## 7-2 Solving Quadratics by Square Roots

Vocabulary Review

1.A square of a number is: multiply by itself

2.A square root is the Inverse of a square.

3.If $b^2 = a$, then b is a square root of a.

4.All positive real numbers have two square roots a positive and a negative.

Square roots are written with a radical symbol $\sqrt{}$ the number or expression inside the radical symbol is the radicand.

5.Usually when we write square roots we use the symbol $\pm$ which is read plus or minus.

When we find square roots we ask ourselves: What number multiplied by itself gives me the radicand?

Zero has only 1 square root 0.

6. Negative numbers have no REAL square roots because:

NEGATIVE · NEGATIVE = positive

7. A perfect square is:

# that has an integer square root

Examples: 9, 36, 25

8. Square roots of numbers that are not perfect squares must be written using the radical symbol or approximated. These are called radical numbers.

**Solving Quadratic Equations**

Remember a quadratic equation written in standard form is: $ax^2 \cancel{+bx} + c = 0$

Today we are going to talk about what happens when b = 0.

Let b = 0 in the standard form, solve for x.

$ax^2 + c = 0$

$-c \quad -c$

$\frac{ax^2}{a} = \frac{-c}{a}$

$\sqrt{x^2} = \sqrt{\frac{-c}{a}}$

$x = \pm\sqrt{\frac{-c}{a}}$

Solve the following equations and write how many solutions each equation has:

$\sqrt{x^2} = \sqrt{4}$

$\boxed{x = \pm 2}$

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

$x = \pm\sqrt{5}$

$\sqrt{x^2} = \sqrt{0}$

$x = 0$

$x^2 = -1$

no real solution

Square Root Property

Solve quadratics by taking square root.

when b=0 in $ax^2+bx+c=0$ (ie: no x term)

Can you use the square root property?

$x^2 = 5$ $\quad$ $\cancel{3x^2 = x - 5}$ $\quad$ $x^2 - 12 = 0$

$\cancel{x^2 - x = 3}$ $\quad$ $3x^2 = 18$ $\quad$ $\cancel{x^2 - 2x + 1 = 0}$

Solve using the square root property

$p^2 - 9 = 0$

$+9 \quad +9$

$\sqrt{p^2} = \sqrt{9}$

$\boxed{p = \pm 3}$

You Try

$$3b^2 = 75$$

$$\frac{3b^2}{3} = \frac{75}{3}$$

$$\sqrt{b^2} = \sqrt{25}$$

$$b = \pm 5$$

Solve using the square root property

$$y^2 - 14 = 2$$

$$+14 \quad +14$$

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

$$y = \pm 4$$

You Try

$$3q^2 - 36 = 0$$

$$+36 \quad +36$$

$$\frac{3q^2}{3} = \frac{36}{3}$$

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

$$q = \pm\sqrt{12} = \pm 2\sqrt{3}$$

$12 \to 2 \cdot 6$, $6 \to 2 \cdot 3$

Solve using the square root property

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

$$x - 2 = \pm 5$$

$$+2 \quad +2$$

$$x = 2 \pm 5$$

$$\boxed{x = 7, -3}$$

$$\sqrt{25} = \sqrt{(5^2)}$$

$5 \cdot 5$

$\downarrow$

$5$

You Try

$$(q-5)^2-21=4$$

$+21 \quad +21$

$\sqrt{(q-5)^2}=\sqrt{25}$

$q-5=\pm 5$

$+5 \quad +5$

$q=5\pm 5$

$q=10, 0$

$$\frac{2(x+3)^2}{2}=\frac{64}{2}$$

$\sqrt{(x+3)^2}=\sqrt{32}$

$x+3=\pm\sqrt{32}$

$8 \quad \cancel{4}$

$4 \quad 2$

$x+3=\pm 4\sqrt{2}$

$-3 \quad -3$

$\boxed{x=-3\pm 4\sqrt{2}}$

Solving : $x^2=d$

If d > 0 then $x^2=d$ has 2 solutions: $x=\pm\sqrt{d}$

If d = 0 then $x^2=d$ has 1 solution: x = 0

If d < 0 then $x^2=d$ has no real solutions.