**HW: Quadratic Formula** **Date: Dec. 18**

**Directions: Glue at the top of page 72**

- Solve each equation using the quadratic formula, write out the formula for each problem.
- Be sure to show all steps and substitution. Use pages 73 – 75.

1.) $4x^2 + 11x - 20 = 0$

a = 4
b = 11
c = -20

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

Substitute in the values of a, b, and c into the quadratic formula.

$$x = \frac{-(11) \pm \sqrt{(11)^2 - 4(4)(-20)}}{2(4)}$$

$x = \frac{-11 \pm \sqrt{441}}{8}$ $\frac{-11+21}{8} = \frac{5}{4}$ $\frac{-11-21}{8} = -4$

The roots are: $\{\frac{5}{4}, -4\}$

2.) $x^2 - 5x - 24 = 0$

a = 1
b = -5
c = -24

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

Substitute in the values of a, b, and c into the quadratic formula.

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(-24)}}{2(1)}$$

$x = \frac{5 \pm \sqrt{121}}{2}$ $\frac{5+11}{2} = 8$ $\frac{5-11}{2} = -3$

$x = \frac{5 \pm 11}{2}$

The roots are: $\{8, -3\}$

3.) $x^2 = 3x + 3$

4.) $x^2 + 5 = -5x$

5.) $4x^2 + 7x - 15 = 0$

6.) $x^2 = 10 - 3x$

7.) The product of two consecutive odd integers is 99. Find the integers.

8.) Find two consecutive positive integers such that the square of the first is decreased by 17 equals 4 times the second.

3.) $x^2 - 3x - 3 = 0$ $a = 1, b = -3, c = -3$

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

$$x = \frac{-(-3) \pm \sqrt{(-3)^2 - 4(1)(-3)}}{2(1)}$$

$x = \frac{3 \pm \sqrt{21}}{2}$ $\frac{3+\sqrt{21}}{2} \approx 3.7913$, $\frac{3-\sqrt{21}}{2} \approx -0.7913$

4.) $x^2+5x+5=0$

$a=1$, $b=5$, $c=5$

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

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

$$x=\frac{-5\pm\sqrt{5}}{2}=\begin{cases}\frac{-5+\sqrt{5}}{2}\approx -1.3819\ldots\\ \frac{-5-\sqrt{5}}{2}\approx -3.6180\ldots\end{cases}$$

roots/zeros

$$x=\left\{\frac{-5\pm\sqrt{5}}{2}\right\}$$

5.) $4x^2+7x-15=0$

$a=4$, $b=7$, $c=-15$

$$x=\frac{-(7)\pm\sqrt{(7)^2-4(4)(-15)}}{2(4)}$$

$$x=\frac{-7\pm\sqrt{289}}{8}=\begin{cases}\frac{-7+17}{8}=\frac{10}{8}=\frac{5}{4}\\ \frac{-7-17}{8}=\frac{-24}{8}=-3\end{cases}$$

$$x=\left\{-3,\frac{5}{4}\right\}$$

roots/zeros

6.) $x^2=10-3x$

$-10+3x \quad -10+3x$

$x^2+3x-10=0$

$a=1$, $b=3$, $c=-10$

$$x=\frac{-(3)\pm\sqrt{(3)^2-4(1)(-10)}}{2(1)}$$

$$x=\frac{-3\pm\sqrt{49}}{2}=\begin{cases}\frac{-3+7}{2}=2\\ \frac{-3-7}{2}=-5\end{cases}$$

$$x=\{2,-5\}$$ roots/zeros

7.) Let 1st COI = $x$
2nd COI = $x+2$

$x(x+2) = 99$
$x^2+2x = 99$
$-99 \quad -99$
$x^2+2x-99 = 0$

$a = 1$
$b = 2$
$c = -99$

$$x = \frac{-(2) \pm \sqrt{(2)^2 - 4(1)(-99)}}{2(1)}$$

$$x = \frac{-2 \pm \sqrt{400}}{2} = \frac{-2 \pm 20}{2}$$

$\frac{-2+20}{2}$ $\quad$ $\frac{-2-20}{2}$
$9$ $\quad$ $-11$

answer:
1st # = 9
2nd # = 11
or
1st # = -11
2nd # = -9

8.) Let 1st CPI = $x$
and CPI = $x+1$

$x^2 - 17 = 4(x+1)$ $\quad a=1$
$x^2 - 17 = 4x + 4$ $\quad b=-4$
$-4x \quad -4 \quad -4x - 4$ $\quad c=-21$
$x^2 - 4x - 21 = 0$

$$x = \frac{-(-4) \pm \sqrt{(-4)^2 - 4(1)(-21)}}{2(1)}$$

$$x = \frac{4 \pm \sqrt{100}}{2} = \frac{4 \pm 10}{2}$$

$\frac{-4+10}{2}$ $\quad$ $\frac{-4-10}{2}$

$3$ $\quad$ $-7$ reject b/c it wants a positive integer

answer:
1st # = 3
2nd # = 4