Are there any questions from last day's assigned work you would like to see on the board?

Last day's work: pp. 186-188 # 1 – 15 (All Mulple Choice)

Note: p. 184 5a,b are on the next screens

Today's Learning Goal(s):

By the end of the class, I will be able to:

a) Compare the standard and vertex forms of a quadratic function.

p. 184 **5.** Solve by graphing.

a) $x^2 + 6x - 3 = -3$

$y = -3$

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

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

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

$= (x+3)^2 - 12$ $\therefore V(-3, -12)$

$x = \frac{-b}{2a}$

$= \frac{-(6)}{2(1)}$

$= \frac{-6}{2}$

$= -3$

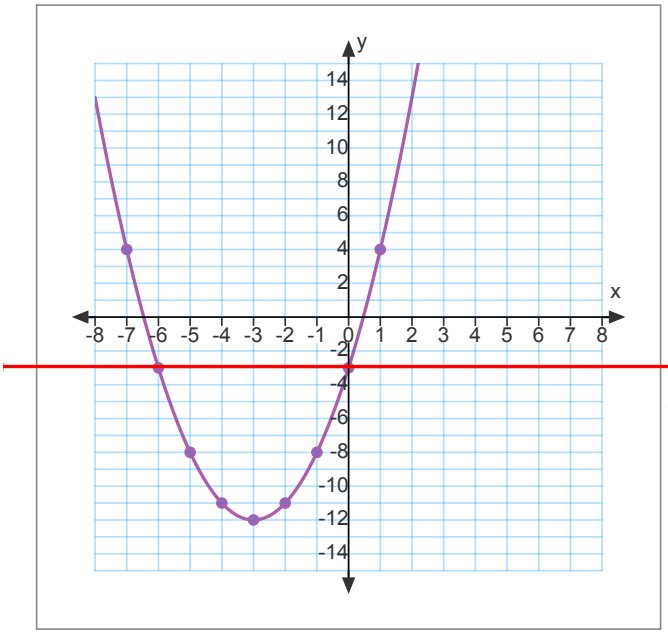
if $x = -3$

$y = (-3)^2 + 6(-3) - 3$

$= 9 - 18 - 3$

$= -12$

$\therefore V(-3, -12)$



$y = x^2 + 6x$

$\therefore$ the solutions are $x = -6$ and $x = 0$

$y = -3$

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

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

$x^2 + 6x = 0$

$\therefore y = x^2 + 6x$

Axis: $x = \frac{-b}{2a}$

$= \frac{-(6)}{2(1)}$

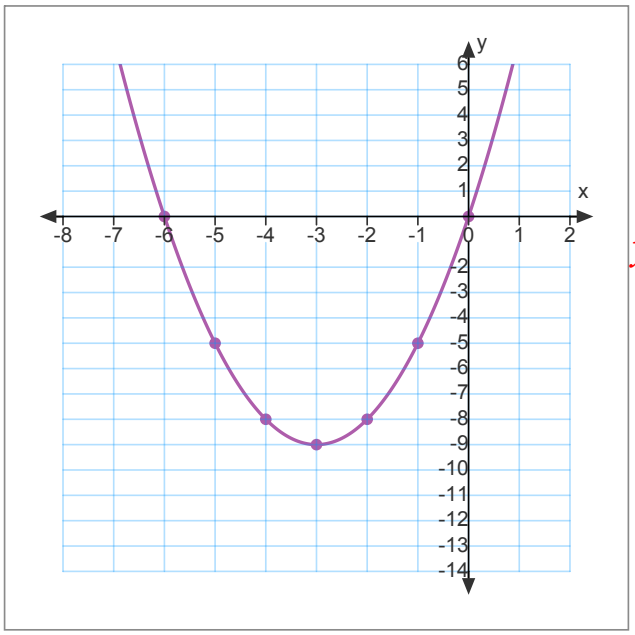
$= -3$

$y = (-3)^2 + 6(-3)$

