

4.4 NOTES: Graphing Square Root Functions

Graph the parent square root function on the graph below. Create a table of values to graph and write the domain and range. Then using **4 different** colors graph the transformed equations and fill in the table below.

Parent Function

$$y = \sqrt{x}$$

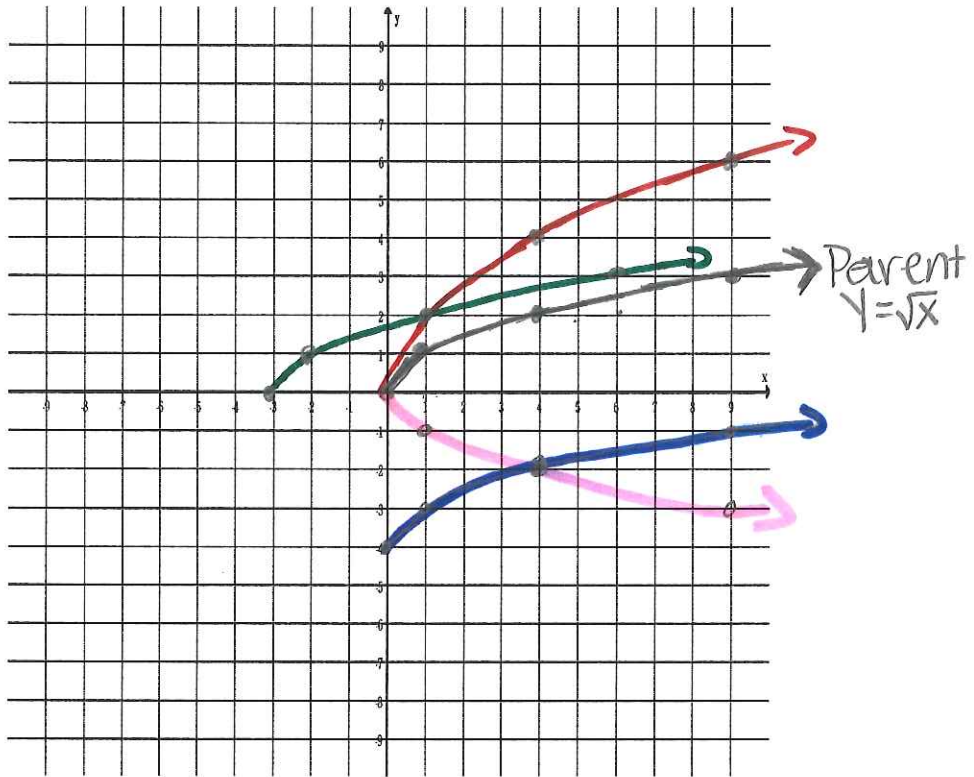
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$$x \geq 0$$

x	y
0	0
1	1
4	2
9	3

Domain: $x \geq 0 ; [0, \infty)$

Range: $y \geq 0 ; [0, \infty)$



$y = a\sqrt{x-h} + k$																																												
Equation	$y = \sqrt{x} - 4$	$y = \sqrt{x+3}$	$y = -\sqrt{x}$	$y = 2\sqrt{x}$																																								
Color of Graph	—	—	—	—																																								
Table	<table border="1"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>0</td><td>-4</td></tr> <tr><td>1</td><td>-3</td></tr> <tr><td>4</td><td>-2</td></tr> <tr><td>9</td><td>-1</td></tr> </tbody> </table>	x	y	0	-4	1	-3	4	-2	9	-1	<table border="1"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>-3</td><td>0</td></tr> <tr><td>-2</td><td>1</td></tr> <tr><td>1</td><td>2</td></tr> <tr><td>6</td><td>3</td></tr> </tbody> </table>	x	y	-3	0	-2	1	1	2	6	3	<table border="1"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>-1</td></tr> <tr><td>4</td><td>-2</td></tr> <tr><td>9</td><td>-3</td></tr> </tbody> </table>	x	y	0	0	1	-1	4	-2	9	-3	<table border="1"> <thead> <tr><th>x</th><th>y</th></tr> </thead> <tbody> <tr><td>0</td><td>0</td></tr> <tr><td>1</td><td>2</td></tr> <tr><td>4</td><td>4</td></tr> <tr><td>9</td><td>6</td></tr> </tbody> </table>	x	y	0	0	1	2	4	4	9	6
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Range	$y \geq -4$	$y \geq 0$	$y \leq 0$	$y \geq 0$																																								
Transformations	down 4	left 3	reflect over x-axis	vert. stretch																																								

Fill in the missing information in the table below. You may use a calculator to check.

Equation	$y = \sqrt{x} + 6$	$y = \sqrt{x-5}$	$y = \frac{1}{3}\sqrt{x}$
Domain	$x \geq 0$	$x \geq 5$	$x \geq 0$
Range	$y \geq 6$	$y \geq 0$	$y \geq 0$
Transformations	up 6	right 5	vert. shrink

Given: $y = a\sqrt{x-h} + k$, explain the change to the parent graph $y = \sqrt{x}$ for each:

if a is neg.	<u>reflect over x-axis</u>	if $\sqrt{x-h}$	<u>right</u>
		if $\sqrt{x+h}$	<u>left</u>
if $0 < a < 1$	<u>vert. shrink</u>	if $\sqrt{x+k}$	<u>up</u>
if $ a > 1$	<u>vert. stretch</u>	if $\sqrt{x-k}$	<u>down</u>

Without your calculator, fill in the missing information and give the domain and range.

Original Equation	Transformations	New Equation	New Equation	
			Domain	Range
$y = \sqrt{x}$	right 5, down 6	$y = \sqrt{x-5} - 6$	$x \geq 5$	$y \geq -6$
$y = \sqrt{x}$	left 3, up 7 reflect over x-axis	$y = -\sqrt{x+3} + 7$	$x \geq -3$	$y \leq 7$ 0
$y = \sqrt{x}$	vertical stretch of 2, up 9	$y = 2\sqrt{x} + 9$	$x \geq 0$	$y \geq 9$
$y = \sqrt{x-3} - 7$	left 8, up 5	$y = \sqrt{x+5} - 2$	$x \geq -5$	$y \geq -2$
$y = \sqrt{x-1} - 2$	left 3, down 4	$y = -\sqrt{x+2} - 6$	$x \geq -2$	$y \leq -6$
$y = \sqrt{x-5}$	left 1 up 6	$y = \sqrt{x-4} + 6$	$x \geq 4$	$y \geq 6$