

$$y = 2(x+2)^2 - 1$$

$a=2$ $p=-2$ $q=-1$

5.3-Graphing Radicals

Think back to chapter 3. We initially learned how to graph quadratics using vertex form. The equations for this type of formula was written as $y = a(x-p)^2 + q$. This chapter focuses on radicals, the basic form of this type of functions is written $y = a\sqrt{x-h} + k$.

$$y = a(x-p)^2 + q$$

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

Transformation of a radical function follows the same principals of that of a quadratic function.

'a': vertical stretch / what multiply over y-direction

'h': starting point (h,k)

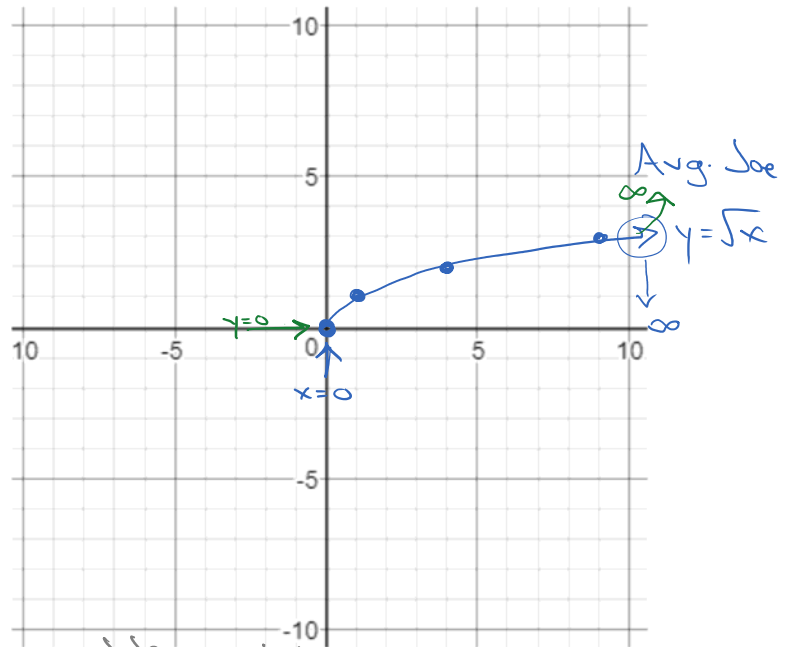
'k': starting point (h,k)

"Average Joe" or base y-values

1) $y = \sqrt{x}$ $\xrightarrow{a=1}$ $\boxed{1}\sqrt{x-\boxed{0}} + \boxed{0}$

\downarrow \downarrow
 a h k
 $(0,0)$
 starting point

x	y
(0)	(0)
(1)	(1)
(4)	(2)
(9)	(3)



'a' = 1

Starting Point, (h,k) = (0,0)

variable describing what x can be
 Domain $\{x | x \geq 0, x \in \mathbb{R}\}$ Range $\{y | y \geq 0, y \in \mathbb{R}\}$
 or "such that" number set
 $[0, \infty)$ or... $[0, \infty)$

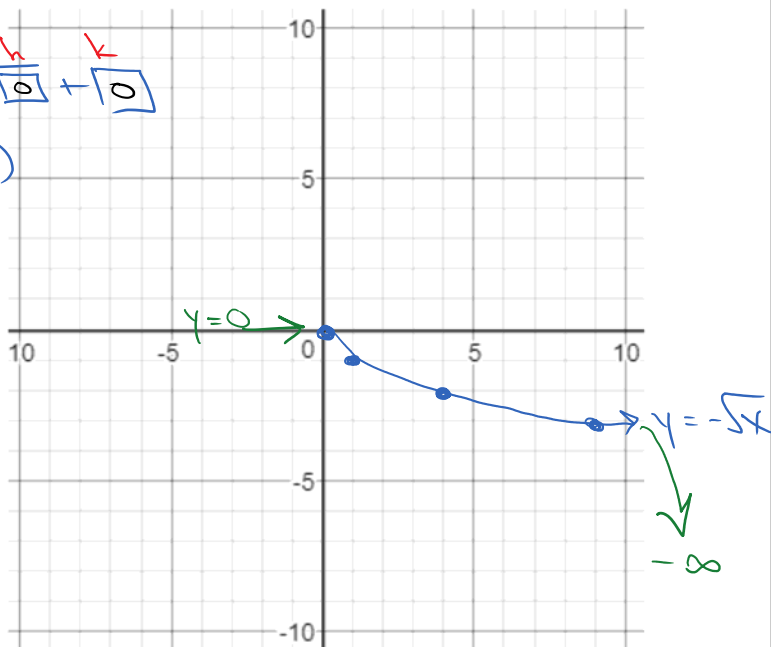
Reflected in the x-axis ($a < 0$)

