Warm-up: Using Desmos, complete the solution to p.142#14.
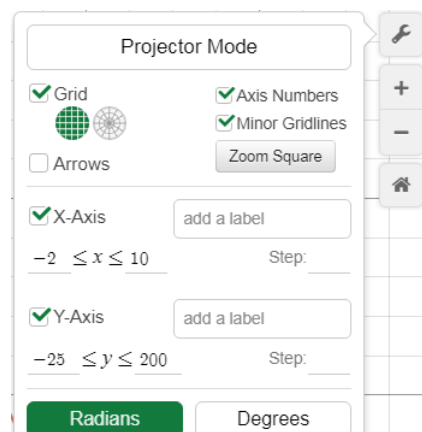   **Your solution will NOT be algebraic!!! Use the graph to answer the question.

Use graph settings: 🔧 $-2 \leq x \leq 10$

$-25 \leq y \leq 200$

Projector Mode	
✔ Grid	✔ Axis Numbers
	✔ Minor Gridlines
☐ Arrows	Zoom Square
✔ X-Axis	add a label
$-2 \leq x \leq 10$	Step:
✔ Y-Axis	add a label
$-25 \leq y \leq 200$	Step:
Radians	Degrees

Today's Learning Goal(s):

By the end of the class, I will be able to:
a) Use graphs to solve quadratic equations.
b) Connect graphs to the solutions of a quadratic equation.

MCF 3MI   3.3 Solving Quadratic Equations by Graphing

Date: __Mar. 19/18__
(**Every** lesson)

Ex. 1   Given the quadratic equation $0 = -x^2 + 4x + 12$,
solve it by sketching the corresponding quadratic function: $f(x) = -x^2 + 4x + 12$.
The x-intercepts (or zeros) of the function are the solutions (or roots) of the equation.

$\left(\frac{b}{2}\right)^2$

$ax^2 + bx + c$

$f(x) = -x^2 + 4x + 12$ (complete the square)
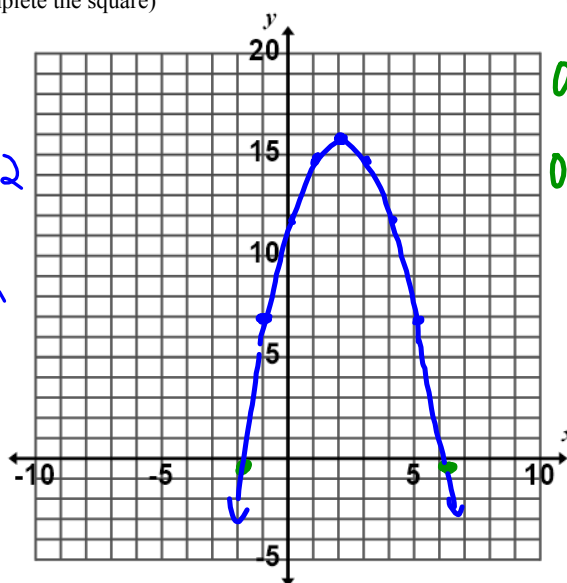
$$= -(x^2 - 4x) + 12$$
$$= -(x^2 - 4x + 4 - 4) + 12$$
$$= -\left((x-2)^2 - 4\right) + 12$$
$$= -(x-2)^2 + 4 + 12$$
$$= -(x-2)^2 + 16$$

$V(2, 16)$

M.G. $a = -1$

1	-1
2	-4
3	-9

$0 = -x^2 + 4x + 12$ (factor)

$$0 = -(x^2 - 4x - 12)$$
$$0 = -(x - 6)(x + 2)$$

$X - 6 = 0$ or $X + 2 = 7$

$X = 6$ or $X = -2$

A.O.S. $X = \dfrac{6 + (-2)}{2}$

$= \dfrac{4}{2}$

$X = 2$

$A \times B = 0$
$A = 0$ or $B = 0$

Ex. 2 Determine the solution to the quadratic equation $x^2 - 6x + 8 = 3$ by graphing.

Method 1

$\left(\dfrac{b}{2}\right)^2$

$y = x^2 - 6x + 8$

$= x^2 - 6x + 3^2 - 3^2 + 8$

$= (x-3)^2 - 9 + 8$

$= (x-3)^2 - 1$

$\cup(3, -1)$

$y = 3$
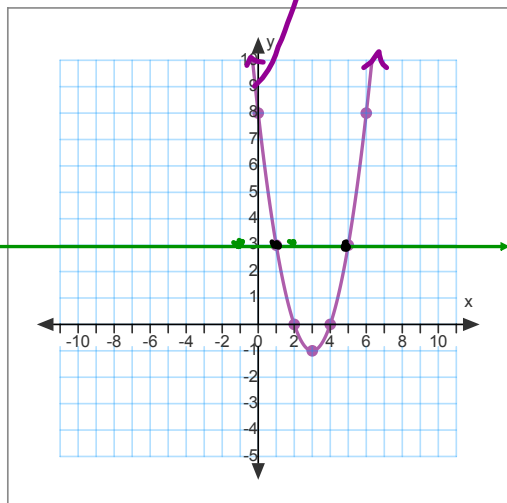
$y = 3$ $(-1, 3)$

$(2, 3)$

Method 2

$x^2 - 6x + 8 = 3$

$x^2 - 6x + 8 - 3 = 0$

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

$\therefore$ the graph are equal when $x = 1$ and $x = 5$
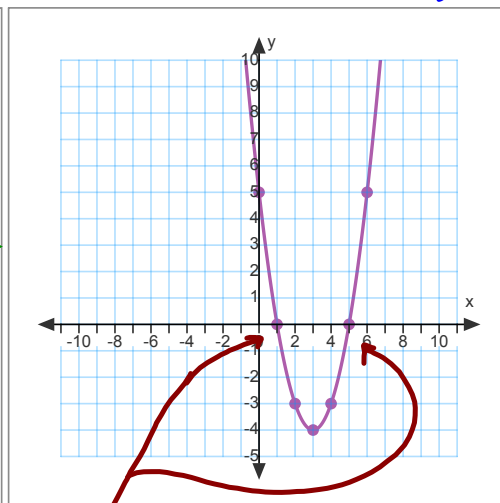
$y = x^2 - 6x + 5$

$= x^2 - 6x + 9 - 9 + 5$

$= (x-3)^2 - 4$

$\therefore \cup(3, -4)$

$\therefore$ the solutions are

$x = 1$ and $x = 5$

[the x-intercepts]

Homework: **READ p.154 CAREFULLY**, and ask me if anything is unclear!
          Complete: pp. 149-151 # 1b, 4ace, 11, 13
                    p. 155 #1, 2, 3ad, 5a, 6a, 7