

CHAPTER 2

Radical Functions

Section 2.1: Radical Functions and Transformations

↳ A function that involves a radical with a variable in the radicand

$$y = \sqrt{6x}$$

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

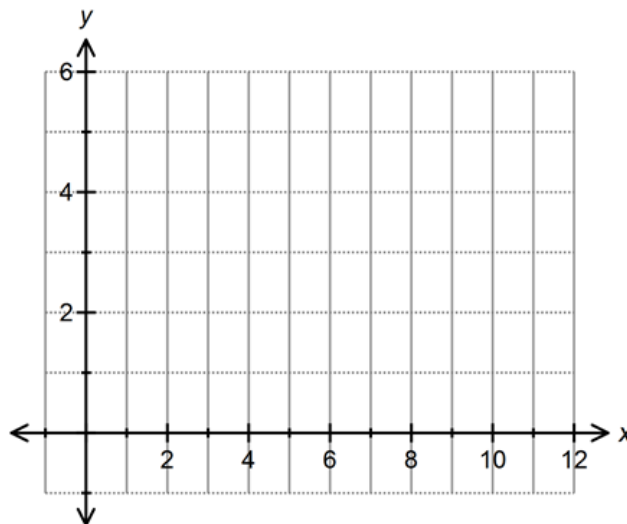
$$y = \sqrt{2(x-4)} + 1$$

Example 1

Use a table of values to sketch the graph of the function $y = \sqrt{x}$

Why would there be a restricted domain?

x	y
0	
1	
4	
9	



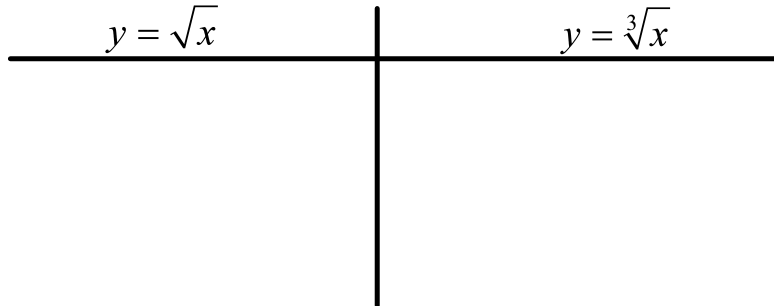
Domain:

Range:



Restricted Domain

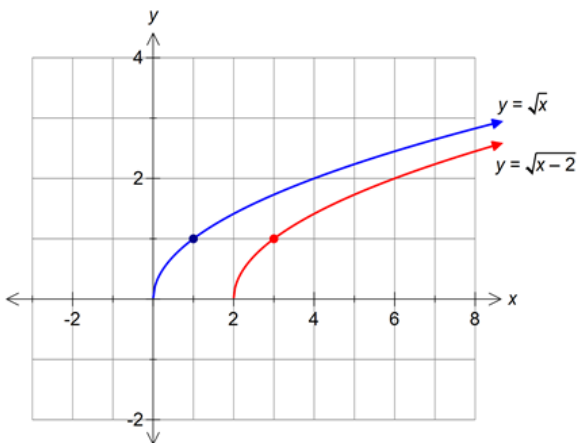
↳ Radical functions have restricted domains if the index of the radical is an even number.



