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NOTES: Section 12.1 – Functions Involving Square Roots

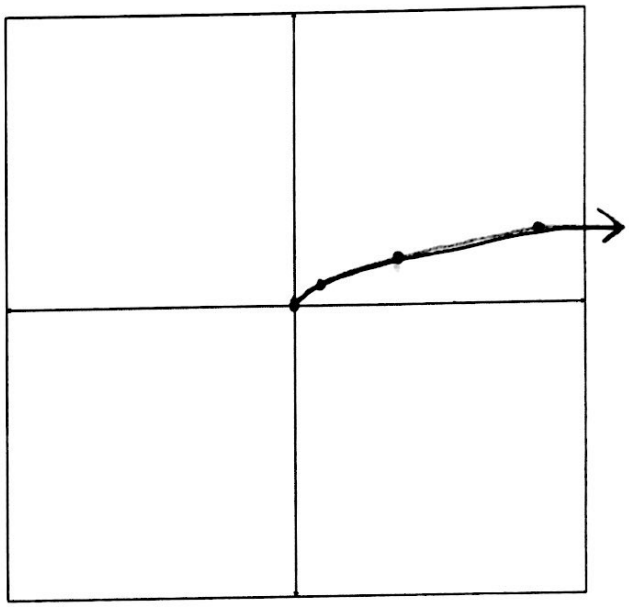
Goals: #1 - I can evaluate and graph a function involving square roots.

Homework: Section 12.1 Worksheet

Exploration #1: Graph the following function using a table of values.

1. $y = \sqrt{x}$

x	y
-1	—
0	0
1	1
4	2
9	3



a. Make some observations about your graph:

No negative x-values
No negative y-values

2. Evaluate the function for the given value of x. Round your answer to the nearest tenth.

a. $y = 3\sqrt{x}$ when $x = 4$

$y = 3\sqrt{4}$
$= 3 \cdot 2$
$= \boxed{6}$

b. $y = \sqrt{x+2}$ when $x = 9$

$y = \sqrt{9+2}$
$= \sqrt{11}$
$\approx \boxed{3.3}$

c. $y = \sqrt{4x-1}$ when $x = 21$

$y = \sqrt{4(21)-1}$
$y = \sqrt{83}$
$\approx \boxed{9.1}$

d. $y = \sqrt{x} - 10$ when $x = 3$

$y = \sqrt{3} - 10$
$y \approx 1.7 - 10$
$\approx \boxed{-8.3}$

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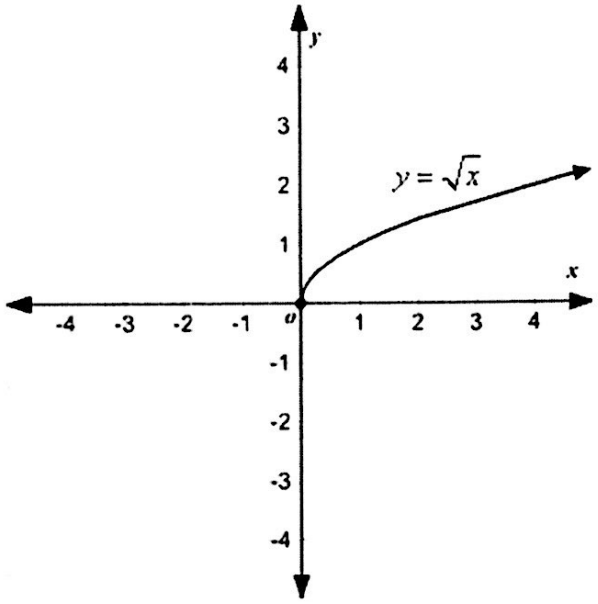
Notes:

A square root function is a function that can be written in the standard form: $y = \sqrt{x}$



Characteristics of Square Root Functions:

- The domain is: $x \geq 0$ because we cannot take the square root of negative numbers.
- The range is: $y \geq 0$
- When choosing x-values for our table, we find perfect squares.