$= 9 - 18$

$= -9$

$\therefore V(-3, -9)$



$\therefore$ the solutions are $x = -6$ and $x = 0$

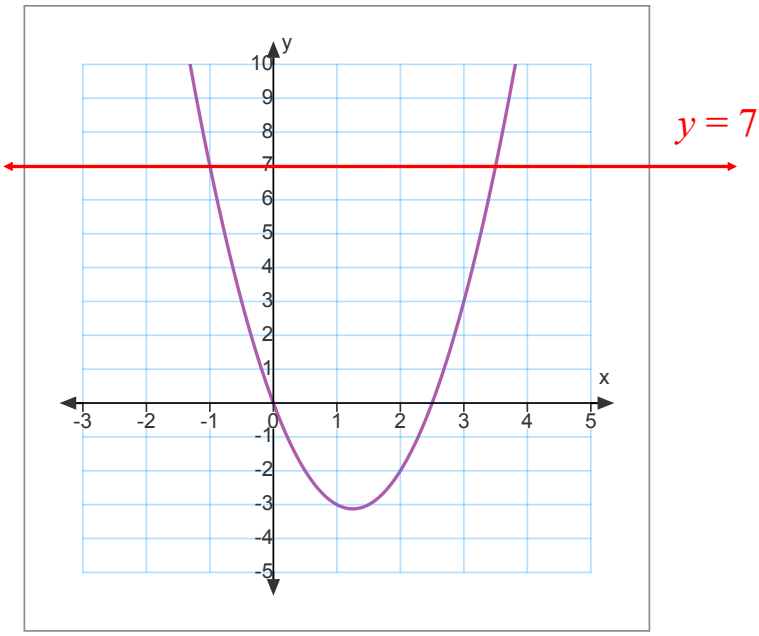
p. 184 **5.** Solve by graphing.

b) $2x^2 - 5x = 7$

$y = 7$

$y = 2x^2 - 5x$

$= x(2x-5)$



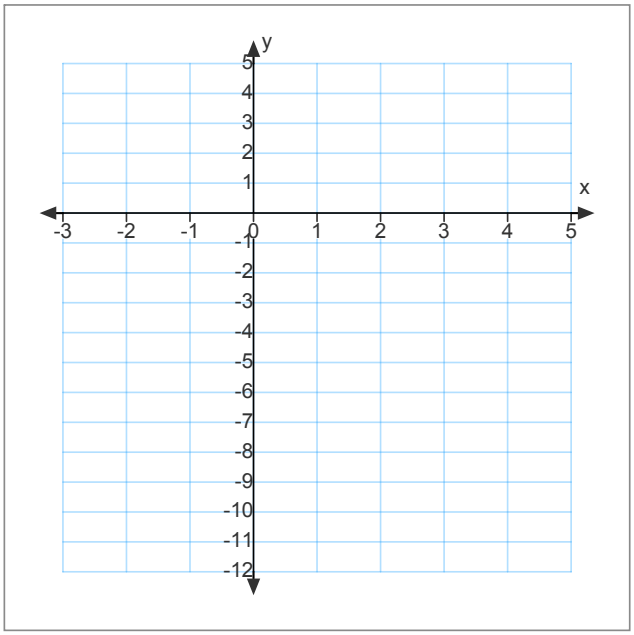
$y = 2x^2 - 5x - 7$

AOS: $x = \frac{-b}{2a}$

$= \frac{-(-5)}{2(2)}$

$= \frac{5}{4}$

$= 1.25$



MCF 3MI

4.1 The Vertex Form of a Quadratic Function

Date: Oct. 21/19

VERTEX FORM	vs.	STANDARD FORM
$f(x) = a(x-h)^2 + k$	V(h,k)	$f(x) = ax^2 + bx + c$
$g(w) = -(w-15)^2 + 225$	(Show by expanding)	$f(w) = -w^2 + 30w$

We are able to obtain "standard form" by expanding the vertex form.

(use the back of the handout)

$g(w) = -(w-15)(w-15) + 225$

$= -(w^2 - 30w + 225) + 225$

$= -w^2 + 30w - 225 + 225$

$= -w^2 + 30w$

Ex. 1: Given $f(x) = 3(x+4)^2 - 8$, determine the:

a) direction of opening: upwards

b) equation of the axis of symmetry: $x = -4$

c) ~~max~~ min value: -8

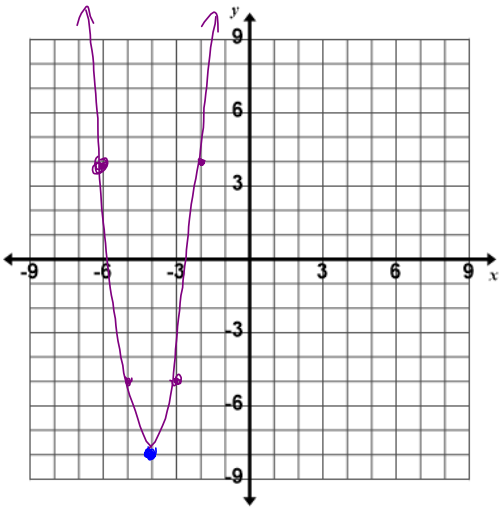
d) vertex: $(-4, -8)$

e) State the Domain and Range

D: $\{x \in \mathbb{R}\}$

R: $\{y \in \mathbb{R} \mid y \geq -8\}$

f) sketch of the graph (no technology)



