Lesson Plan

Grade 10 Academic Math **Lesson: 6 - 2**

Unit: Quadratic Equations **Topic: Quadratic Formula**

- ***homework check:*** **Principles of Mathematics 10 p. 320 # 3 – 9 LHC, #11, 13**

- ***note:*** **Using the Quadratic Formula**

The quadratic formula is used when a certain quadratic cannot be factored. This formula was developed by completing the square and solving the quadratic $ax^2 + bx + c = 0$. The formula tells us that $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ and gives us the solutions or roots of the quadratic equation.

Determine which of the following quadratics can be solved by factoring and which can be solved using the quadratic formula.

a) $y = 2x^2 + x - 2$ *cannot be factored, use quadratic formula
b) $y = 3x^2 - 27$ *can be factored - common, then difference of squares
c) $y = -5x^2 + 15x$ *can be factored - common
d) $y = -2x^2 + 5x - 1$ *cannot be factored, use quadratic formula

Solve each of the equations above using the appropriate method.

$a)\ y = 2x^2 + x - 2$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$
$$= \frac{-1 \pm \sqrt{1^2 - 4(2)(-2)}}{2(2)}$$
$$= \frac{-1 \pm \sqrt{1+16}}{4}$$
$$= \frac{-1 \pm \sqrt{17}}{4}$$

$b)\ y = 3x^2 - 27$

$y = 3(x^2 - 9)$

$y = -3(x+3)(x-3)$

$x + 3 = 0 \qquad x - 3 = 0$

$x = -3 \qquad x = 3$

$$d)\ y = -2x^2 + 5x - 1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-5 \pm \sqrt{5^2 - 4(-2)(-1)}}{2(-2)}$$

$$= \frac{-5 \pm \sqrt{25 - 8}}{-4}$$

$$= \frac{5 \pm \sqrt{17}}{4}$$

$$c)\ y = -5x^2 + 15x$$

$$y = -5x(x - 3)$$

$$-5x = 0 \qquad x - 3 = 0$$

$$x = 0 \qquad x = 3$$

Remember that sometimes both the radical and the fraction can be reduced. For example,

$$a)\ x = \frac{-2 \pm \sqrt{24}}{2}$$

$$= \frac{-2 \pm \sqrt{4}\sqrt{6}}{2}$$

$$= \frac{-2 \pm 2\sqrt{6}}{2}$$

$$= -1 \pm \sqrt{6}$$

$$b)\ x = \frac{8 \pm 3\sqrt{32}}{4}$$

$$= \frac{8 \pm 3\sqrt{16}\sqrt{2}}{4}$$

$$= \frac{8 \pm 12\sqrt{2}}{4}$$

$$= 2 \pm 3\sqrt{2}$$

- ***homework assignment:*** **<u>Principles of Mathematics 10</u> p. 343 # 3 – 5, 8, 9, 13, 19 (no calculator approximations – reduce to show exact values)**