2)

$$y = -\sqrt{x} \rightarrow -1\sqrt{x-0} + 0$$

a h k
 $(0, 0)$

x	y	$(-1)y$
1	$-1(1)$	-1
4	$-1(2)$	-2
9	$-1(3)$	-3
16	$-1(4)$	-4



'a' = -1 Starting Point, $(h,k) = (0,0)$ like your Restrictions:
 Domain $\{x | x \geq 0, x \in \mathbb{R}\}$ Range $\{y | y \leq 0, y \in \mathbb{R}\}$
 $[0, \infty)$ $(-\infty, 0]$

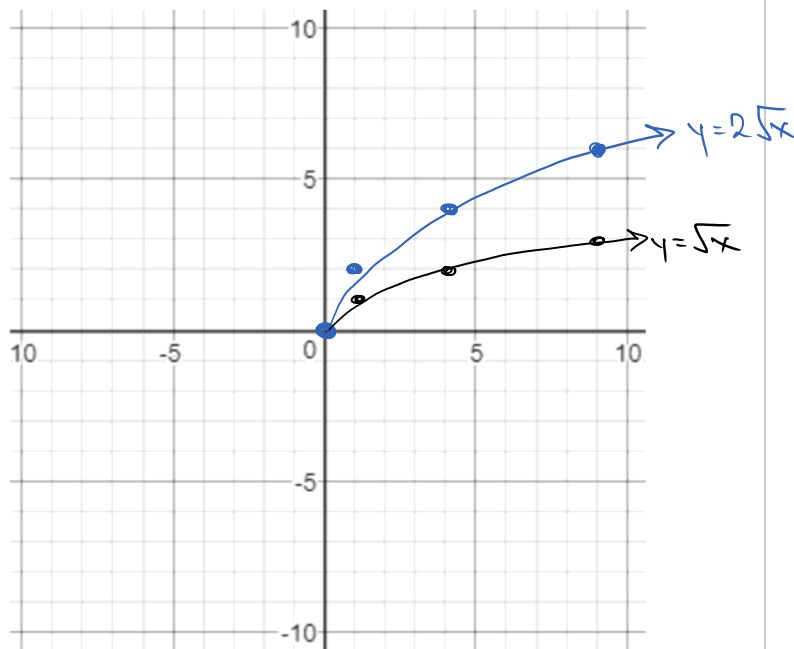
Vertical stretch ($a > 1$)

3)

$$y = 2\sqrt{x} \rightarrow 2\sqrt{x-0} + 0$$

$(0, 0)$

x	y	$(\frac{2}{1})y$
1	$2(1)$	2
4	$2(2)$	4
9	$2(3)$	6
16	$2(4)$	8



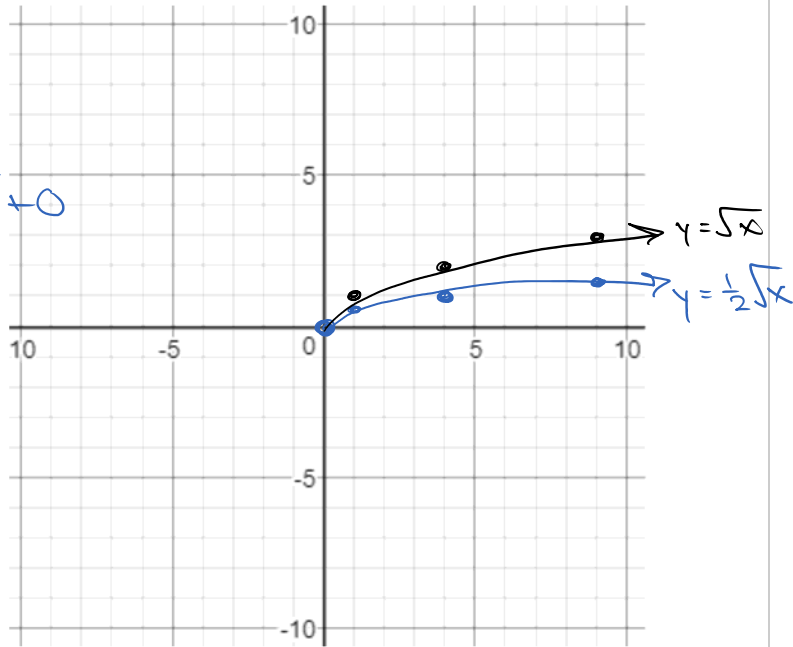
'a' = 2 Starting Point, $(h,k) = (0,0)$ Domain $[0, \infty)$ Range $[0, \infty)$

4) Vertical compression

$(-1 < a < 1, a \neq 0)$

$y = \frac{1}{2}\sqrt{x} \rightarrow \frac{1}{2}\sqrt{x-0} + 0$

x	y	$(\frac{1}{2})y$
1	$\frac{1}{2}(1)$	$= \frac{1}{2}$
4	$\frac{1}{2}(2)$	$= 1$
9	$\frac{1}{2}(3)$	$= \frac{3}{2}$
16	$\frac{1}{2}(4)$	$= 2$



