Are there any questions from last day's assigned work you would like to see on the board?
Last day's Assigned Pracce: pp. 139-142 # 2bd, 3cd, 4bde, 5be, 6, 7cde, 12bcd, 14
READ pp.153-154

p. 139

2. Express each quadratic function in factored form. Then determine the zeros, the equation of the axis of symmetry, and the coordinates of the vertex.

a) $f(x) = 2x^2 + 12x$

b) $f(x) = x^2 - 7x + 12$

c) $f(x) = -x^2 + 100$

d) $f(x) = 2x^2 + 5x - 3$ P.: -6   S: 5

b)

$0 = (x-3)(x-4)$

$x = 3$ or $x = 4$

A of S: $x = \dfrac{3+4}{2}$

$x = \dfrac{7}{2}$

or $x = 3.5$

$f\left(\dfrac{7}{2}\right) = \left(\dfrac{7}{2}\right)^2 - 7\left(\dfrac{7}{2}\right) + 12$

$= \dfrac{49}{4} - \dfrac{49}{2} + 12$

$= \dfrac{49}{4} - \dfrac{98}{4} + \dfrac{48}{4}$

$= \dfrac{1}{4}$

$\therefore V\left(\dfrac{7}{2}, \dfrac{1}{4}\right)$

d)

$= 2x^2 + 6x - 1x - 3$

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

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

$x = -3$ $2x - 1 = 0$
                  $2x = 1$
                  $x = \dfrac{1}{2}$

A of S:

$x = \dfrac{-3 + \frac{1}{2}}{2}$

$= \dfrac{-\frac{6}{2} + \frac{1}{2}}{2}$

$= \dfrac{-\frac{5}{2}}{2}$

$x = -\dfrac{5}{4}$

$f\left(-\dfrac{5}{4}\right)$

$= 2\left(\dfrac{5}{4}\right)^2 + 5\left(-\dfrac{5}{4}\right) - 3$

$= 2\left(\dfrac{25}{16}\right) - \dfrac{25}{4} - 3$

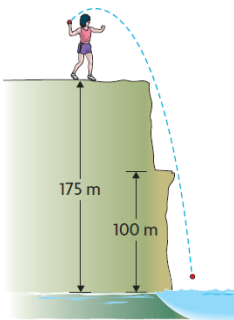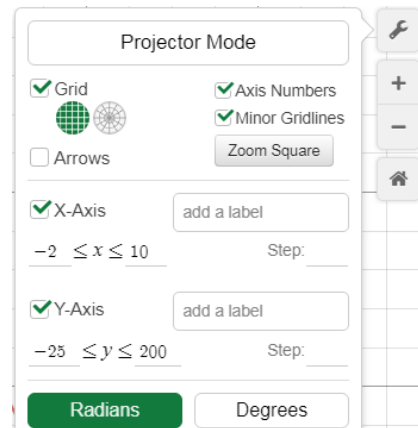$= \dfrac{25}{8} - \dfrac{50}{8} - \dfrac{24}{8}$

$= -\dfrac{49}{8}$

$\therefore V\left(\dfrac{-5}{4}, \dfrac{-49}{8}\right)$

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

14. A ball is thrown into water from a cliff that is 175 m high. The height
of the ball above the water after it is thrown is modelled by the
function $h(t) = -5t^2 + 10t + 175$, where $h(t)$ is the height in
metres and t is time in seconds.
a) When will the ball reach the water below the cliff?
b) When will the ball reach a ledge that is 100 m above the water?

