Solve each quadratic equation by factoring.
Remember to follow these steps:

a. Rewrite equation so that is has this form: $ax^2 + bx + c = 0$
b. Factor completely.
c. Find the zeros of each factor.

1. $16x^3 + 36x^2 = 10x$

$16x^3 + 36x^2 - 10x = 0$

$-10x \quad -10x$

$2x(8x^2 + 18x - 5) = 0$

$4x - 1$

$2x$	$8x^2$	$-2x$
$+5$	$20x$	-5

$2x(4x-1)(2x+5) = 0$

$x = 0, \frac{1}{4}, -\frac{5}{2}$

-40, -2, 20, 18

2. $-54x = -3x^2 - 243$

$3x^2 - 54x + 243 = 0$

$3(x^2 - 18x + 81) = 0$

81, -9, -9, -18

$3(x-9)(x-9) = 0$

$x = 9$

3. $3x^3 - 2x^2 + 32 = 48x$

$3x^3 - 2x^2 - 48x + 32 = 0$

	$3x$	-2
x^2	$3x^3$	$-2x^2$
-16	$-48x$	32

$(3x-2)(x^2-16) = 0$

$(x \pm 4)$

$3x - 2 = 0$

$+2 \quad +2$

$x = \frac{2}{3} \quad x = 4 \quad x = -4$

4. $42x^2 + 24x = 0$

$6x(7x+4) = 0$

$x = 0, -\frac{4}{7}$

Standard Form of a Quadratic Equation:

$0 = ax^2 + bx + c$

Solutions to Quadratic Equations are the same as

x-intercepts of the graph.

When y=0 you are finding x-intercepts!

Property **Zero-Product Property**

For every real number a and b, if ab=0, then a=0 or b=0

Example: If (x+3)(x+2)=0, then x+3=0 or x+2=0

$x + 3 = 0$ $\quad -3 \quad -3$ $\qquad$ or $\qquad$ $x + 2 = 0$ $\quad -2 \quad -2$

$x = -3$ $\qquad\qquad\qquad\qquad$ $x = -2$

-3 and -2 are called:

- solutions to the equation
- Zeros of the factors
- Roots of the function
- They are also x-intercepts of the parabola

Sec 10-5: Factoring to Solve Quadratic Equations

1. Make sure the Quadratic Equation is in Standard Form
   $0 = ax^2 + bx + c$
2. Factor the Quadratic
3. Find the zeros of each factor

Solve each equation by factoring.

$x^2 - 8 = 2x$

Solve each equation by factoring.

$7x^2 - 21x = 0$

Solve each equation by factoring.

$6x^2 + 5x - 21 = 0$

Solve each equation by factoring.

$4x^3 + 4x^2 = 120x$

Solve each equation by factoring.

$9w^2 - 49 = 0$

Solve each equation by factoring.

$3x^2 - 11 = 2x^2 - 4x + 1$

$x^2 + 4x - 12 = 0$

	x	+6
x	x^2	6x
−2	−2x	−12

−12, −2, 6, 4

$(x+6)(x-2) = 0$

$x = -6$

$x = 2$

Solve each equation by factoring.

$2x^3 - 5x^2 = 18x - 45$

$2x^3 - 5x^2 - 18x + 45 = 0$

$(2x-5)(x^2-9)$

	2x	−5
x^2	$2x^3$	$-5x^2$
−9	−18x	45

$2x - 5 = 0$

$+5 \quad +5$

$x = \frac{5}{2}$

$(x \pm 3)$

$x = 3 \quad x = -3$

Quiz Class Review

1. A company wants to maximize its profit. The following function models the company's profit as a function of the number of components it manufactures:

$P(c) = -0.075c^2 + 240c + 27,500$

a) Find the company's maximum profit.

$-0.075(1600)\ldots$

$\$219,500$

b) How many components should it manufacture to realize this maximum profit?

$c = 1600$

$c = \frac{-b}{2a} = \frac{-240}{2(-0.075)}$

$(-240)/(2*-0.075)$

Find the y-intercept for each parabola.

1. $y = -4x^2 + 6x$

$y = 0$

2. $y = 9x^2 - 12 + 3x$

$y = 9x^2 + 3x - 12$

$y = -12$

Find the equation for the LOS of each parabola.

1. $y = 7x^2 + 8x - 11$

$x = \frac{-8}{2(7)} = \frac{-4}{7}$

2. $y = -2x^2 + 24$

$x = 0$

Find the coordinates of the Vertex for each parabola.

1. $y = 3x^2 + 36x - 19$

$(-6, -127)$

2. $y = -5x^2 + 18$

$(0, 18)$

Does each parabola have a Maximum or a Minimum?

1. $y = 0.0015x^2 - 87x - 101$

∪ min

2. $y = -126x + 508x^2 + 93$

min

Find all EXACT real solutions for each quadratic using square roots.

1. $313 - 5x^2 = 153$

$-313 \quad -313$

$-5x^2 = -160$

$x^2 = 32$

$x = \sqrt{32}$ 16 | 2

$= \pm 4\sqrt{2}$

2. $2(x-1)^2 + 7 = 57$

$2(x-1)^2 = 50$

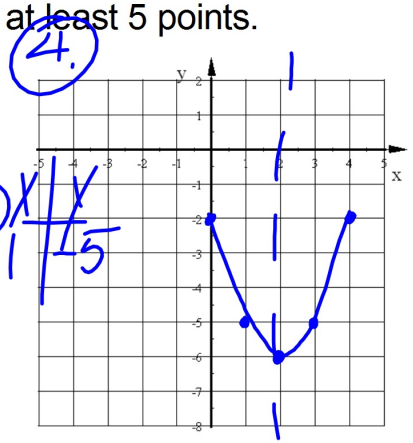
$(x-1)^2 = 25$

$x - 1 = \pm 5$

$x = 6, -4$

Graph this parabola using at least 5 points.

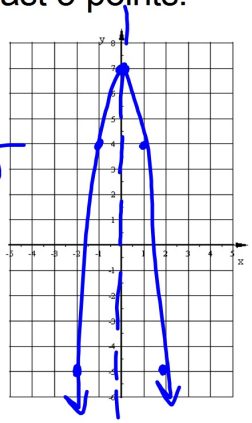
$y = x^2 - 4x - 2$

1. $x = \frac{4}{2(1)} = 2$
2. $(2, -6)$
3. $y = -2$
4. 
5. $\begin{array}{c|c} x & y \\ \hline 1 & -5 \end{array}$

Graph this parabola using at least 5 points.

$y = -3x^2 + 7$

$\begin{array}{c|c} x & y \\ \hline 1 & 4 \\ 2 & -5 \end{array}$



Solving quadratic equations: $ax^2 + bx + c = 0$

Square Roots

But, it ony works some of the time.

ONLY when b = 0

Factoring

But, this method only works some of the time too.

IXL #15 - BB.5 & BB.6 due Friday at 4pm!