

Warm-up!

Solve the following equations:

a. $\sqrt{x^2} = \sqrt{25}$

$x^2 - 25 = 0$

$(x-5)(x+5) = 0$

$x = \pm 5$

b. $\sqrt{x^2} = \sqrt{81}$

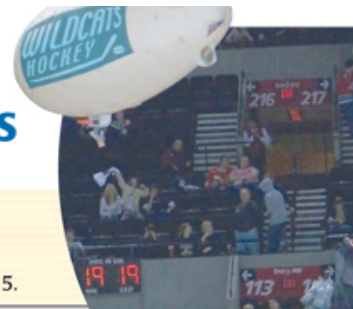
$x = \pm 9$

c. $\frac{3x^2}{3} = \frac{48}{3}$

$\sqrt{x^2} = \sqrt{16}$

$x = \pm 4$

9.4 Use Square Roots to Solve Quadratic Equations

**Before**

You solved a quadratic equation by graphing.

Now

You will solve a quadratic equation by finding square roots.

Why?

So you can solve a problem about a falling object, as in Example 5.

GOAL: Use square roots to solve quadratic equations.

Solve
Solutions
x intercepts
roots
zeros

What are we doing
today?

Solving equations,
except adding a new
twist: square roots!

Example 1: Two Easier Ones!

$$\frac{2x^2}{2} = \frac{32}{2}$$

$$x^2 = 16$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = \pm 4$$

$$6a^2 = 216$$

$$\frac{6a^2}{6} = \frac{216}{6}$$

$$a^2 = 36$$

$$\sqrt{a^2} = \sqrt{36}$$

$$a = \pm 6$$

Now What?

$$x^2 = 50$$

$$\sqrt{x^2} = \sqrt{50}$$

$$x = \pm 7.07$$

$$y^2 = 18$$

$$\sqrt{y^2} = \sqrt{18}$$

$$y = \pm 4.24$$

$$\frac{6a^2}{6} = \frac{72}{6}$$

$$a^2 = 12$$

$$\sqrt{a^2} = \sqrt{12}$$

$$a = \pm 3.46$$

Example 2: Adding a Step

$$12x^2 - 24 = 36$$

$$\begin{array}{r} +24 \quad +24 \\ \hline 12x^2 = 40 \\ \frac{12}{12} \quad \frac{40}{12} \end{array}$$

$$x^2 = 5$$

$$\sqrt{x^2} = \sqrt{5}$$

$$x = \pm 2.24$$

$$3x^2 - 11 = 7$$

$$\begin{array}{r} +11 \quad +11 \\ \hline 3x^2 = 18 \\ \frac{3}{3} \quad \frac{18}{3} \end{array}$$

$$x^2 = 6$$

$$\sqrt{x^2} = \sqrt{6}$$

$$x = \pm 2.45$$

Next 2-More Difficult!

$$\frac{3(2n - 11)}{3} = \frac{75}{3}$$

$$(2n - 11)^2 = 25$$

$$\sqrt{(2n - 11)^2} = \sqrt{25}$$

$$2n - 11 = \pm 5$$

$$\frac{2n}{2} = \frac{11 \pm 5}{2}$$

$$n = \frac{11 \pm 5}{2}$$

$$n = \frac{11+5}{2} \quad n = \frac{11-5}{2}$$

$$n = \frac{16}{2} \quad n = \frac{6}{2}$$

$$n = 8 \quad n = 3$$

$$\frac{6(4n - 3)^2}{6} = \frac{54}{6}$$

$$(4n - 3)^2 = 9$$

$$\sqrt{(4n - 3)^2} = \sqrt{9}$$

$$4n - 3 = \pm 3$$

$$\frac{4n}{4} = \frac{3 \pm 3}{4}$$

$$n = \frac{3 \pm 3}{4}$$

$$n = \frac{3+3}{4} \quad n = \frac{3-3}{4}$$

$$n = \frac{6}{4} = \frac{3}{2} \quad n = \frac{0}{4} = 0$$