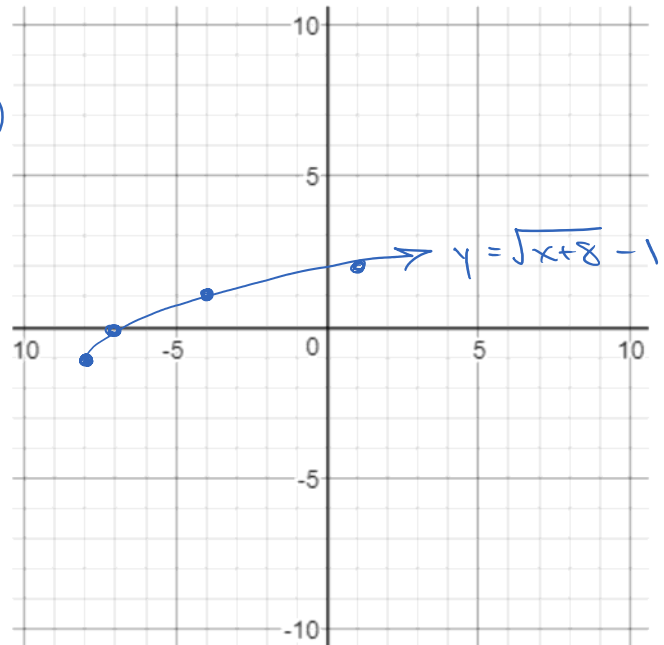
'a' = $\frac{1}{2}$ Starting Point, (h,k) = (0,0) Domain $[0, \infty)$ Range $[0, \infty)$

5) Vertical/horizontal translations

$y = \sqrt{(x+8)} - 1$

$a=1$
 h k
 $(-8, -1)$

x	y
1	1
4	2
9	3
16	4

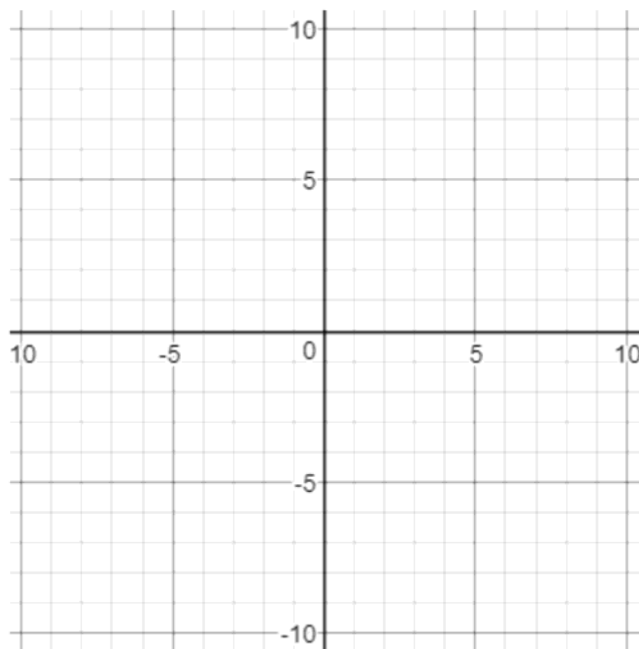


'a' = 1 Starting Point, (h,k) = (-8,-1) Domain $\{x | x \geq -8, x \in \mathbb{R}\}$ Range $\{y | y \geq -1, y \in \mathbb{R}\}$

6) All transformations

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

x	y
1	
4	
9	
16	



'a' =

Starting Point, (h,k) =

Domain

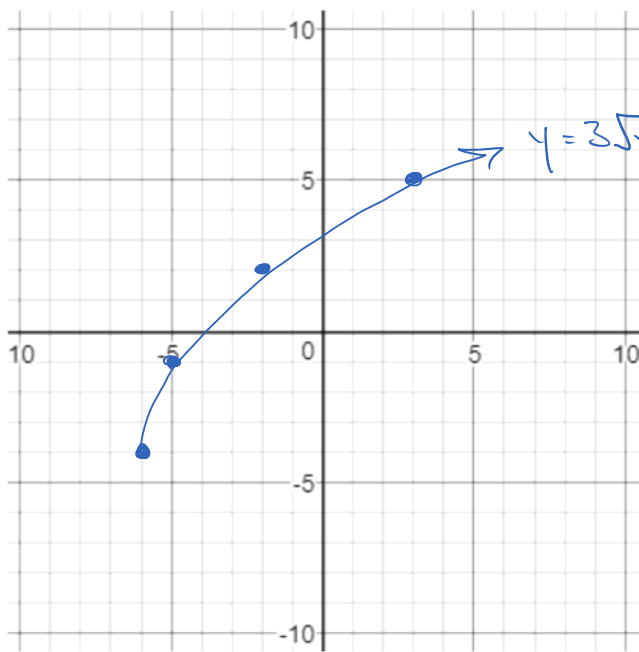
Range

7)

$$y = 3\sqrt{(x+6)} - 4$$

x	y
1	3(1) 3
4	3(2) 6
9	3(3) 9
16	3(4) 12

(-6, -4)



'a' =

Starting Point, (h,k) =

Domain

Range

HW: 5.3 WS