Chapters 8 & 9 Technology Worksheet

Rationalizing Denominators

When simplifying radical expressions, we write our answers so there is no radical in a denominator.

One Term Denominators: Multiply the numerator and denominator by a radical expression that will make the denominator's radicand perfect, clearing the radical from the denominator.

By Hand	By Technology (Wolfram|Alpha)
Rationalize the denominator: $\frac{12}{\sqrt{75}}$	Rationalize the denominator: $\frac{12}{\sqrt{75}}$

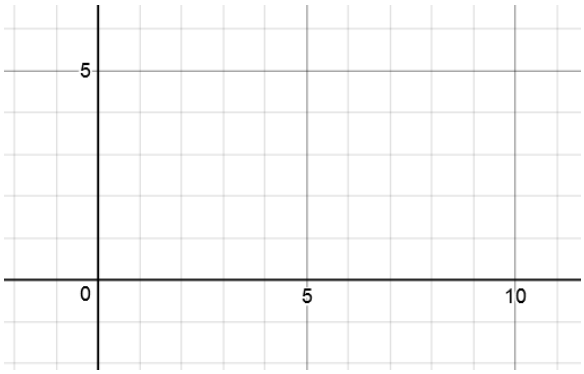
Two Term Denominators: Multiply the numerator and denominator by the conjugate of the denominator, clearing the radical(s) from the denominator.

By Hand	By Technology (Wolfram|Alpha)
Rationalize the denominator: $\frac{5\sqrt{3}+4\sqrt{2}}{6\sqrt{3}-5\sqrt{2}}$	Rationalize the denominator: $\frac{5\sqrt{3}+4\sqrt{2}}{6\sqrt{3}-5\sqrt{2}}$

Graphing Square Root Functions By Hand

The Basic Square Root Function: $y = \sqrt{x}$

x	$y = \sqrt{x}$	(x, y)
0		
1		
4		
9		



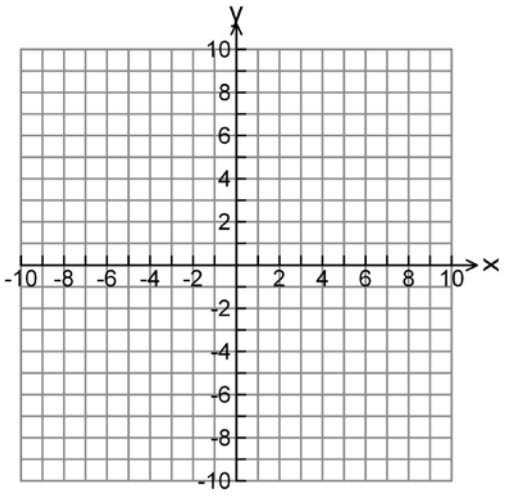
Transformations of the Basic Square Root Function: $y = \sqrt{x-h} + k$

The basic graph will be shifted horizontally by *h* units and vertically by *k* units.

Graph and state the domain and range.

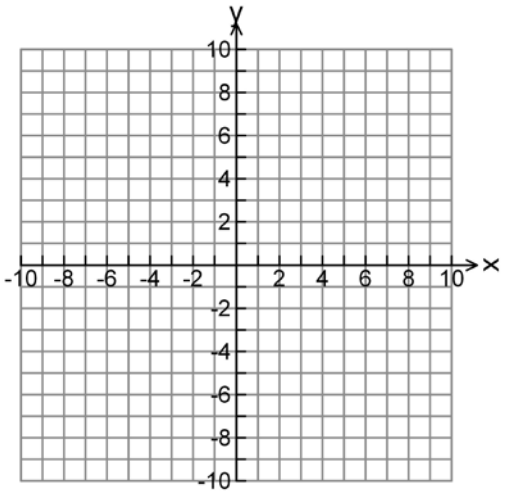
$y = \sqrt{x-5} + 4$

h: *k*:



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

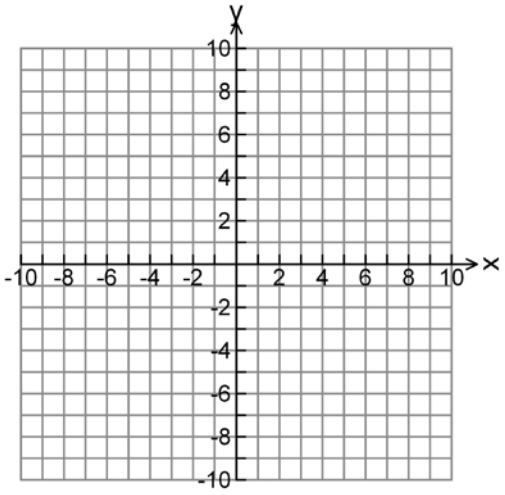
h: *k*:



How will the graph be affected by the negative sign?

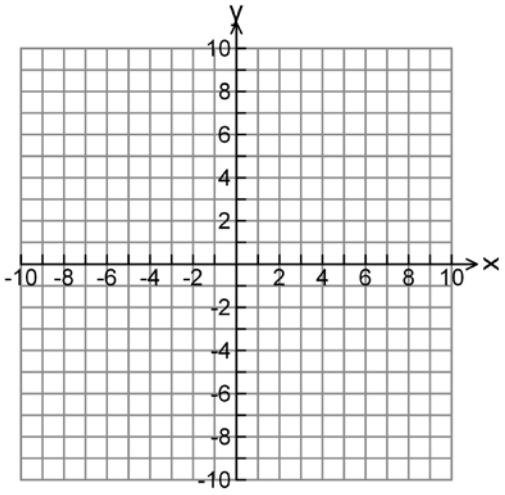
$y = -\sqrt{x-5}+4$

h: *k*:



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

h: *k*:



Graphing Square Root Functions Using Desmos

To graph the function $y = \sqrt{x-5}+4$ using Desmos, type the following:

y = sqrt(x – 5) + 4

Use Desmos to graph all 4 of the previous graphs, and compare your results to those we got by hand.

Solving Radical Equations

Overall Strategy: Isolate a radical on one side of the equation, then raise both sides of the equation to the right power to clear that one radical. (You may need to repeat that process more than once.) Check for extraneous solutions.

By Hand	By Technology (Desmos)
Solve: $\sqrt{x+2}+3=6$	Solve: $\sqrt{x+2}+3=6$

By Hand	By Technology (Desmos)
Solve: $\sqrt{x-5}=x-7$	Solve: $\sqrt{x-5}=x-7$

Solve the following using Desmos.

1) $\sqrt{4x-3}=5$

2) $\sqrt{x^2-9}=4$

3) $\sqrt{6x+46}=x+9$

4) $\sqrt{4x+13}+2=x$

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

6) $\sqrt{4x-15}+3=\sqrt{6x}$

7) $\sqrt{x-3}+5=|x-1|+1$

Word Problems

The period *T* of a pendulum (the time required to swing from one extreme to the other and back) is given by the formula $T = 2\pi\sqrt{\frac{L}{32}}$, where *L* is the length of the pendulum in feet.

By Hand

Find the period of a pendulum whose length is 4.5 feet.

Find the length of a pendulum whose period is 2.7 seconds.

By Technology

Car Crash Analysis: The speed, *s*, in mph of a vehicle can be approximated by $s = \sqrt{30df}$ where *d* is the drag factor of the road and *f* is the length of the skid marks in feet.

The drag factor for an asphalt road is 0.75.

a) What was the speed of a car when it started to skid on an asphalt road if it made 240 feet of skid marks?

b) How long would the skid marks be for a car whose speed was 100 mph?