Kuta Software - Infinite Algebra 1

Name KEY

Using the Quadratic Formula

Date _____ Period ____

{4

Solve each equation with the quadratic formula.

1) $m^2 - 5m - 14 = 0$ $a=1, b=-5, c=-14$

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

$m = \frac{5 \pm \sqrt{25+56}}{2} = \frac{5 \pm \sqrt{81}}{2} = \frac{5 \pm 9}{2}$

$m = \frac{5+9}{2} = \frac{14}{7} = \boxed{7}$ $m = \frac{5-9}{2} = \frac{-4}{2} = \boxed{-2}$

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

$b = \frac{4 \pm \sqrt{(-4)^2 - 4(1)(4)}}{2(1)} = \frac{4 \pm \sqrt{16-16}}{2}$

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

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

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

$m = \frac{-2 \pm \sqrt{4+96}}{4} = \frac{-2 \pm \sqrt{100}}{4}$

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

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

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

$x = \frac{3 \pm \sqrt{9+40}}{4} = \frac{3 \pm \sqrt{49}}{4} = \frac{3 \pm 7}{4}$

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

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

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

$x = \frac{-4 \pm \sqrt{16-12}}{2} = \frac{-4 \pm \sqrt{4}}{2} = \frac{-4 \pm 2}{2}$

$x = \frac{-4+2}{2} = \frac{-2}{2} = \boxed{-1}$ $x = \frac{-4-2}{2} = \frac{-6}{2} = \boxed{-3}$

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

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

$x = \frac{-3 \pm \sqrt{9+160}}{4} = \frac{-3 \pm \sqrt{169}}{4}$

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

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

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

$b = \frac{-8 \pm \sqrt{(8)^2 - 4(4)(3)}}{2(4)} = \frac{-8 \pm \sqrt{64-48}}{8}$

$b = \frac{-8 \pm \sqrt{16}}{8} = \frac{-8 \pm 4}{8}$

$b = \frac{-8+4}{8} = \frac{-4}{8} = \boxed{\frac{-1}{2}}$

$b = \frac{-8-4}{8} = \frac{-12}{8} = \boxed{\frac{-3}{2}}$

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

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

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

$m = \frac{7 \pm \sqrt{49+24}}{4} = \boxed{\frac{7 \pm \sqrt{73}}{4}}$

9) $2x^2 - 3x - 15 = 5$

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

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

$x = \frac{3 \pm \sqrt{9+160}}{4} = \frac{3 \pm \sqrt{169}}{4} = \frac{3 \pm 13}{4}$

$x = \frac{3+13}{4} = \frac{16}{4} = \boxed{4}$

$x = \frac{3-13}{4} = \frac{-10}{4} = \boxed{\frac{-5}{2}}$

10) $x^2 + 2x - 1 = 2$

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

$x = \frac{-2 \pm \sqrt{(2)^2 - 4(1)(-3)}}{2(1)} = \frac{-2 \pm \sqrt{4+12}}{2}$

$x = \frac{-2 \pm \sqrt{16}}{2} = \frac{-2 \pm 4}{2}$

$x = \frac{-2+4}{2} = \boxed{1}$

$x = \frac{-2-4}{2} = \boxed{-3}$

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

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

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

$k = \frac{-9 \pm \sqrt{81-56}}{4} = \frac{-9 \pm \sqrt{25}}{4} = \frac{-9 \pm 5}{4}$

$k = \frac{-9+5}{4}$ $\quad k = \frac{-9-5}{4}$

$k = \boxed{-1}$ $\quad k = \frac{-14}{4} = \boxed{\frac{-7}{2}}$

12) $5r^2 = 80$

$5r^2 - 80 = 0$

$r = \frac{0 \pm \sqrt{(0)^2 - 4(5)(-80)}}{2(5)} = \frac{\pm \sqrt{1600}}{10}$

$r = \frac{\pm 40}{10} = \boxed{\pm 4}$

13) $2x^2 - 36 = x$

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

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

$x = \frac{1 \pm \sqrt{1+288}}{4} = \frac{1 \pm \sqrt{289}}{4} = \frac{1 \pm 17}{4}$

$x = \frac{1+17}{4} = \boxed{\frac{9}{2}}$

$x = \frac{1-17}{4} = \boxed{-4}$

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

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

$x = \frac{-9 \pm \sqrt{(9)^2 - 4(5)(4)}}{2(5)} = \frac{-9 \pm \sqrt{81-80}}{10}$

$x = \frac{-9 \pm 1}{10}$

$\frac{-9+1}{10} = \frac{-8}{10} = \boxed{\frac{-4}{5}}$

$\frac{-9-1}{10} = \frac{-10}{10} = \boxed{-1}$

15) $k^2 - 31 - 2k = -6 - 3k^2 - 2k$

$4k^2 - 25 = 0$

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

$k = \frac{\pm \sqrt{400}}{8} = \frac{\pm 20}{8} = \boxed{\pm \frac{5}{2}}$

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

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

$n = \frac{7 \pm \sqrt{(-7)^2 - 4(9)(-4)}}{2(9)} = \frac{7 \pm \sqrt{49+144}}{18}$

$\boxed{n = \frac{7 \pm \sqrt{193}}{18}}$

17) $8n^2 + 4n - 16 = -n^2$

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

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

$n = \frac{-4 \pm \sqrt{16+576}}{18} = \frac{4 \pm \sqrt{592}}{18}$

$n = \frac{4 \pm 4\sqrt{37}}{18} = \boxed{\frac{2 \pm 2\sqrt{37}}{9}}$

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

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

$n = \frac{-7 \pm \sqrt{(7)^2 - 4(8)(-8)}}{2(8)} = \frac{-7 \pm \sqrt{49+256}}{16}$

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