Before we begin, are there any questions from last day's work? Wkst 5.5

p. 275 Challenge: #12, 13   4e f
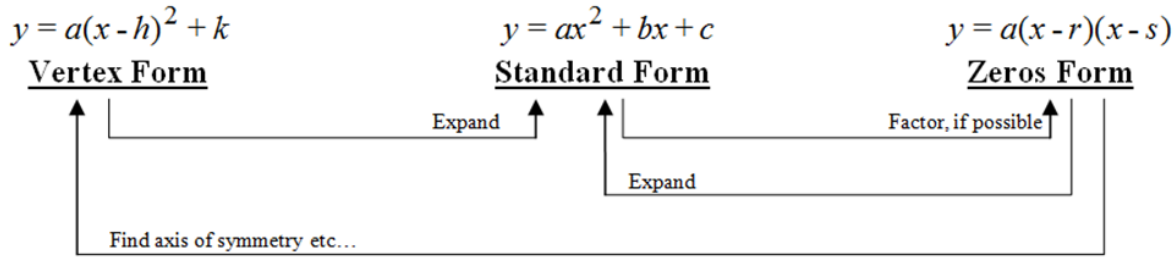
(Reminder: Unit Summative is Wednesday, May 10th.)

Today's Learning Goal(s):

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

a) find the zeros of a quadratic (in standard form), by factoring.
b) find the vertex, by first finding the axis of symmetry.
   [half way between the zeros (x-intercepts)].
c) solve problems using the above methods.

MBF 3CI   5.6 Solve Problems Involving Quadratic Relations (Day 1)   Date: May 3/17

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

$$y = ax^2 + bx + c$$
Standard Form

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

Expand

Factor, if possible

Expand

Find axis of symmetry etc…

Ex.1 Given the quadratic relation $y = -2x^2 - 8x + 24$

a) Does this relation have a maximum or a minimum value?
        How do you know? → a is negative.

b) Find the zeroes of the relation.

c) Determine the x-coordinate of the maximum or minimum point.

d) What is the equation of the axis of symmetry?

e) Find the maximum or minimum.

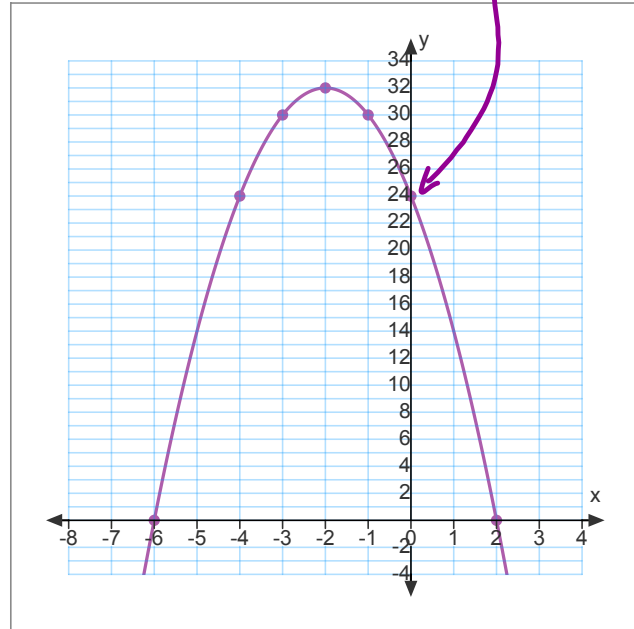f) Write the relation in **vertex** form.

g) Graph the relation.

y-int
$c = 24$

b) $y = -2x^2 - 8x + 24$

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

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

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

c) $x = \dfrac{2 + (-6)}{2}$

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

d) $x = -2$

e) $y = -2(x - 2)(x + 6)$
$= -2(-2 - 2)(-2 + 6)$
$= -2(-4)(4)$
$= 32$

$\therefore V(-2, 32)$

f)   h   k

$y = -2(x + 2)^2 + 32$

Ex. 2 Find the equation of the axis of symmetry for each quadratic relation.

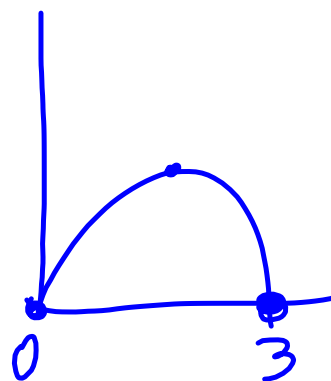a) $y = (x+3)(x+7)$ b) $y = -3(x+2)(x-8)$

$0 = (x+3)(x+7)$

$x = -3$ $x = -7$

$x = \dfrac{-3+(-7)}{2}$

$= \dfrac{-10}{2}$

$= -5$

Ex. 3 A water balloon is launched upwards. The balloon follows a path modelled by the relation:
$h = -4t^2 + 12t$, where h is the balloon's height above the ground, in metres, and t is the time, in seconds.

a) When will the balloon hit the ground?

Let $h = 0$

$0 = -4t^2 + 12t$

$= -4t(t-3)$

$-4t = 0$ $t - 3 = 0$

$\dfrac{-4t}{-4} = \dfrac{0}{-4}$ $t = 3$

$t = 0$

the balloon hits the ground at ___3 Sec.___

b) What is the balloon's maximum height?

$t = \dfrac{0+3}{2}$ $h = -4t(t-3)$

$= 1.5$ $= -4(1.5)(1.5-3)$

$= -4(1.5)(-1.5)$

$= 9$

the balloon's maximum height is ___9 m___

Entertainment: pp. 281-284 #1ad, 2ad, 3abd, 4, 5ace, 13, 14ab