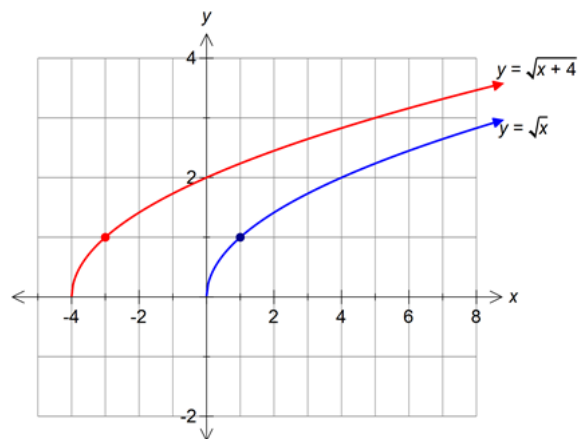
Example 2

Restrict the domain for each of the following radical functions

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



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



c) $y = \sqrt{2x-5}$

d) $y = \sqrt{3x+6}$

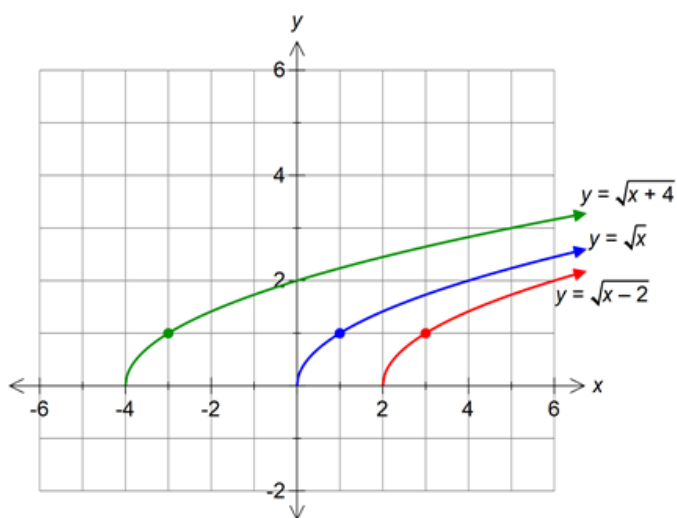


Lesson 2.1 Radical Functions and Transformations

Graphing Radical Functions using Transformations

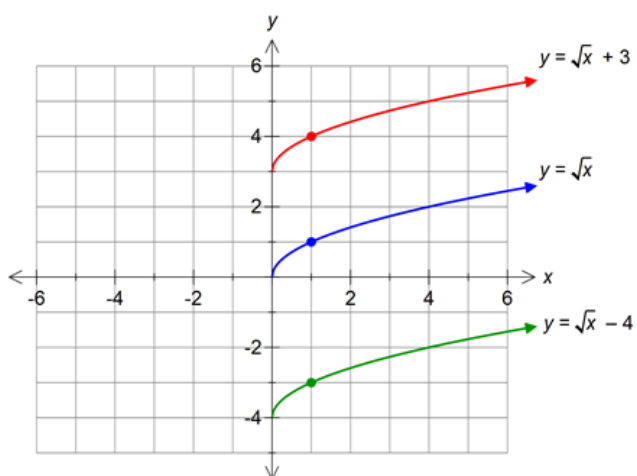
$$\begin{array}{l} \left. \begin{array}{l} \hookrightarrow y - k = a\sqrt{b(x - h)} \\ k \rightarrow VT \\ |a| \rightarrow VS \\ h \rightarrow HT \\ \left| \frac{1}{b} \right| \rightarrow HS \end{array} \right\} \end{array}$$

