

## Warm Up

Solve each of the following equations:

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

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

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

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

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

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

3.  $3x^3 - 75x = 0$

$$3x(x^2 - 25) = 0$$

$$3x(x-5)(x+5) = 0$$

$$x = 0, \pm 5$$

2.  $x^2 - 2x + 6 = 2x^2 - 6x - 26$

$$0 = x^2 - 4x - 32$$

$$0 = (x-8)(x+4)$$

$$x = 8 \text{ or } x = -4$$

4.  $\frac{3}{2}(p+2) = 9p^2$  (2)

$$3p + 6 = 18p^2$$

$$0 = 18p^2 - 3p - 6$$

$$0 = 6p^2 - p - 2$$

$$0 = 6p^2 - 4p + 3p - 2$$

$$0 = 2p(3p-2) + 1(3p-2)$$

$$0 = (3p-2)(2p+1)$$

$$p = \frac{2}{3} \text{ or } p = -\frac{1}{2}$$

## Creating a Quadratic Equation given Two Roots (x-int)

### EXAMPLE:

Create a quadratic equation that has the following roots...

a) -7 & 4

$$x = -7 \quad x = 4$$
$$(x + 7)(x - 4) = 0$$

$$x^2 - 4x + 7x - 28 = 0$$

$$x^2 + 3x - 28 = 0$$

b)  $-\frac{5}{2}$  &  $\frac{2}{3}$

$$\left(x + \frac{5}{2}\right)\left(x - \frac{2}{3}\right) = 0$$

$$x^2 - \frac{2}{3}x + \frac{5}{2}x - \frac{10}{6} = 0$$

$$x^2 + \frac{11}{6}x - \frac{5}{3} = 0$$

$$(2x + 5)(3x - 2) = 0$$

$$6x^2 + 11x - 10 = 0$$

ex:

$$5(x+2)^2 - 16 = 7$$

$$\frac{5(x+2)^2}{5} = \frac{23}{5}$$

$$\sqrt{(x+2)^2} = \sqrt{\frac{23}{5}}$$

$$x+2 = \pm \sqrt{\frac{23}{5}}$$

$$x = -2 \pm \sqrt{\frac{23}{5}}$$

$$-2 \pm \frac{\sqrt{115}}{5}$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$5(x^2 + 4x + 4) - 16 = 7$$

$$5x^2 + 20x + 20 - 16 - 7 = 0$$

$$5x^2 + 20x - 3 = 0$$

$$x = \frac{-20 \pm \sqrt{400 - 4(5)(-3)}}{2(5)}$$

$$x = \frac{-20 \pm \sqrt{460}}{10}$$

$$x = -\frac{20}{10} \pm \frac{\sqrt{460}}{10}$$

$$x = -2 \pm \frac{2\sqrt{115}}{10}$$

$$x = -2 \pm \frac{\sqrt{115}}{5}$$

## Solving Quadratics using Vertex Form

### EXAMPLE 1:

Determine the x-intercepts of the following...

$$y = x^2 + 4x + 1$$

$$0 = x^2 + 4x + 1$$

$$0 = (x^2 + 4x + \underline{4}) + 1 - \underline{4}$$

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

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

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

Not Allowed

to use

Quad.

Formula!!

if  $x^2 = 25$ ,  
then  $x = \pm 5$

Note

**GRAPH???**

### Example 2:

$$\text{Solve: } 5x^2 - 30x = 3$$

$$5(x^2 - 6x + \underline{9}) = 3 + \underline{45}$$

$$\frac{5(x-3)^2}{5} = \frac{48}{5}$$

$$\sqrt{(x-3)^2} = \sqrt{\frac{48}{5}}$$

$$x-3 = \pm \frac{\sqrt{48}}{\sqrt{5}}$$

$$x = 3 \pm \frac{4\sqrt{3}}{\sqrt{5}}$$

$$x = 3 \pm \frac{4\sqrt{15}}{5}$$

ex.

Solve  $7x^2 - 10x = 19$

① Do using Vertex Form

② Verify By Quad. Formula

$$7\left(x^2 - \frac{10}{7}x + \frac{25}{49}\right) = \frac{19}{1} + \frac{25}{7}$$

$$7\left(x - \frac{5}{7}\right)^2 = \frac{158}{7} \cdot \left(\frac{1}{7}\right)$$

$$\sqrt{\left(x - \frac{5}{7}\right)^2} = \sqrt{\frac{158}{49}}$$

$$x - \frac{5}{7} = \pm \frac{\sqrt{158}}{7}$$

$$x = \frac{5}{7} \pm \frac{\sqrt{158}}{7}$$

x =

$$x = \frac{10 \pm \sqrt{100 - 4(7)(19)}}{14}$$
$$x = \frac{10 \pm \sqrt{32}}{14}$$
$$x = \frac{10 \pm 2\sqrt{8}}{14}$$
$$x = \frac{5 \pm \sqrt{8}}{7}$$

EXAMPLE #3 - What is happening if the left side is negative?

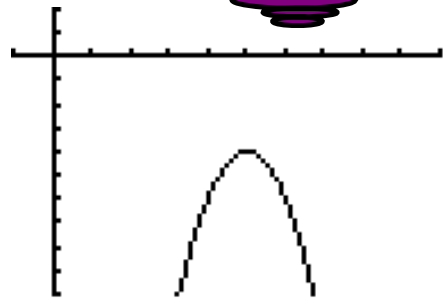
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$$\underline{-2(x - 5)^2 = 4}$$

$$\sqrt{\overset{-2}{(x-5)^2}} = \sqrt{\overset{-2}{4}}$$

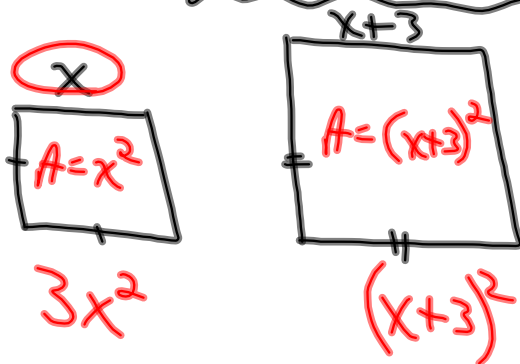
No "Real"  
Solutions

\*\*\*no x-intercepts\*\*\*



## Warm Up

A fashion magazine prints its photographs in two square sizes. The larger photographs measure 3 cm longer than the smaller photographs. Three of the smaller photographs have a combined area  $9.0 \text{ cm}^2$  more than the area of one of the larger size. Determine the dimensions of each size of photograph.



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

$$3x^2 - 9 = x^2 + 6x + 9$$

$$\frac{2x^2}{2} - \frac{6x}{2} - \frac{18}{2} = \frac{0}{2}$$

$$x^2 - 3x - 9 = 0$$

$$x = \frac{-3 \pm \sqrt{9 - 4(1)(-9)}}{2}$$

$$x = \frac{-3 \pm \sqrt{45}}{2}$$

$$x = 4.9 \text{ or } -\cancel{9}$$