

12.4 EQ: **How DO YOU SOLVE QUADRATIC EQUATIONS?**

Solve quadratics by finding square roots: use if there is no linear term (i.e. no bx)

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

If $x^2 = 9$, then $x = \pm 3$

A) Isolate x^2 **Get $x^2 =$**

B) Square root both sides-remember you will need \pm !

$$\begin{aligned} 5x^2 - 180 &= 0 \\ +180 &+180 \\ \hline 5x^2 &= 180 \\ \frac{5x^2}{5} &= \frac{180}{5} \\ x^2 &= 36 \\ \sqrt{x^2} &= \sqrt{36} \\ x &= \pm 6 \\ x &= 6, -6 \end{aligned}$$

Solve each equation by taking square roots.

1) $x^2 = 36$

$$x = \pm 6$$

3) $n^2 = 81$

$$n = \pm 9$$

5) $p^2 - 4 = 32$

$$\frac{\cancel{+4} + 4}{}$$

$$p^2 = 36$$

$$p = \pm 6$$

2) $n^2 = 64$

$$n = \pm 8$$

4) $n^2 = 100$

$$n = \pm 10$$

6) $-8k^2 = -800$

$$\frac{-8}{-8} \quad \frac{-800}{-8}$$

$$k^2 = 100$$

$$k = \pm 10$$

$$7) a^2 + 1 = 37$$

$$\begin{array}{r} -1 \quad -1 \\ \hline \end{array}$$

$$a^2 = 36$$

$$a = \pm 6$$

$$9) 25x^2 + 8 = 24$$

$$\begin{array}{r} -8 \quad -8 \\ \hline \end{array}$$

$$\frac{25x^2}{25} = \frac{16}{25}$$

$$\sqrt{x^2} = \sqrt{\frac{16}{25}}$$

$$x = \pm \frac{4}{5}$$

$$\sqrt{\frac{16}{25}} = \frac{\sqrt{16}}{\sqrt{25}}$$

$$11) 4x^2 - 10 = 26$$

$$8) x^2 + 3 = 12$$

$$10) -1 + 81n^2 = 0$$

$$\begin{array}{r} +1 \quad +1 \\ \hline \end{array}$$

$$n^2 = \frac{1}{81}$$

$$n = \pm \frac{1}{9}$$

$$12) 16x^2 - 4 = -3$$

$$\begin{array}{r} +4 \quad +4 \\ \hline \end{array}$$

$$\frac{16x^2}{16} = \frac{1}{16}$$

$$x^2 = \frac{1}{16}$$

$$x = \pm \frac{1}{4}$$

12.5 EQ:

Solve quadratics by factoring: use when it is easy to factor!

Zero product property: **If $a \cdot b = 0$, then $a = 0$ and/or $b = 0$**

A) Get equation in standard form ($ax^2 + bx + c = 0$)
note: It's easier if you make sure ax^2 is positive

B) Factor

C) Set each factor equal to zero and solve.

Ex: $x^2 - 5x = 14$

$$x^2 - 5x - 14 = 0$$

$$(x + 2)(x - 7) = 0$$

$$\begin{array}{l} x + 2 = 0 \quad x - 7 = 0 \\ \underline{-2 \quad -2} \quad \underline{+7 \quad +7} \\ \boxed{x = -2} \quad \boxed{x = 7} \end{array}$$

Solve by the method you believe is best (factoring or square roots):

1) $x^2 + 12 = 7x$

2) $2x^2 + 6x = -4$

3) $6x^2 + 5 = -17x$

4) $x^2 - 1 = 0$

5) $x^2 - 24x = 0$

6) $2x^2 - 6 = 30$