(i) $y = \sqrt{x - h}$



Horizontal translations affects the _____

(ii) $y = \sqrt{x} + k$



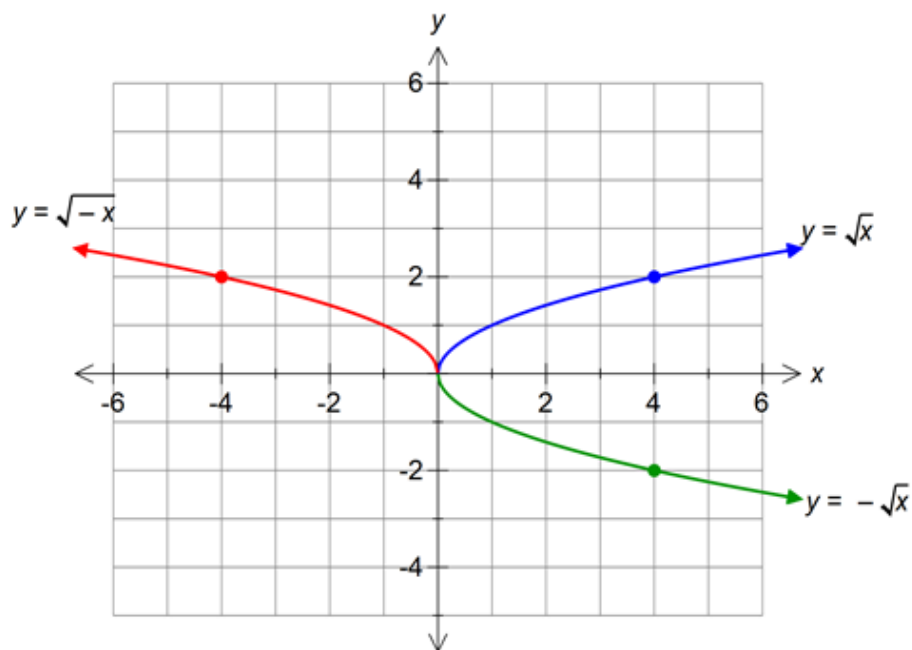
Vertical translations affects the _____

→

Lesson 2.1 Radical Functions and Transformations

(iii) $y = \sqrt{-x}$ \longrightarrow

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



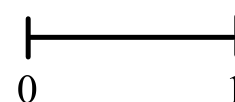
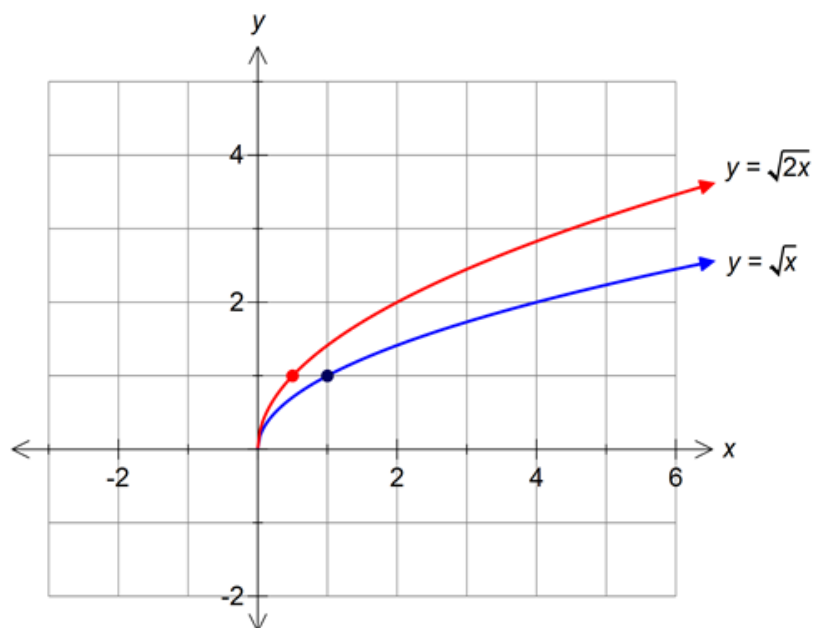
How do reflections affect the domain and range?

	$y = \sqrt{x}$	$y = \sqrt{-x}$	$y = -\sqrt{x}$
Domain			
Range			

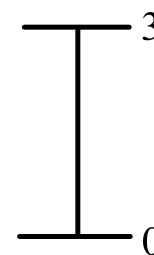
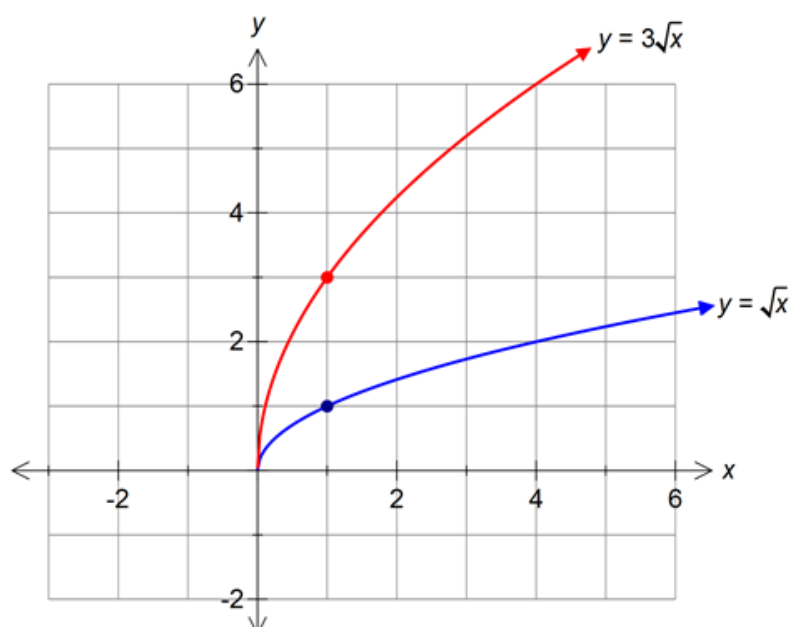
\longrightarrow

Lesson 2.1 Radical Functions and Transformations

(iv) $y = \sqrt{bx}$



(iv) $y = a\sqrt{x}$



How do stretches affect the domain and range?

