Lesson Plan Grade 10 Academic Math Lesson: <u>4 - 5</u> Unit: <u>Quadratic Relations</u> Topic: <u>Quadratic Models using Factored Form</u>

H homework check: <u>Principles of Mathematics 10</u> p. 165 # 1, 8 – 12, 15

note: <u>Quadratic Models using Factored Form</u>

We should be able to find the equation of any quadratic model if it passes through the x axis using the method that relies on x intercepts. This means that if a curve of best fit can be drawn and has parabola form, we can find an equation that models that parabola. For example, find the equation for the model given.



*draw a curve of best fit



*find and label the important points



*write the equation using the x intercept form of the equation and solve for a using the point (7, 5) as your (x, y)

$$y = a(x - (-1))(x - 8)$$

$$5 = a(7 + 1)(7 - 8)$$

$$5 = -8a$$

$$\frac{-5}{8} = a$$

$$\therefore y = -\frac{5}{8}(x + 1)(x - 8)$$

$$y = -0.625(x^2 - 7x - 8)$$

$$y = -0.625x^2 + 4.375x + 5$$

We can also use technology to find a quadratic equation by using the quadratic regression calculation on a graphing calculator by creating a scatter plot. Enter your data into the columns under stat>edit then complete a regression and graph your equation by pressing stat > calc > 5 > L1, L2, vars > y-vars > enter > enter. The coefficients for each variable will be present on the screen and can be substituted in order to write the equation. For example, enter the following data and perform a quadratic regression.

X	У
-2	7
-1	4
0	3
1	4
2	7

The calculator gives us the values for a, b, and c in $ax^2 + bx + c$ form. We get:

QuadReg

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

 $a = 1$
 $b = 0$
 $c = 3$

which means that the equation for this quadratic is $y = x^2 + 3$ and if we look at the graph, we can see the parabola that fits our data.



NOTE: It is important to recognize that although we can find the equation using graphing technology, we MUST also be able to find the equation by hand.

i homework assignment: <u>Principles of Mathematics 10</u> p. 175 # 2, 4, 6, 8, 10, 12