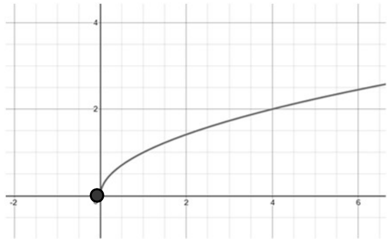
Domain of all square functions are "all real numbers" (redundant to write it in "set-builder" notation).

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

Endpoint of k(x) = ?

Domain of k(x) = ?

Graph k(x)



Write k(x) in "set-builder" notation.

$k(x) = \{\sqrt{x}, \text{x} = [0, \infty)\}$

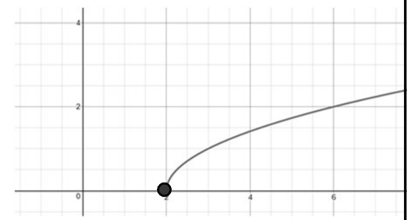
Domain of all square root functions are NOT "all real numbers" (redundant BUT more useful to write it in "set-builder" notation).

$j(x) = \sqrt{x-2}$

Endpoint of j(x) = ?

Domain of j(x) = ?

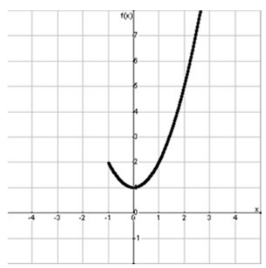
Graph j(x)

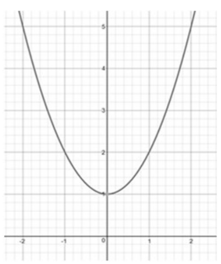


Write j(x) in "set-builder" notation.

What is the domain of the graph?

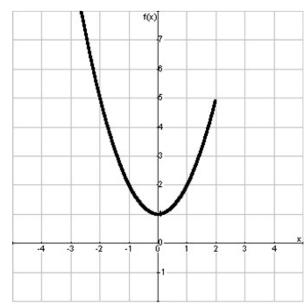
What is the equation of the graph?





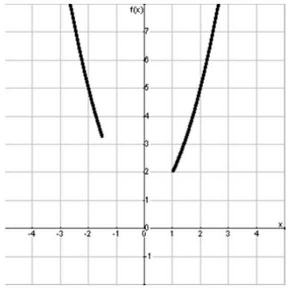
Write the equation of the graph above in set-builder notation.

p(x)



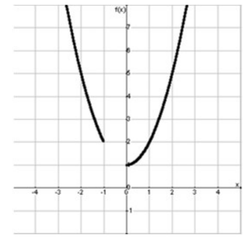
Define p(x) using "set-builder" notation.

m(x)



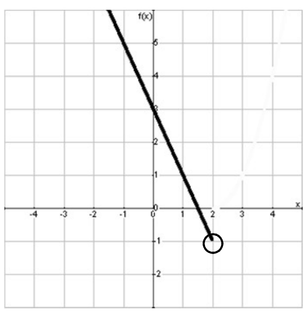
Define m(x) using “set-builder” notation.

Graph j(x)

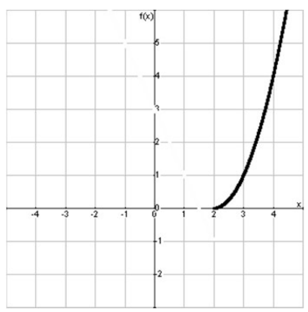


$f(x)=\{-2x+3, x=(-\infty,2)\}$

$g(x)=\{(x-2)^2, x=[2,\infty)\}$

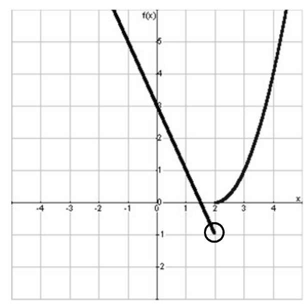


What is the equation of the graph?



What is the equation of the graph?

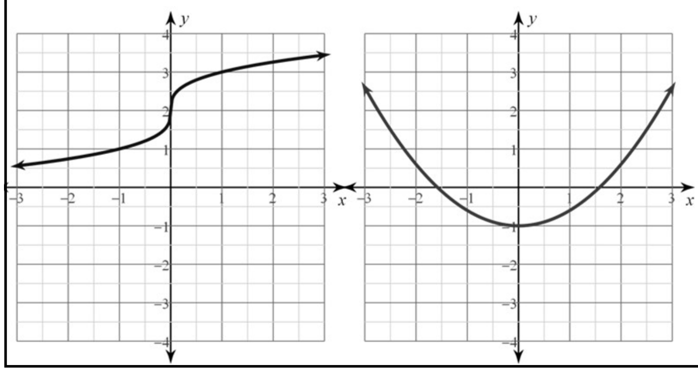
How would you define the following graph?



<u>We call this a “piece-wise” defined function.</u>

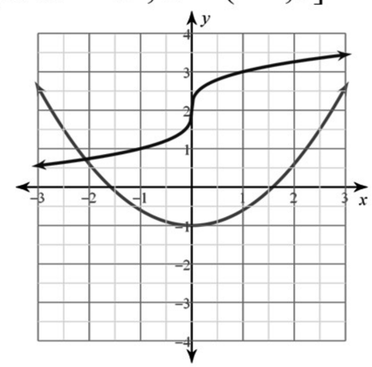
Graph them both:

$$h(x)=\begin{cases}2+\sqrt[3]{x}\ ,\ x=(0,\infty)\\ 0.4x^2-1\ \ ,\ x=(-\infty,0]\end{cases}$$



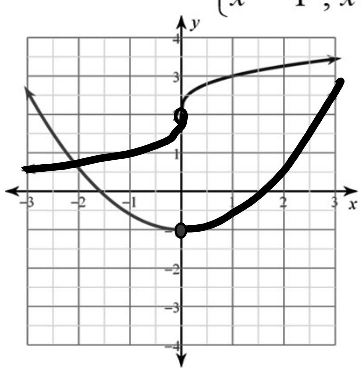
But, put them on the same x-y plot:

$$h(x)=\begin{cases}2+\sqrt[3]{x}\ ,\ x=(0,\infty)\\ 0.4x^2-1\ \ ,\ x=(-\infty,0]\end{cases}$$



Now <u>erase the part of the graph for each that does not apply based upon "restricted domain"</u>.

$$h(x)=\begin{cases}2+\sqrt[3]{x}\ ,\ x=(0,\infty)\\ x^2-1\ \ ,\ x=(-\infty,0]\end{cases}$$



Graph these piecewise-defined functions:

$$h(x)=\begin{Bmatrix}x^2\ ,\ x=(-\infty,0)\\ |x|\ \ ,\ x=[0,\infty)\end{Bmatrix}$$

$$g(x)=\begin{Bmatrix}1+\sqrt{x}\ ,\ x=(-\infty,-1)\\ 2x-3\ \ ,\ x=[0,\infty)\end{Bmatrix}$$