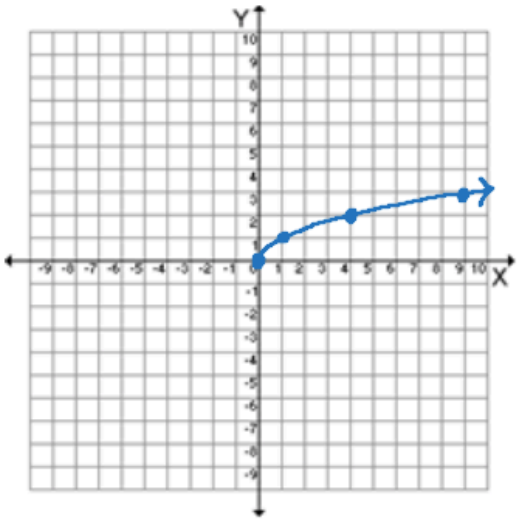
Square Root Functions Key

The Square Root Function

1. What is the parent equation for the Square Root Function? $f(x) = \sqrt{x}$

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

2. Graph the parent function for Square Root.



3. Domain: (I) $[0,\infty)$ (S) $\{x \mid x \geq 0\}$ (Int. notation, Set Notation)

   Range: (I) $[0,\infty)$ (S) $\{y \mid y \geq 0\}$

4. Point of Origin: $(0,0)$

   What are the coordinates for 3 major points:

   $(0,0)$, $(1,1)$, $(4,2)$

5. Based on your knowledge of transformations, describe the roles a, b, h, and k play for the family of functions $y = a\sqrt{b(x-h)} + k$.

   (i.e what does a do, what does h do, what does k do, and so on.....)

   a: $a<0$ reflect over x-axis, $|a|>1$ vert. stretch $0<|a|<1$ vert. comp

   h: translates left (-) and right (+)

   k: translates up (+) and down (-)

   b: $b<0$ reflects over the y-axis

6. How would each of the following graphs change in relation to the parent graph?

   a) $y = \sqrt{x-3}$ $h=3$ right 3

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

   c) $y = -3\sqrt{x}$ $a=-3$ reflects over x-axis + vert. stretch

   d) $y = \sqrt{x} + 5$ $k=5$ up 5

   e) $y = \sqrt{-x} - 6$ $b=-1$ $k=-6$ refl over y-axis and down 6

   f) $y = \frac{1}{2}\sqrt{-(x-4)}$ $a=\frac{1}{2}$ $b=-1$ $h=4$ vert. compressed, reflected y-axis right 4

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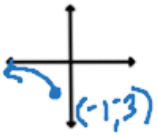
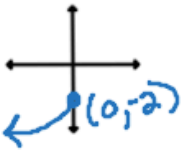
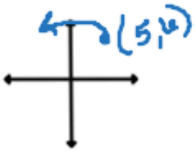
7. Sketch each graph and label the point of origin. Then state the Domain and Range of each function. Use Set notation for (S) and Interval notation for (I).

	Sketch	Domain	Range
a) $y = 2\sqrt{x+2}$		(S) $x \geq -2$	$y \geq 0$
b) $y = \sqrt{x-3}$ $\rightarrow 3$		(I) $[3, \infty)$	$[0, \infty)$
c) $y = -\sqrt{x}+5$ refl. x $\uparrow 5$		(S) $x \geq 0$	$y \leq 5$
d) $y = \sqrt{-(x+1)}-3$ refl. y $\leftarrow 1$ $\downarrow 3$		(I) $(-\infty, -1]$	$[-3, \infty)$
e) $y = -\sqrt{-x}-2$ refl + $\downarrow 2$ refl. y		(S) $x \leq 0$	$y \leq -2$
f) $y = -\sqrt{x-1}-3$ refl. x $\rightarrow 1$ $\downarrow 3$		(I) $[1, \infty)$	$(-\infty, -3]$
g) $y = \frac{2}{3}\sqrt{-(x-5)}+6$ vert comp. ref. y $\rightarrow 5$ $\uparrow 6$		(S) $x \leq 5$	$y \geq 6$

