

Now that we know what the square root function looks like graphed out, it's time to solve using the square root function.

1. The stopping distance for a car on dry pavement can be measured by the skid marks on the pavement after an accident. The initial speed of the car in miles per hour,  $s$ , is related to the distance it took to stop,  $d$ , in the equation  $s = \sqrt{22d}$ .

- a. How fast was a car going if it left a skid mark of 130 feet?

$$s = \sqrt{22(130)} = \sqrt{2860} = 53.48 \text{ mph}$$

- b. If a car is traveling at 40 mph, how far will the car travel before it comes to a complete stop?

$$40 = \sqrt{22d}$$

$$40^2 = (\sqrt{22d})^2$$

$$1600 = 22d$$

$$72.73 = d$$

2. Rabob drops an egg from 25 feet above the ground. The formula  $t = \frac{1}{4}\sqrt{25-h}$  describes the height of the egg,  $h$ , after a number of seconds,  $t$ .

- a. How long has the egg been falling when it is 16 feet high?

$$t = \frac{1}{4}\sqrt{25-16}$$

$$t = \frac{1}{4}\sqrt{9}$$

$$t = \frac{1}{4}(3)$$

$$t = \frac{3}{4} \text{ or } 0.75 \text{ sec.}$$

- b. How far off the ground is the egg after 1 second?

$$1 = \frac{1}{4}\sqrt{25-h}$$

$$4 = \sqrt{25-h}$$

$$16 = 25 - h$$

$$-9 = -h$$

$$-25 \quad -25$$

$$t(1) \quad t(1)$$

$$9 = \text{height}$$

Guidelines for solving square root equations:

1. Isolate the square root
2. Take both sides to the 2<sup>nd</sup> power
3. Solve the rest
4. Check your answer

Solve the following:

3.  $3\sqrt{2x-1} + 6 = -12$   
          -6       -6

Step 1

$$\begin{cases} 3\sqrt{2x-1} = -18 \\ \div 3 \qquad \div 3 \end{cases}$$

$$\sqrt{2x-1} = -6$$

Step 2

$$(\sqrt{2x-1})^2 = (-6)^2$$

$$\begin{cases} 2x-1 = 36 \\ +1 \qquad +1 \end{cases}$$

Step 3

$$\begin{cases} 2x = 37 \\ \div 2 \qquad \div 2 \end{cases}$$

$$x = \frac{37}{2} \text{ or } 18.5$$

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

4.  $3\sqrt{x-4} + 30 = 21$

Check

$$3\sqrt{2(18.5)-1} + 6 = -12$$

$$3\sqrt{37-1} + 6 = -12$$

$$3\sqrt{36} + 6 = -12$$

$$3(6) + 6 = -12$$

$$24 = -12 \quad \text{not true}$$

No Sol.

6.  $\frac{1}{2}\sqrt{2x+4} + 3 = 2.5$

Step 1 - Square roots already isolated ✓

Step 2  $(\sqrt{2x+1})^2 = (\sqrt{x})^2$

Check

$$\sqrt{2(-1)+1} = \sqrt{-1}$$

$$\sqrt{-1} = \sqrt{-1}$$

Step 3

$$\begin{cases} x+1 = 0 \\ -1 \qquad -1 \end{cases}$$

$$x = -1$$

No real sol.

@ -1 is an imaginary/complex answer