Example #1: Find the domain of the function.

1. $y = 5\sqrt{x}$

$x \geq 0$

2. $y = \sqrt{x+2}$

$x + 2 \geq 0$

$x \geq -2$

3. $y = \sqrt{4x-1}$

$4x - 1 \geq 0$

$4x \geq 1$

$x \geq 1/4$

You practice: Find the domain of the function.

1. $y = \sqrt{x-7}$

$x - 7 \geq 0$

$x \geq 7$

2. $y = \sqrt{3x+2}$

$3x + 2 \geq 0$

$3x \geq -2$

$x \geq -2/3$

3. $y = \sqrt{5x-3} - 2$

$5x - 3 \geq 0$

$5x \geq 3$

$x \geq 3/5$

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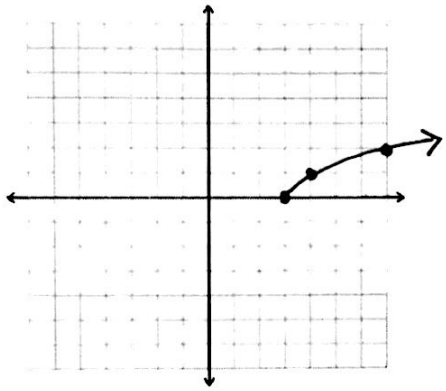
Example #2: Sketch the graph. Find the domain and range.

1. $y = \sqrt{x-3}$

x	y
3	0
4	1
7	2
12	3
19	4



Domain: $x \geq 3$

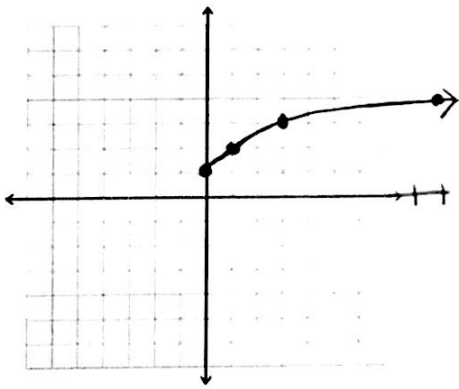
Range: $y \geq 0$

$x - 3 \geq 0$

$x \geq 3$

2. $y = \sqrt{x} + 1$

x	y
0	1
1	2
4	3
9	4
16	5



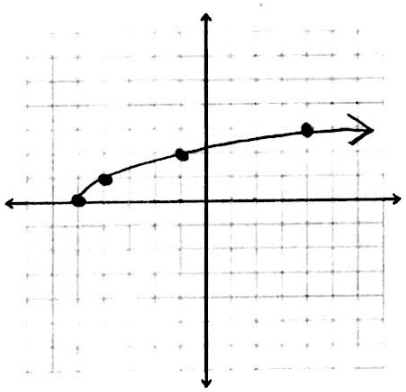
Domain: $x \geq 0$

Range: $y \geq 1$

You practice: Sketch the graph. Find the domain and range.

1. $y = \sqrt{x+5}$

x	y
-5	0
-4	1
-1	2
4	3
11	4



Domain: $x \geq -5$

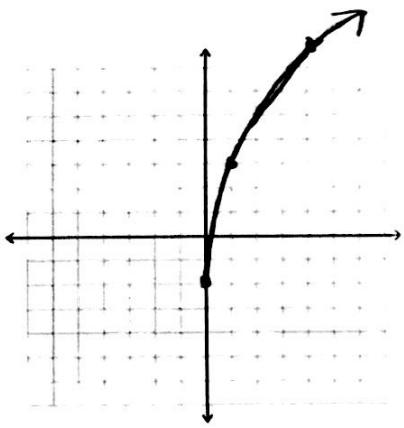
Range: $y \geq 0$

$x + 5 \geq 0$

$x \geq -5$

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

x	y
0	-2
1	3
4	8
9	13
16	18



Domain: $x \geq 0$

Range: $y \geq -2$