Lesson 2.1 Radical Functions and Transformations

Example 3

Sketch the graph of the function $y = -3\sqrt{\frac{1}{2}(x+6)} + 1$ by transforming the graph of $y = \sqrt{x}$. Then identify the domain and range.

Identify the parameters of the transformation

$a =$

$b =$

$h =$

$k =$

Key points of $y = \sqrt{x}$

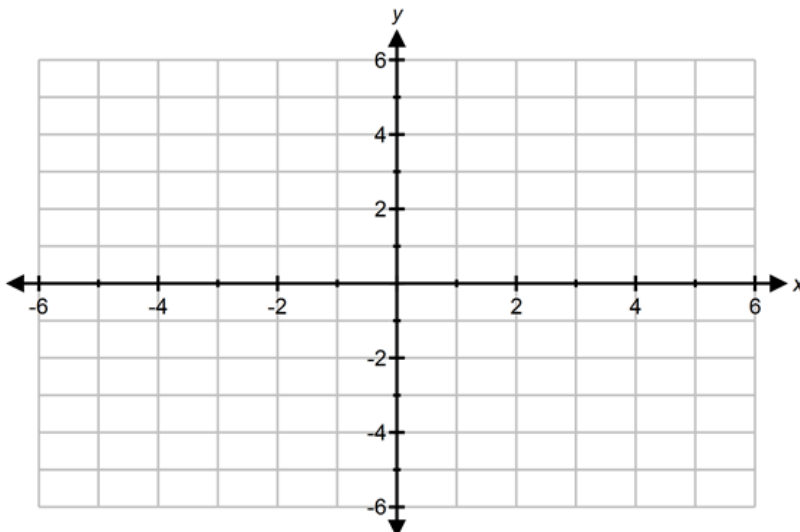
x	y
0	0
1	1
4	2
9	3

Mapping Rule:

$(x,y) \rightarrow$

$y = -3\sqrt{\frac{1}{2}(x+6)} + 1$

x	y



Domain:

Range:

Lesson 2.1 Radical Functions and Transformations

Example 4

Sketch the graph of the function $y = \frac{1}{3}\sqrt{-2(x+1)} - 4$ by transforming the graph of $y = \sqrt{x}$. Then identify the domain and range.

Identify the parameters of the transformation

$a =$

$b =$

$h =$

$k =$

Key points of $y = \sqrt{x}$

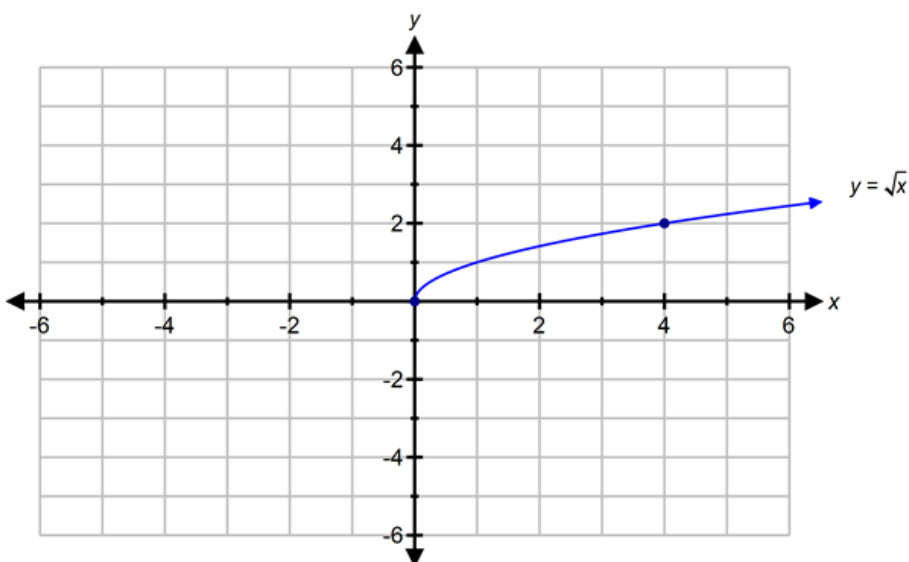
x	y
0	0
1	1
4	2
9	3

Mapping Rule:

$(x,y) \rightarrow$

$y = \frac{1}{3}\sqrt{-2(x+1)} - 4$

x	y



Domain:

Range:

Lesson 2.1 Radical Functions and Transformations

Example 5

Sketch the graph of the function $2(y-5) = \sqrt{-2x+8}$ by transforming the graph of $y = \sqrt{x}$. Then identify the domain and range.

