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

Kuta Software - Infinite Algebra 1 Name_____

Using the Quadratic Formula

Date_____ Period____

Solve each equation with the quadratic formula.

1) $m^2 - 5m - 14 = 0$

$a=1$, $b=-5$, $c=-14$

$m = \frac{-(-5) \pm \sqrt{(-5)^2-4(1)(-14)}}{2 \cdot 1}$

$m = \frac{5 \pm \sqrt{81}}{2}$

$m = \frac{5 \pm 9}{2}$ → $m = \frac{5+9}{2} = 7$; $m = \frac{5-9}{2} = -2$

2) $b^2 - 4b + 4 = 0$

$a=1$, $b=-4$, $c=4$

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

$= \frac{4 \pm \sqrt{0}}{2}$

$= \frac{4}{2}$

$= 2$

3) $2m^2 + 2m - 12 = 0$

$a=2$, $b=2$, $c=-12$

$m = \frac{-2 \pm \sqrt{(2)^2-4(2)(-12)}}{2 \cdot 2}$

$= \frac{-2 \pm \sqrt{100}}{4}$

$= \frac{-2 \pm 10}{4}$ → $m = \frac{-2+10}{4} = 2$; $m = \frac{-2-10}{4} = -3$

4) $2x^2 - 3x - 5 = 0$

$a=2$, $b=-3$, $c=-5$

$x = \frac{-(-3) \pm \sqrt{(-3)^2-4(2)(-5)}}{2 \cdot 2}$

$= \frac{3 \pm \sqrt{49}}{4}$

$= \frac{3 \pm 7}{4}$ → $x = \frac{3+7}{4} = \frac{10}{4} = \frac{5}{2}$; $x = \frac{3-7}{4} = -1$

5) $x^2 + 4x + 3 = 0$

$a=1$, $b=4$, $c=3$

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

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

$= \frac{-4 \pm 2}{2}$ → $x = \frac{-4+2}{2} = -1$; $x = \frac{-4-2}{2} = -3$

6) $2x^2 + 3x - 20 = 0$

$a=2$, $b=3$, $c=-20$

$x = \frac{-3 \pm \sqrt{(3)^2-4(2)(-20)}}{2 \cdot 2}$

$= \frac{-3 \pm \sqrt{169}}{4}$

$= \frac{-3 \pm 13}{4}$ → $x = \frac{-3+13}{4} = \frac{5}{2}$; $x = \frac{-3-13}{4} = -4$

7) $4b^2 + 8b + 7 = 4$

$-4 \quad -4$

$4b^2 + 8b + 3 = 0$

$a=4$, $b=8$, $c=3$

$b = \frac{-8 \pm \sqrt{(8)^2-4(4)(3)}}{2 \cdot 4}$

$= \frac{-8 \pm \sqrt{16}}{8}$

$= \frac{-8 \pm 4}{8}$ → $b = \frac{-8+4}{8} = -\frac{1}{2}$; $b = \frac{-8-4}{8} = -\frac{3}{2}$

8) $2m^2 - 7m - 13 = -10$

$+10 \quad +10$

$2m^2 - 7m - 3 = 0$

$a=2$, $b=-7$, $c=-3$

$m = \frac{-(-7) \pm \sqrt{(-7)^2-4(2)(-3)}}{2 \cdot 2}$

$= \frac{7 \pm \sqrt{73}}{4}$

$m = \frac{7+\sqrt{73}}{4}$; $m = \frac{7-\sqrt{73}}{4}$

9) $2x^2 - 3x - 15 = 5$ (−5 −5)

$2x^2 - 3x - 20 = 0$

$a = 2$, $b = -3$, $c = -20$

$x = \frac{3 \pm \sqrt{(-3)^2 - 4(2)(-20)}}{2(2)}$

$= \frac{3 \pm \sqrt{169}}{4}$

$= \frac{3 \pm 13}{4}$ → $x = \frac{3+13}{4} = \frac{16}{4} = 4$; → $x = \frac{3-13}{4} = \frac{-10}{4} = -\frac{5}{2}$

