Are there any Homework Questions you would like to see on the board?

Practice: pp. 56-58 #1 – 7

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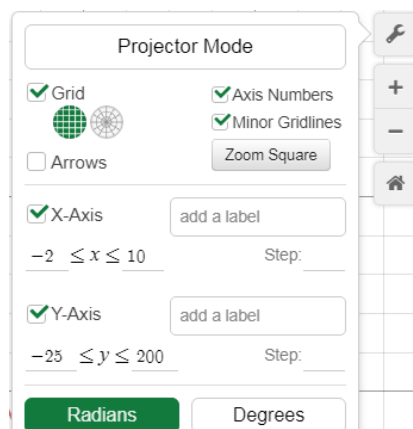   **Your solution will NOT be algebraic!!! Use the graph to answer the question.

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. 19/19_

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.

$\left(\dfrac{6}{2}\right)^2$

$= \left(\dfrac{-4}{2}\right)^2$

$ax^2 + bx + c$

$f(x) = -x^2 + 4x + 12$ (complete the square)

$$= -1(x^2 - 4x) + 12$$

$$= -1(x^2 - 4x + 2^2 - 2^2) + 12$$
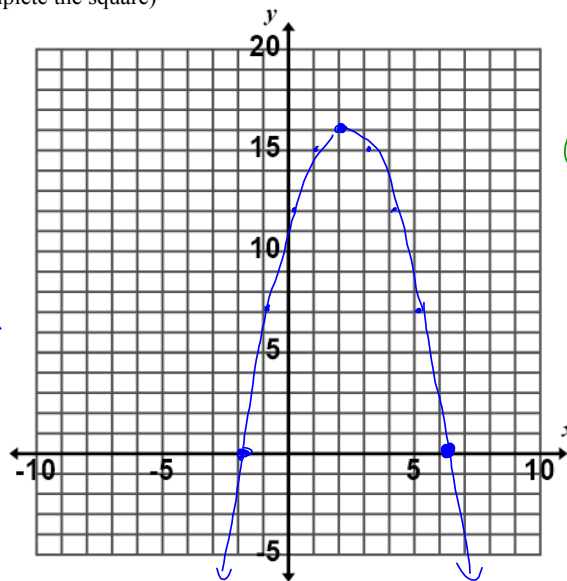
$$= -1(x^2 - 4x + 4 - 4) + 12$$

$$= -1(x-2)^2 - 1(-4) + 12$$

$$= -1(x-2)^2 + 4 + 12$$

$$= -1(x-2)^2 + 16$$

$$\therefore V(2, 16)$$

$$a = -1$$

∴ the solutions are:
x = -2 and x = 6

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

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

$$0 = -1(x - 6)(x + 2)$$

$$\boxed{[A \times B = 0]}$$

X - 6 = 0 on X + 2 = 0
X = 6   X = -2

Also

Axis: $X = \dfrac{6 + (-2)}{2}$

$$= \dfrac{4}{2}$$

$$X = 2$$

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

Method 1
(Intersection Method: Graph left and right separately. The solutions will be the P.O.I.)
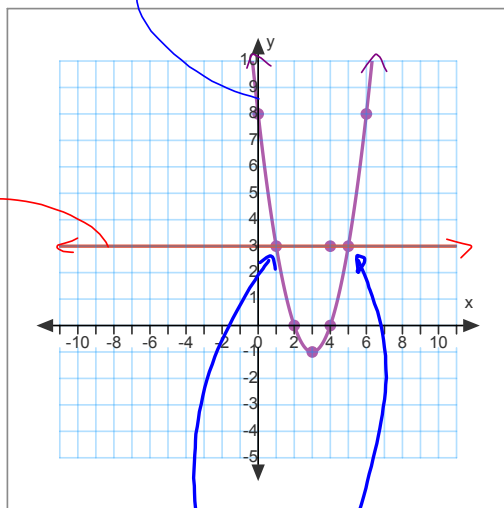
$$y = x^2 - 6x + 8 \qquad y = 3$$

$y = \underbrace{x^2 - 6x + 9}_{} \underbrace{-9 + 8}_{}$ $\Big|$ $(1, 3)$

$= (x - 3)^2 - 1$ $(4, 3)$

$V(3, -1)$

$a = 1$

(MG)

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

$y = 3$

the graphs are equal when $x = 1$ and $x = 5$

Method 2 $y = 3$
(Create 1 Equation = 0: The solutions (i.e. the zeros) will be the x-intercepts.)

$x^2 - 6x + 8 = 3$ $\left(\dfrac{b}{2}\right)^2$

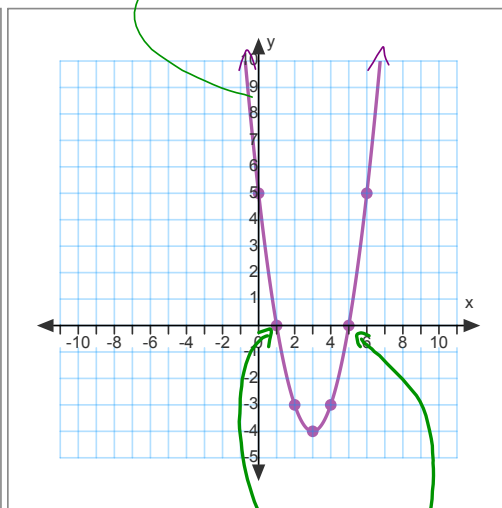$x^2 - 6x + 8 - 3 = 0$

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

Let $y = x^2 - 6x + 5$

$= x^2 - 6x + 3^2 - 3^2 + 5$

$= (x - 3)^2 - 9 + 5$

$y = (x - 3)^2 - 4$ $\boxed{y = x^2 - 6x + 5}$

$V(3, -4)$

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