Name: _____ Date: _____

Learning Goal 4.1	Given a quadratic equation, identify the number of solutions, zeros, roots or x – intercepts.

Equations vs. Functions

Solve.

- you control input
- function gives the output

Recall Graphing Quadratic Functions

- Vertex Form $y = a(x-p)^2 + q$
- Standard Form $y = ax^2 + bx + c$
- Factored Form $y = (x-m)(x-n)$

Example Determine the roots of the quadratic equation $x^2 - 6x + 9 = 0$ by graphing.

← what are the x-intercepts?

$-3 \times -3 = 9$

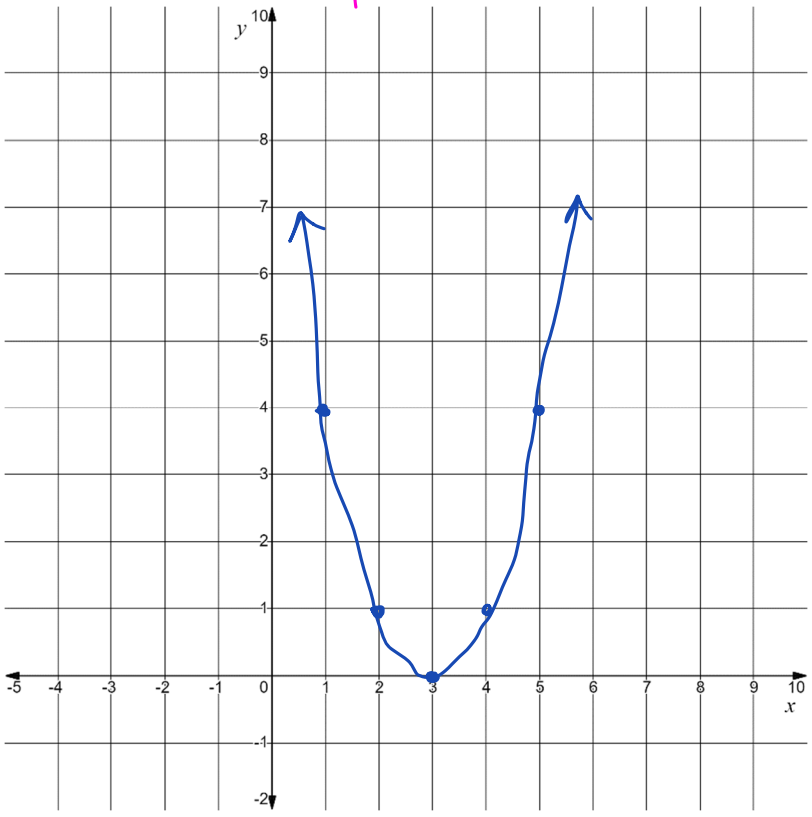
$-3 + -3 = -6$

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

$(x-3)^2 = 0$

$x - 3 = 0$

$x = 3$



Example Solve $3m^2 + 6m = -6$ by graphing.

$3m^2 + 6m + 6 = 0$

$3(m^2 + 2m + 2) = 0$

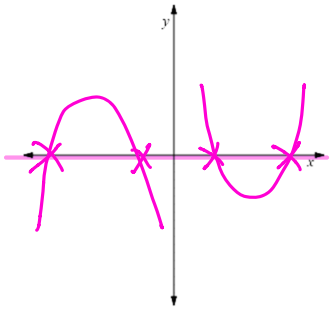
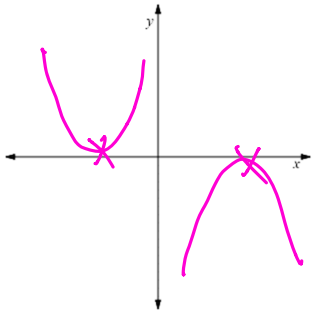
Not factorable

$\_ \times \_ = 2$

$\_ + \_ = 2$

↳ find another method!

Assignment p. 215 # 1, 2, 3 (without graphing), 5 – 10, 13, 15, 17, 18 Quiz Next Day!

or	Vertex	Number of x – intercepts or solutions
☺	below x-axis $g<0$	2 x-int. 
☹	$g>0$	
☺	$g=0$	1 x-int 
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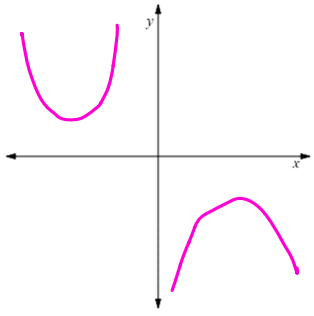
☺	$g>0$	0 x-int 
☹	$g<0$	

← still looking for x-intercepts.

Example Determine the number of zeros of the following functions.

a. $y = -0.07(x-3.1)^2 - 4.25$

☹ $g<0$

there are no zeros

b. $y = x^2 + 18x + 81$

$9 \times 9 = 81$

$9 + 9 = 18$

$= (x+9)(x+9)$

$= (x+9)^2$

there is one zero

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

$= -(x^2 - 4x) - 1$

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

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

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

there are two zeros.