

# Warm - Up

1. Solve by graphing:  $f(x) = x^2 + 4x - 12$

What is the a.o.s?

What is the vertex?

What is the y - intercept?

2. Solve by factoring:  $x^2 + 10x = -16$

## More Practice Solving by Factoring

$$x^2 - 3x = 0$$

$$x(x-3) = 0$$

$$x = 0 \text{ or } x = 3$$

$$x^2 + 4x + 3 = 0$$

$$(x+1)(x+3) = 0$$

$$x = -1 \text{ or } x = -3$$

$$x^2 + 5x - 6 = 0$$

$$(x+6)(x-1) = 0$$

$$x = -6 \text{ or } x = 1$$

$$x^2 + 11x + 24 = 0$$

$$(x+3)(x+8) = 0$$

$$x = -3 \text{ or } x = -8$$

### More Practice Solving by Factoring

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

$$\begin{array}{r} 2x - 1 = -8x^2 \\ +8x^2 \quad +8x^2 \\ \hline 8x^2 + 2x - 1 = 0 \end{array}$$

$$a=8 \quad b=2 \quad c=-1$$

$$a \cdot c = -8$$

$$\begin{array}{r|l} -1 & 8 \\ -2 & 4 \end{array}$$

$$(8x^2 - 2x) + (4x - 1)$$

$$2x(4x - 1) + 1(4x - 1)$$

$$(2x + 1)(4x - 1) = 0$$

$$x = -\frac{1}{2} \text{ or } x = \frac{1}{4}$$

$$x = 10x^2 - 2$$

$$2x^2 = 13x + 7$$

Solving using square roots.

→ Get  $x^2$  by itself  
Square Root both sides  
Write + and - solutions

Solve.

→ Use if  $b=0$

1.  $3x^2 - 24 = 0$

$$\begin{array}{r} +24 \quad +24 \\ 3x^2 = 24 \\ \frac{3x^2}{3} = \frac{24}{3} \\ \sqrt{x^2} = \sqrt{8} \end{array}$$

$$\begin{array}{l} x = \sqrt{8} \\ x = 2\sqrt{2} \end{array}$$

2.  $\sqrt{x^2} = \sqrt{56}$

$$x = \frac{\sqrt{56}}{\sqrt{4}\sqrt{14}} \text{ or } x = -\frac{\sqrt{56}}{\sqrt{4}\sqrt{14}}$$

$$x = \pm 2\sqrt{14}$$

3.  $-81 = -27x^2$

$$\begin{array}{r} -27 \quad -27 \\ \sqrt{3} = \sqrt{x^2} \end{array}$$

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

$$\begin{array}{l} x = -\sqrt{8} \\ x = -2\sqrt{2} \end{array}$$

$$x = \pm 2\sqrt{2}$$

4.  $-72 - 2x^2 = 0$

$$\begin{array}{r} +72 \quad +72 \\ -2x^2 = 72 \end{array}$$

$$\begin{array}{r} -2x^2 = 72 \\ -2 \quad -2 \\ \sqrt{x^2} = \sqrt{36} \end{array}$$

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

Can't sq. root a negative → No Real solutions

The height of a fireworks rocket in meters can be approximated by  $h = -5t^2 + 30t$ , where  $h$  is the height in meters and  $t$  is the time in seconds. Find the time it takes the rocket to reach the ground after it has been launched.

When rocket reaches ground, height = 0

$$-5t^2 + 30t = 0$$

$$-5t(t - 6) = 0$$

$$t = 0 \text{ or } t = 6$$

6 seconds

A golf player hits a golf ball from a tee with initial velocity of 80 feet per second. The height of the golf ball  $t$  seconds after it is hit is given by  $h = -16t^2 + 80t$ .

a) How long is the golf ball in the air?

$$-16t^2 + 80t = 0$$

$$-16t(t - 5) = 0$$

$$t = 0 \text{ or } t = 5$$

5 seconds

b) What is the maximum height of the golf ball?

max height  $\rightarrow$  Find vertex!

$$x = \frac{-b}{2a} = \frac{-80}{2(-16)} = \frac{-80}{-32} = 2.5$$

Max height = 100 feet

$$y = -16(2.5)^2 + 80(2.5) = 100$$

A relief package is released from a helicopter at 1600 feet. The height of the package can be modeled by the equation  $h = -16x^2 + 1600$ , where  $h$  is the height of the package and  $x$  is the time in seconds. The pilot wants to know how long it will take for the package to hit the ground.

The height of a flare fired from a deck of a ship in distress can be modeled by  $h = -16t^2 + 104t + 56$ , where  $h$  is the height of the flare above water and  $t$  is the time in seconds.

- a) Find the time it takes the flare to hit the water.
- b) How high is the flare after 2 seconds?

# Homework

Solve by Factoring Quadratics  
Practice WS