175 m

100 m

$(0, 175)$ $(1, 180)$

$(5, 100)$

$(7, 0)$
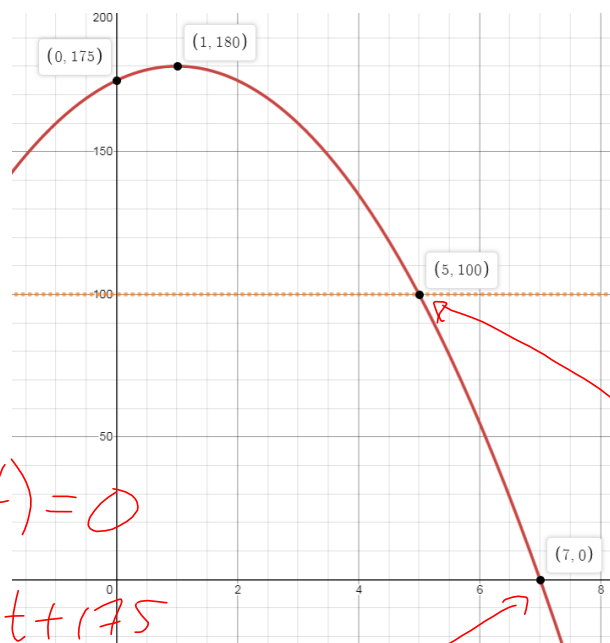
a) when is $h(t) = 0$

$\Rightarrow 0 = -5t^2 + 10t + 175$

$\therefore t = 7$ seconds

b) when $h(t) = 100$

$100 = -5t^2 + 10t + 175$

$\therefore t = 5$ seconds

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: _Oct. 10/19_
(**Every** lesson)
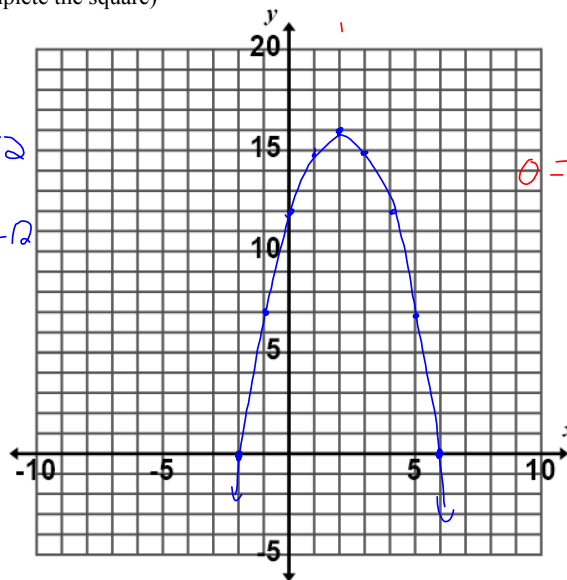
Ex. 1   Given the quadratic equation $0 = -x^2 + 4x + 12$,
solve it by sketching the corresponding quadratic function: $f(x) = -x^2 + 4x + 12$.
$\left(\frac{b}{2a}\right)^2$ The x-intercepts (or zeros) of the function are the solutions (or roots) of the equation.

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

$$= -(x^2 - 4x) + 12$$
$$= -(x^2 - 4x + 4 - 4) + 12$$
$$= -(x - 2)^2 - (-4) + 12$$
$$= -(x-2)^2 + 4 + 12$$
$$= -(x-2)^2 + 16$$
$$\therefore V(2, 16)$$

MG $a = -1$

1	1	-1
2	4	-4
3	9	-9
4	16	-16

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

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

$\therefore X - 6 = 0$ or $X + 2 = 0$
$X = 6$ $X = -2$

$\therefore$ the x-intercepts are
$X = -2$ and $X = 6$

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.)

$$y = x^2 - 6x + 8 \qquad y = 3$$

$$= x^2 - 6x + 9 - 9 + 8$$

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

$$\mathrm{V}(3, -1)$$

Method 2 $y = 3$

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

$$x^2 - 6x + 8 = 3 \qquad y = x^2 - 6x + 5$$
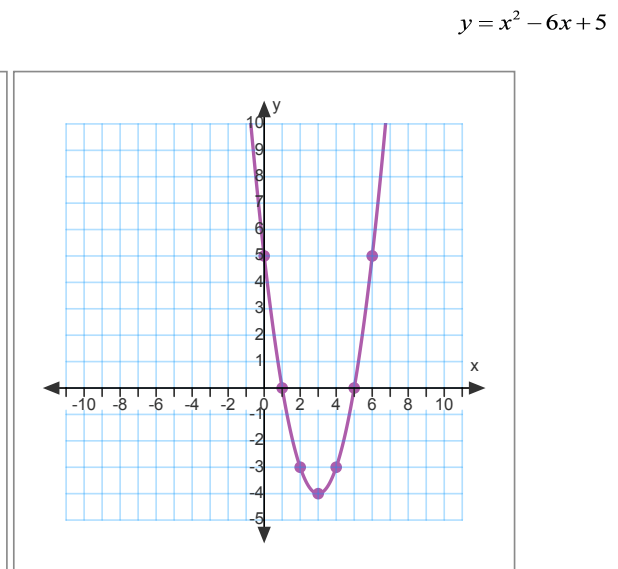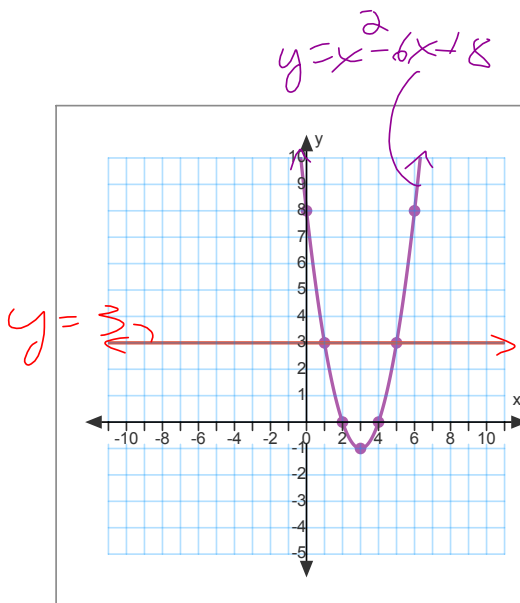
$$x^2 - 6x + 8 - 3 = 0 \qquad = x^2 - 6x + 9 - 9 + 5$$

$$x^2 - 6x + 5 = 0 \qquad = (x - 3)^2 - 4$$

$$\mathrm{V}(3, -4)$$

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

$$y = 3$$

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

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

the solutions are $x = 1$ and $x = 5$
(the x-intercepts)

Today's Assigned Pracce:

> **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

Print tomorrow's lesson in advance from the website?