Lesson Plan

Lesson: <u>4 - 3</u>

Grade 10 Academic Math

Unit: **Quadratic Relations**

Topic: Factored Form of a Quadratic

homework check: <u>Principles of Mathematics 10</u> p. 146 #4, 6, 7 c – f, # 8 (without technology), # 12, 13

i note: <u>Factored Form of a Quadratic</u>

The factored form of a quadratic looks like y = a(x-r)(x-s) and each factor is then used to determine the x intercepts or zeroes of the function. The x intercepts of this function are then *r* and *s*. The equation of the line of symmetry is still found by determining the midpoint of these roots. For example, find the roots and the equation of the axis of symmetry: a) y = 2(x+5)(x-3)

x intercepts occur when each factor is set to zero

x + 5 = 0 x - 3 = 0x = -5 x = 3

equation of the axis of symmetry is found by calculating the midoint of these roots

 $\frac{-5+3}{2} = -1$

x = -1 is the equation of the axis of symmetry

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

x intercepts occur when each factor is set to zero

$$x+2=0$$
 $x+8=0$
 $x=-2$ $x=-8$

equation of the axis of symmetry is found by calculating the midoint of these roots

$$\frac{-8 + (-2)}{2} = -5$$

x = -5 is the equation of the axis of symmetry

If we know the zeroes of the function and one other point, we can use this information to find the equation of the quadratic.

Writing the equation of any quadratic can be done if we know the roots and one other point on the curve so that we can find the value of a. For example, find the equation of the given parabola.

c) Sean throws a ball from the top of the bleachers in the park. The bleachers are 4m high. The ball reaches a maximum height of 8m after 2 s in the air and hits the ground 5s after being thrown. Write an equation that models this behavior. As part of your solution, discuss important information that includes a detailed sketch, the x and y intercepts, the axis of symmetry, and the vertex of the parabola.

Sketch:



x intercepts: (-1, 0) and (5, 0)y intercept: (0, 4)vertex: (2, 8)axis of symmetry x = 2

place value of roots in the place of r and s

$$y = a(x - (-1))(x - 5)$$

y = a(x + 1)(x - 5)

assign values to x and y using another point that we know

$$4 = a(0+1)(0-5)$$

$$4 = -3a$$

$$\frac{-4}{5} = a$$

$$y = -0.8(x+1)(x-5)$$
 is the equation of our parabola
if we simplify this equation we get:

$$y = -0.8(x^2 - 4x - 5)$$

$$y = -0.8x^2 + 3.2x + 4$$

‡ homework assignment: <u>Principles of Mathematics 10</u> p. 155 # 2 – 6, 10, 12, 13, 15