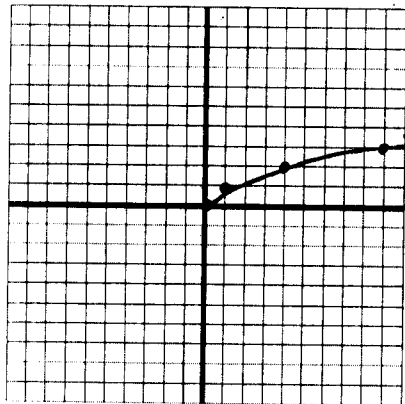


7-3 Graphing Square Root Functions

Master E

We will discover what happens to the parent function when the elements are changed. When you finish, you should be able to graph a square root function without a calculator!

1) Parent function $y = \sqrt{x}$

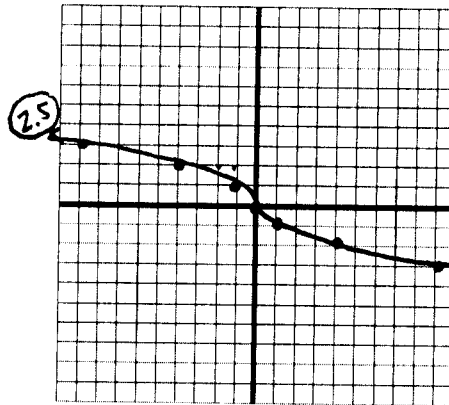


x	y
0	0
1	1
4	2
9	3

↑ 1 → 1
 ↑ 1 → 3
 ↑ 1 → 5

Domain: $[0, \infty)$ Range: $[0, \infty)$

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



x	y
0	0
1	-1
4	-2
9	-3

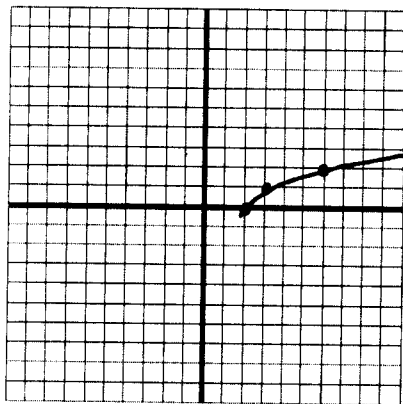
reflect over x-axis
 ↓ 1 → 1
 ↓ 1 → 3
 ↓ 1 → 5