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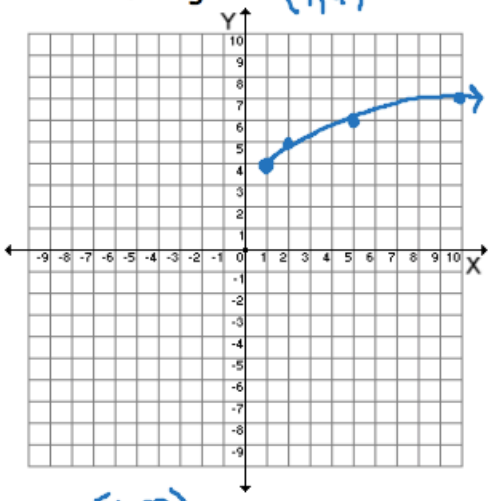
9. Graph the following square root functions using transformation changes. Check your points using the calculator and viewing the table.

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

a: 1 b: 1 h: 1 k: 4

Point of origin: (1,4)



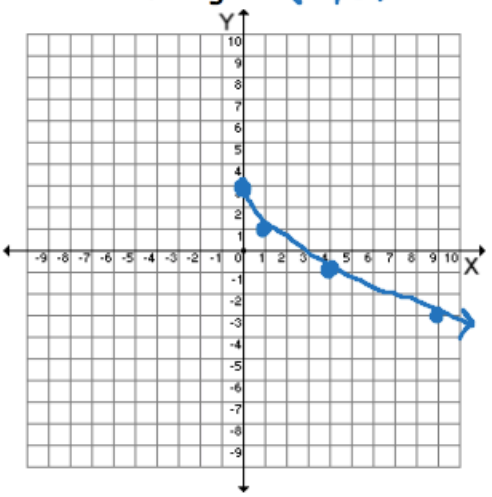
Domain: (I) [1,∞) (S) $x \geq 1$

Range: (I) [4,∞) (S) $y \geq 4$

b) $y = -2\sqrt{x}+3$

a: -2 b: 1 h: 0 k: 3

Point of origin: (0,3)



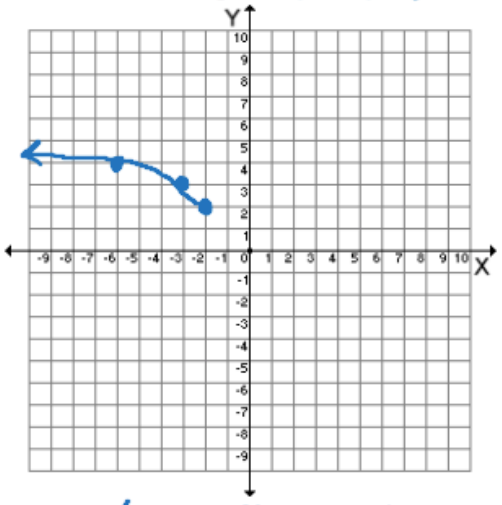
Domain: (I) [0,∞) (S) $x \geq 0$

Range: (I) $(-\infty, 3]$ (S) $y \leq 3$

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

a: 1 b: -1 h: -2 k: 2

Point of origin: (-2,2)



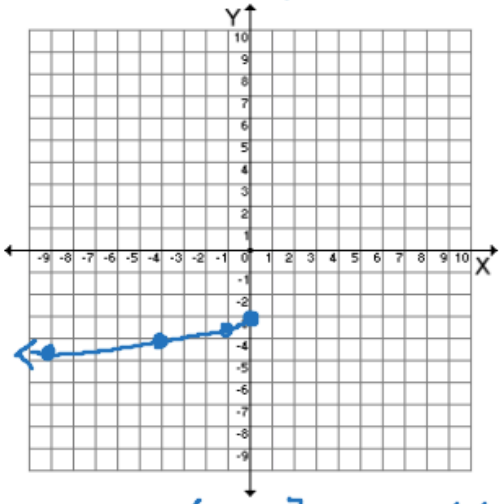
Domain: (I) $(-\infty, -2]$ (S) $x \leq -2$

Range: (I) [2,∞) (S) $y \geq 2$

d) $y = -\frac{1}{2}\sqrt{-x}-3$

a: -½ b: -1 h: 0 k: -3

Point of origin: (0,-3)



Domain: (I) $(-\infty, 0]$ (S) $x \leq 0$

Range: (I) $(-\infty, -3]$ (S) $y \leq -3$