Are there any questions from last day's assigned work 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) Complete the square to obtain the vertex form of a quadratic function.
b) Complete the square with functions that involve fractional values.

If time, Return and Correct Unit 3 Summative

p. 232 **2.** Determine the number of real solutions of each quadratic equation. Do not solve.

a) $x^2 + 3x - 4 = 0$

$a=1 \quad b=3 \quad c=-4$

b^2-4ac

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

$=9+16$

$=25$

$\therefore b^2-4ac>0$

$\therefore$ 2 Real distinct solutions

b) $2x^2 - x + 5 = 0$

$a=2 \quad b=-1 \quad c=5$

b^2-4ac

$=(-1)^2-4(2)(5)$

$=1-40$

$=-39$

$\therefore b^2-4ac<0$

$\therefore$ No Real Solutions

c) $4x^2 - 8x = 4x - 9$

p. 232 **5.** For what value(s) of k does the function $f(x) = kx^2 - 8x + k$ have no zeros?

$b^2-4ac<0$ $a=k$ $b=-8$ $c=k$

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

$64-4k^2<0$

↳ NOT Required in this course.

7. For what value of k does $8x^2 + 4x + k = 0$ have two distinct real solutions? one solution? no solution?

$a=8$ $b=4$ $c=k$

$b^2-4ac>0$

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

$16-32k>0$

$-32k>-16$

$k<\frac{-16}{-32}$

$k<\frac{1}{2}$

$b^2-4ac=0$

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

$b^2-4ac<0$

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

$16-32k<0$

$-32k<-16$

$k>\frac{-16}{-32}$

$k>\frac{1}{2}$

8. a) Explain how you would solve this problem: For what value of k does the function $f(x) = 3x^2 - 5x + k$ have only one zero?

b) Use your strategy to find the value of k.

MCF 3MI

4.2 Relating the Standard and Vertex Forms (by Completing the Square)

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

Date: Oct. 28/19

STANDARD FORM vs. VERTEX FORM

$y = -8x^2 + 80x + 7$ $\left(\frac{1}{2}b\right)^2$ $y = -8(x-5)^2 + 207$

We are able to obtain "vertex form" by completing the square.

$y = -8x^2 + 80x + 7$

$= -8(x^2 - 10x) + 7$

$= -8(x^2 - 10x + 5^2 - 5^2) + 7$

$= -8(x-5)^2 - 8(-25) + 7$

$= -8(x-5)^2 + 200 + 7$

$= -8(x-5)^2 + 207$

$(x-5)^2$

$(x-5)(x-5)$

$= x^2 - 5x - 5x + 25$

$= x^2 - 10x + 25$

Ex. 1 Write each quadratic function in vertex form by completing the square.

a) $y = x^2 + 8x + 10$

$= x^2 + 8x + 16 - 16 + 10$

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

b) $f(x) = -4x^2 + 24x + 5$

$= -4(x^2 - 6x) + 5$

$= -4(x^2 - 6x + 9 - 9) + 5$

$= -4(x-3)^2 - 4(-9) + 5$

$= -4(x-3)^2 + 36 + 5$

$= -4(x-3)^2 + 41$

Ex. 2 Write $y = 2x^2 - 3x - 4$ in vertex form.

$y = 2(x^2 - \frac{3}{2}x) - 4$

$= 2(x^2 - \frac{3}{2}x + (\frac{3}{4})^2 - (\frac{3}{4})^2) - 4$

$= 2(x - \frac{3}{4})^2 + 2(-\frac{9}{16}) - 4$

$= 2(x - \frac{3}{4})^2 - \frac{9}{8} - \frac{32}{8}$

$= 2(x - \frac{3}{4})^2 - \frac{41}{8}$

$\frac{1}{2}(\frac{3}{2}) = \frac{3}{4}$

$0.5(1.5)$

0.75

$y = 2(x^2 - 1.5x) - 4$

$= 2(x^2 - 1.5x + 0.75^2 - 0.75^2) - 4$

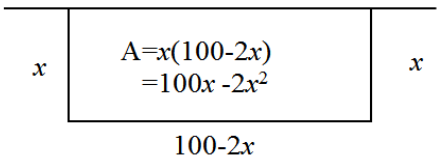
$= 2(x - 0.75)^2 + 2(-0.5625) - 4$

$= 2(x - 0.75)^2 - 1.125 - 4$

$= 2(x - 0.75)^2 - 5.125$

Ex. 3 Judy wants to fence three sides of the yard in front of her house. She bought 100 m of fence and wants the maximum area she can fence in. The function $A(x) = 100x - 2x^2$ represents the area to be enclosed, where x is the width of the yard in metres.

a) Write the function in vertex form.



$A(x) = 100x - 2x^2$

$= -2x^2 + 100x$

$= -2(x^2 - 50x)$

$= -2(x^2 - 50x + 25^2 - 25^2)$

$= -2(x-25)^2 - 2(-625)$

$= -2(x-25)^2 + 1250$

b) Determine the maximum area that can be enclosed.

∴ the max. area is 1250 m²

(and happens when x = 25)

If time, Return and Correct Unit 3 Summative

Today's Assigned Practice:

p. 232 # 2def, 4 **AND**

p.194 # 6 **AND**

p. 214 # 4, 6a-e, 7a-e, 8 **AND**

READ p. 225 **AND**

Work ahead on Mid-chapter Review: p. 226 # 1 – 4

Today's Assigned Practice:

p. 232 # 2def, 4 **AND**
p.194 # 6 **AND**
p. 214 # 4, 6a-e, 7a-e, 8 **AND**
READ p. 225 **AND**
Work ahead on Mid-chapter Review: p. 226 # 1 – 4