Domain: $[0, \infty)$ Range: $(-\infty, 0]$

2.5) $y = -\sqrt{-x}$
 reflect over y-axis

x	y
0	0
-1	+1
-4	2
-9	3

3) $y = \sqrt{x-2}$ 0, 1, 4, 9

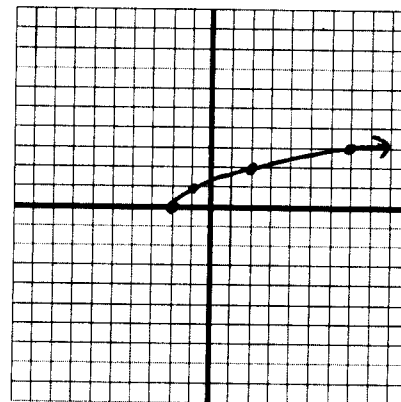


x	y
2	0
3	1
6	2
11	3

shift right 2
 ↑ 1 → 1
 ↑ 1 → 3
 ↑ 1 → 5

Domain: $[2, \infty)$ Range: $[0, \infty)$

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

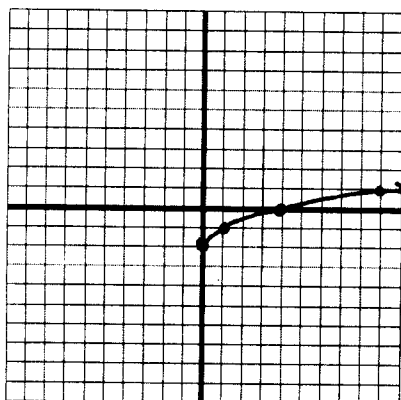


x	y
-2	0
-1	1
2	2
7	3

shift left 2
 ↑ 1 → 1
 ↑ 1 → 3
 ↑ 1 → 5

Domain: $[-2, \infty)$ Range: $[0, \infty)$

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

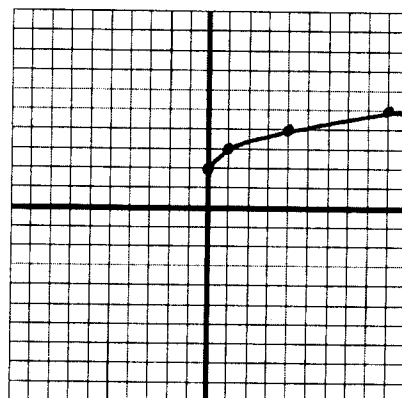


x	y
0	-2
1	-1
4	0
9	1

shift down 2
 ↑ 1 → 1
 ↑ 1 → 3
 ↑ 1 → 5

Domain: $[0, \infty)$ Range: $[-2, \infty)$

6) $y = \sqrt{x} + 2$

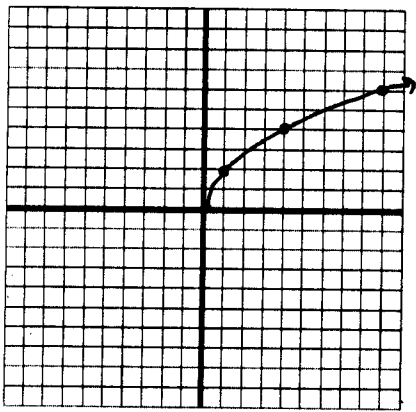


x	y
0	2
1	3
4	4
9	5

shift up 2
 ↑ 1 → 1
 ↑ 1 → 3
 ↑ 1 → 5

Domain: $[0, \infty)$ Range: $[2, \infty)$

7) $y = 2\sqrt{x}$



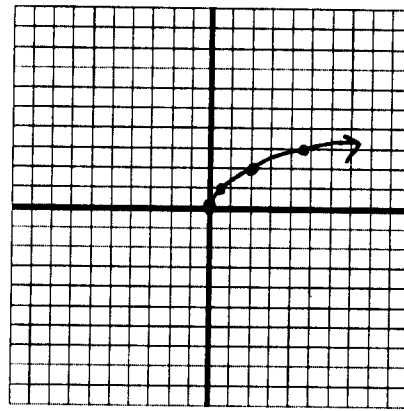
x	y
0	0
1	2
4	4
9	6

$\uparrow 2 \rightarrow 1$
 $\uparrow 2 \rightarrow 3$
 $\uparrow 2 \rightarrow 5$

Domain: $[0, \infty)$ Range: $[0, \infty)$

8) $y = \sqrt{2x}$

$z = z$
0, 1, 4, 9

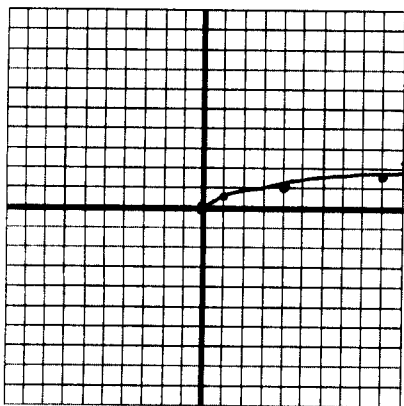


x	y
0	0
$\frac{1}{2}$	1
2	2
4.5	3

$\uparrow 1 \rightarrow \frac{1}{2}$
 $\uparrow 1 \rightarrow 1\frac{1}{2}$
 $\uparrow 1 \rightarrow 2\frac{1}{2}$

Domain: $[0, \infty)$ Range: $[0, \infty)$

9) $y = \frac{1}{2}\sqrt{x}$



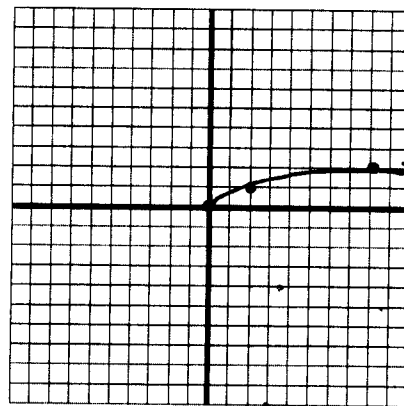
x	y
0	0
1	$\frac{1}{2}$
4	1
9	$1\frac{1}{2}$

$\uparrow \frac{1}{2} \rightarrow 1$
 $\uparrow \frac{1}{2} \rightarrow 3$
 $\uparrow \frac{1}{2} \rightarrow 5$

Domain: $[0, \infty)$ Range: $[0, \infty)$

10) $y = \sqrt{\frac{1}{2}x}$

$\frac{1}{2}(2) \frac{1}{2}(9) \frac{1}{2}(b)$
0, 1, 4, 9



x	y
0	0
2	1
8	2
18	3

$\uparrow 1 \rightarrow 2$
 $\uparrow 1 \rightarrow 6$
 $\uparrow 1 \rightarrow 10$

Domain: $[0, \infty)$ Range: $[0, \infty)$

What did you discover....?

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

-About a? Up or down a every point you make. If a is negative, it reflects over the x-axis. It causes the function to stretch or compress vertically.
-About b? It causes the function to stretch or compress horizontally. Instead of going over 1, 3, 5, go over $\frac{1}{b}$, $\frac{3}{b}$, $\frac{5}{b}$.
-About h? Causes the function to shift left and right (horizontally).
-About k? Causes the function to shift up & down (vertically).
-About the pattern of graphing? $\uparrow a \rightarrow \frac{1}{b}$, $\downarrow a \rightarrow \frac{3}{b}$, $\uparrow a \rightarrow \frac{5}{b}$, $\downarrow a \rightarrow \frac{7}{b}$...
-About the Domain? Always affected by h $[h, \infty)$ or $(-\infty, h]$
-About the Range? Always affected by k $[k, \infty)$ or $(-\infty, k]$