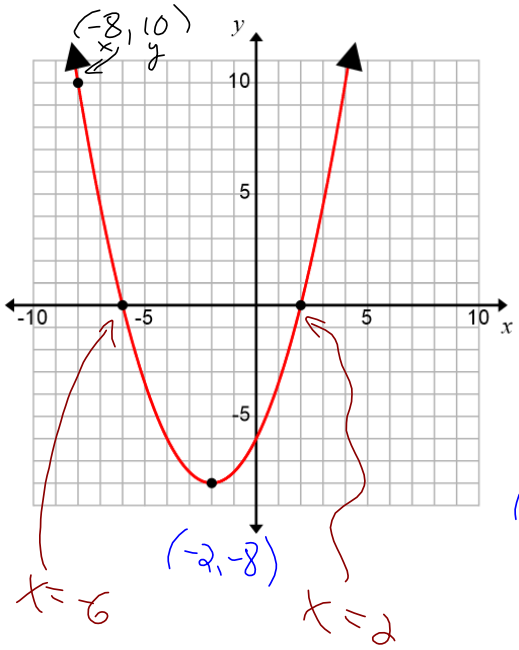
MG $a = 3$

1 → 3

2 → 12

3 → 27

Ex. 2: Given the diagram below, write the quadratic function in each of the 3 forms.



Vertex Form

$y = a(x-h)^2 + k$

$y = a(x+2)^2 - 8$

$10 = a(-8+2)^2 - 8$

$10 = a(-6)^2 - 8$

$10 = 36a - 8$

$10 + 8 = 36a$

$18 = 36a$

$\frac{18}{36} = a$

$\frac{1}{2} = a$

$\therefore y = \frac{1}{2}(x+2)^2 - 8$ is the equation in vertex form

Factored Form

$y = a(x-r)(x-s)$

$y = a(x+6)(x-2)$

$10 = a(-8+6)(-8-2)$

$10 = a(-2)(-10)$

$10 = 20a$

$\frac{10}{20} = a$

$\frac{1}{2} = a$

$\therefore y = \frac{1}{2}(x+6)(x-2)$ is the equation in factored form

Standard Form

$y = \frac{1}{2}(x+6)(x-2)$

$= \frac{1}{2}(x^2 - 2x + 6x - 12)$

$= \frac{1}{2}(x^2 + 4x - 12)$

$= \frac{1}{2}x^2 + 2x - 6$

Ex. 3: What information about the parabola does each form provide?

Standard Form	Factored Form	Vertex Form
$f(x) = ax^2 + bx + c$	$f(x) = a(x - r)(x - s)$	$f(x) = a(x - h)^2 + k$
c is the y-intercept	x-intercepts $x = r$ or $x = s$	vertex (h, k)

Ex. 4: Write the equation of the quadratic function, first in vertex form and then in standard form, given vertex $(-6, 7)$ and passing through $(2, -9)$.

(x, y)

$y = a(x+6)^2 + 7$

$-9 = a(2+6)^2 + 7$

$-9 = a(8)^2 + 7$

$-9 - 7 = 64a$

$-16 = 64a$

$\frac{-16}{64} = a$

$a = -\frac{1}{4}$

$\therefore y = -\frac{1}{4}(x+6)^2 + 7$

is the equation in vertex form.

$y = -\frac{1}{4}(x+6)^2 + 7$

$= -\frac{1}{4}(x^2 + 12x + 36) + 7$

$= -\frac{1}{4}x^2 - 3x - 9 + 7$

$= -\frac{1}{4}x^2 - 3x - 2$

is the equation in standard form.

Be prepared for tomorrow's Unit 3 Summative!!

Today's Assigned Practice:

READ pp. 196 – 203

pp. 203-205 # 1 – 4, 6, 8 – 10