Identify the parameters of the transformation

$a =$

$b =$

$h =$

$k =$

Key points of $y = \sqrt{x}$

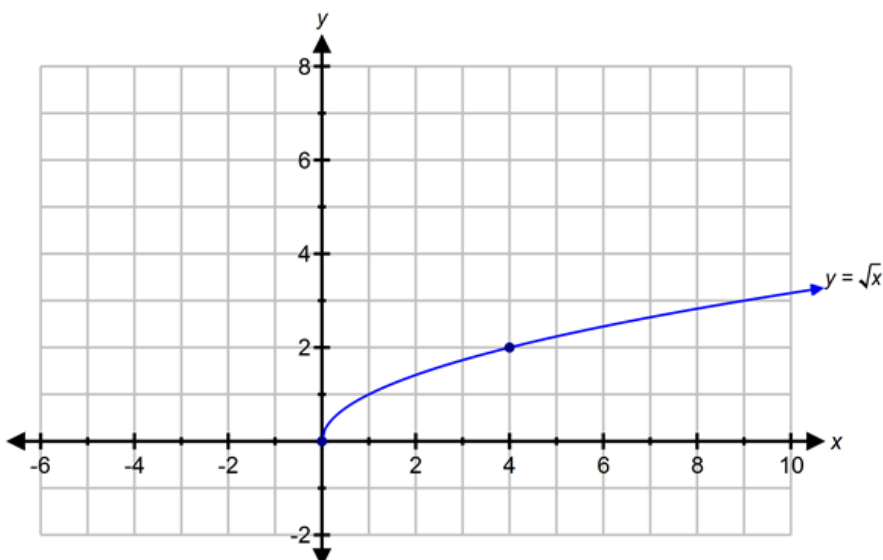
x	y
0	0
1	1
4	2
9	3

Mapping Rule:

$(x,y) \rightarrow$

$y = \frac{1}{2}\sqrt{-2x+8} + 5$

x	y



Domain:

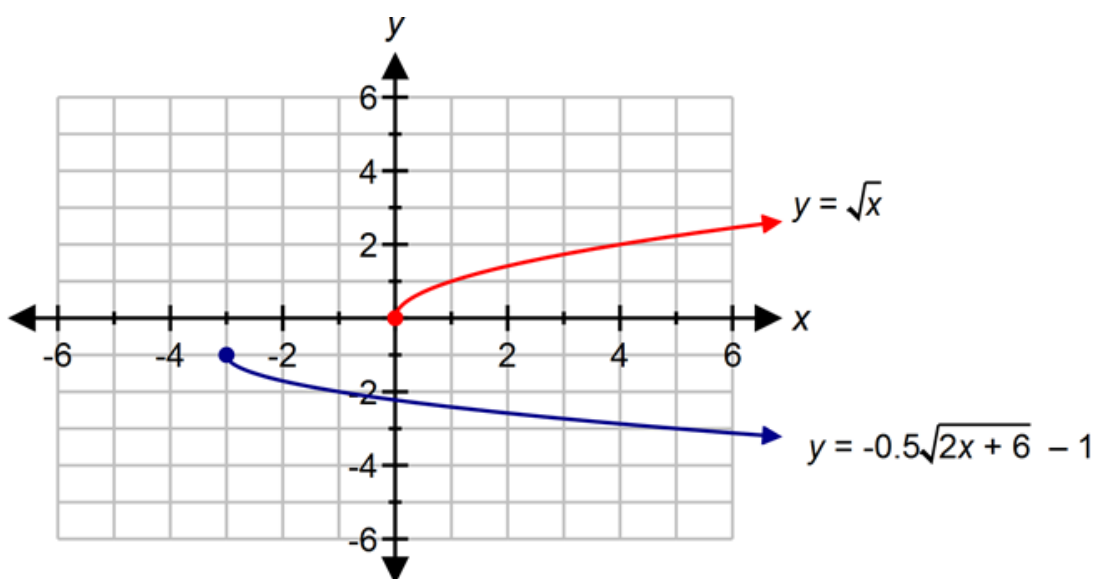
Range:

Lesson 2.1 Radical Functions and Transformations

Example 6

Determine the domain and range of the radical expression $y = -0.5\sqrt{2x+6} - 1$ without the use of a graph.

Visual



Assign P.72-74 #2, 3, 4, 5d