10) $x^2 + 2x - 1 = 2$ (−2 −2)

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

$a = 1$, $b = 2$, $c = -3$

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

$= \frac{-2 \pm \sqrt{16}}{2}$

$= \frac{-2 \pm 4}{2}$ → $x = \frac{-2+4}{2} = \frac{2}{2} = 1$; → $x = \frac{-2-4}{2} = \frac{-6}{2} = -3$

11) $2k^2 + 9k = -7$ (+7 +7)

$2k^2 + 9k + 7 = 0$

$a = 2$, $b = 9$, $c = 7$

$k = \frac{-9 \pm \sqrt{(9)^2 - 4(2)(7)}}{2(2)}$

$= \frac{-9 \pm \sqrt{25}}{4}$

$= \frac{-9 \pm 5}{4}$ → $k = \frac{-9+5}{4} = \frac{-4}{4} = -1$; → $k = \frac{-9-5}{4} = \frac{-14}{4} = -7/2$

12) $5r^2 = 80$ (÷5 ÷5)

$\sqrt{r^2} = \pm\sqrt{16}$

$r = \pm 4$

13) $2x^2 - 36 = x$ (−x −x)

$2x^2 - x - 36 = 0$

$a = 2$, $b = -1$, $c = -36$

$x = \frac{1 \pm \sqrt{(-1)^2 - 4(2)(-36)}}{2(2)}$

$= \frac{1 \pm \sqrt{289}}{4}$

$= \frac{1 \pm 17}{4}$ → $x = \frac{1+17}{4} = \frac{18}{4} = \frac{9}{2}$; → $x = \frac{1-17}{4} = \frac{-16}{4} = -4$

14) $5x^2 + 9x = -4$

$5x^2 + 9x + 4 = 0$

$a = 5$, $b = 9$, $c = 4$

$x = \frac{-9 \pm \sqrt{(9)^2 - 4(5)(4)}}{2(5)}$

$x = \frac{-9 \pm \sqrt{1}}{10} = \frac{-9 \pm 1}{10} = -1$ and $-4/5$

15) $k^2 - 31 - 2k = -6 - 3k^2 - 2k$ (+3k² +6 +2k +6 +3k² +2k)

$4k^2 - 25 = 0$

$a = 4$, $b = 0$, $c = -25$

$k = \frac{0 \pm \sqrt{0 - 4(4)(-25)}}{2(4)}$

$= \frac{\pm\sqrt{400}}{8}$

$= \pm\frac{20}{8}$ → $\frac{20}{8} = \frac{5}{2}$; → $-\frac{20}{8} = -5/2$

16) $9n^2 = 4 + 7n$

$9n^2 - 7n - 4 = 0$

$a = 9$, $b = -7$, $c = -4$

$x = \frac{7 \pm \sqrt{(-7)^2 - 4(9)(-4)}}{2(9)}$

$x = \frac{7 \pm \sqrt{193}}{18}$

17) $8n^2 + 4n - 16 = -n^2$ (+n² +n²)

$9n^2 + 4n - 16 = 0$

$a = 9$, $b = 4$, $c = -16$

$n = \frac{-4 \pm \sqrt{(4)^2 - 4(9)(-16)}}{2(9)}$

$= \frac{-4 \pm \sqrt{592}}{18} = \frac{-4 \pm 4\sqrt{37}}{18} = \frac{-4(1 \pm \sqrt{37})}{18}$

$= \frac{-2(1+\sqrt{37})}{9}$

18) $8n^2 + 7n - 15 = -7$

$8n^2 + 7n - 8 = 0$

$a = 8$, $b = 7$, $c = -8$

$x = \frac{-7 \pm \sqrt{(7)^2 - 4(8)(-8)}}{2(8)}$

$x = \frac{-7 \pm \sqrt{305}}{16}$

$305 = 5 \cdot 61$