FIRST: SWYK 4.1 (*Formative*)

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

pp. 232-233 # 1ac, 2abc, 5, 7, 8a, 11
Work ahead on Mid-chapter Review
p. 226 # 8 – 11

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.232 #5

$f(x) = kx^2 - 8x + k$ has no zeros

$a = k \quad b = -8 \quad c = k$

$b^2 - 4ac < 0$

$(-8)^2 - 4(k)(k) < 0$

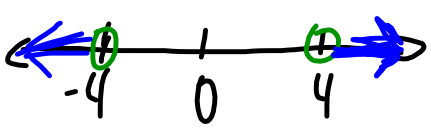
$64 - 4k^2 < 0$

$4(16 - k^2) < 0$

$4(4-k)(4+k) < 0$

Aside

$x < 3$



Check $k = 0$

$LS = 4(4-0)(4+0) \quad RS = 0$

$= 4(4)(4)$

$= 64 \quad LS > RS$

False

MCF 3MI 4.1 The Vertex Form of a Quadratic Function Date: Apr. 3/18

VERTEX FORM ***vs.*** ***STANDARD FORM***

$g(w) = -(w-15)^2 + 225$ (Show by expanding) $f(w) = -w^2 + 30w$

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

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

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

$= -w^2 + 30w$

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

a) direction of opening upwards ($a > 0$)

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

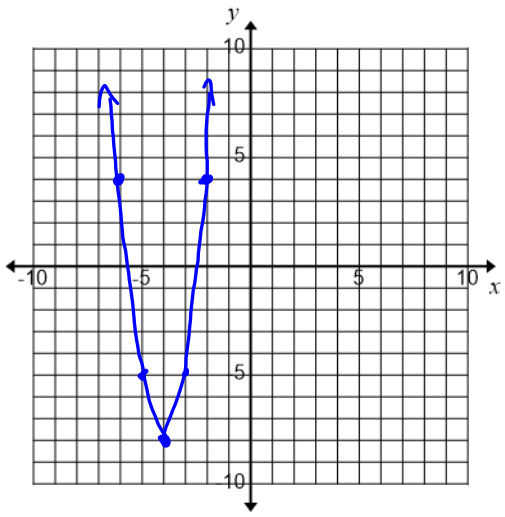
MG $a = 3$

1 $\times 3$

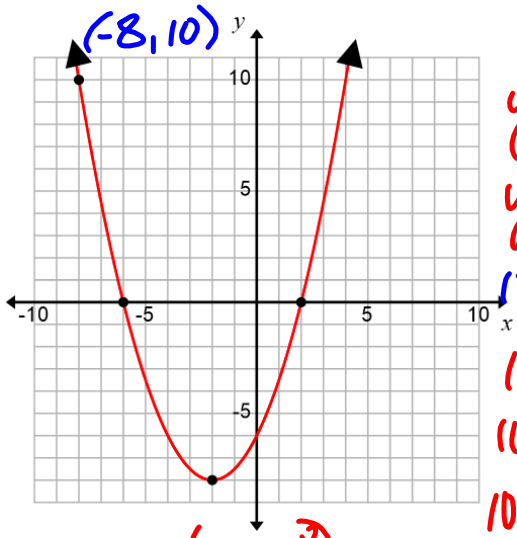
2 $\times 4 \to 12$

3 $\times 9 \to 27$

f) the sketch of the graph (no technology)



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



vertex form

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

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

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

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

$10 = 36a - 8$

$10 + 8 = 36a$

$18 = 36a$

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

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

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

factored form

$r = -6 \quad s = 2$

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

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

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

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

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

$10 = 20a$

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

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

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

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

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

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

$\therefore y = \frac{1}{2}x^2 + 2x - 6$ is the eqn in standard form.

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

Standard Form	Factored Form	Vertex Form
$y=ax^2+bx+c$	$y=a(x-r)(x-s)$	$y=a(x-h)^2+k$
y-intercept = c ∴	x-intercepts: (zeros) $x=r$ 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) .

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

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

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

$-9-7=64a$

$-16=64a$

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

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

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

(x, y)

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

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

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

$\therefore y=\frac{-1}{4}x^2-3x-2$ is the eq'n in standard form.

Today's Homework:

p.232 # 2def, 4 **AND**
pp. 203-205 # 1 – 4, 8 – 10 **AND**
Work ahead on Mid-chapter Review: p. 226 # 1 – 4