

Using the Quadratic Formula

Solve each equation with the quadratic formula.

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

$a = 1 \quad b = -5 \quad c = -14$

$$m = \frac{5 \pm \sqrt{25 - 4(1)(-14)}}{2}$$

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

$$\boxed{m = 7}$$

$$\boxed{m = -2}$$

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

$a = 2 \quad b = 2 \quad c = -12$

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

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

$$\boxed{m = 2}$$

$$\boxed{m = -3}$$

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

$a = 1 \quad b = 4 \quad c = 3$

$$x = \frac{-4 \pm \sqrt{16 - 4(1)(3)}}{2}$$

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

$$\boxed{x = -1}$$

$$\boxed{x = -3}$$

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

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

$a = 4 \quad b = 8 \quad c = 3$

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

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

$$= \frac{-8 \pm 4}{8}$$

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

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

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

$a = 1 \quad b = -4 \quad c = 4$

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

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

$$\boxed{b = 2}$$

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

$a = 2 \quad b = -3 \quad c = -5$

$$x = \frac{3 \pm \sqrt{9 - 4(2)(-5)}}{4}$$

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

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

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

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

$a = 2 \quad b = 3 \quad c = -20$

$$x = \frac{-3 \pm \sqrt{9 - 4(2)(-20)}}{4}$$

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

$$= \frac{-3 \pm 13}{4}$$

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

$$\boxed{x = \frac{-16}{4} = -4}$$

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

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

$a = 2 \quad b = -7 \quad c = -3$

$$m = \frac{7 \pm \sqrt{49 - 4(2)(-3)}}{4}$$

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

9) $2x^2 - 3x - 15 = 5$
 $2x^2 - 3x - 20 = 0$
 $X = \frac{3 \pm \sqrt{9 - 4(2)(-20)}}{4}$
 $= \frac{3 \pm \sqrt{169}}{4}$

$\frac{3 \pm 13}{4}$
 $X = \frac{16}{4} = 4$
 $X = \frac{-10}{4} = -\frac{5}{2}$

10) $x^2 + 2x - 1 = 2$
 $x^2 + 2x - 3 = 0$
 $a=1 \quad b=2 \quad c=-3$
 $X = \frac{-2 \pm \sqrt{4 - 4(1)(-3)}}{2}$
 $= \frac{-2 \pm \sqrt{16}}{2}$

$\frac{-2 \pm 4}{2}$
 $X = \frac{2}{2} = 1$
 $X = \frac{-4}{2} = -2$

11) $2k^2 + 9k = -7$
 $2k^2 + 9k + 7 = 0$
 $a=2 \quad b=9 \quad c=7$
 $K = \frac{-9 \pm \sqrt{81 - 4(2)(7)}}{4}$
 $= \frac{-9 \pm \sqrt{25}}{4}$

$\frac{-9 \pm 5}{4}$
 $K = \frac{-4}{4} = -1$
 $K = \frac{-14}{4} = -\frac{7}{2}$

12) $5r^2 = 80$
 $5r^2 - 80 = 0$
 $a=5 \quad b=0 \quad c=-80$
 $r = \frac{0 \pm \sqrt{0 - 4(5)(-80)}}{10}$
 $r = \frac{0 \pm \sqrt{1600}}{10}$

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

13) $2x^2 - 36 = x$
 $2x^2 - x - 36 = 0$
 $a=2 \quad b=-1 \quad c=-36$
 $X = \frac{1 \pm \sqrt{1 - 4(2)(-36)}}{4}$
 $= \frac{1 \pm \sqrt{289}}{4}$

$\frac{1 \pm 17}{4}$
 $X = \frac{18}{4} = \frac{9}{2}$
 $X = \frac{-16}{4} = -4$

14) $5x^2 + 9x = -4$
 $5x^2 + 9x + 4 = 0$
 $a=5 \quad b=9 \quad c=4$
 $X = \frac{-9 \pm \sqrt{81 - 4(5)(4)}}{10}$
 $= \frac{-9 \pm \sqrt{1}}{10}$

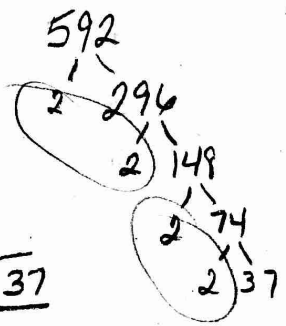
$\frac{-9 \pm 1}{10}$
 $X = \frac{-10}{10} = -1$
 $X = \frac{-8}{10} = -\frac{4}{5}$

15) $k^2 - 31 - 2k = -6 - 3k^2 - 2k$
 $4k^2 - 25 = 0$
 $a=4 \quad b=0 \quad c=-25$
 $K = \frac{0 \pm \sqrt{0 - 4(4)(-25)}}{8}$
 $= \frac{0 \pm \sqrt{400}}{8}$

$\frac{\pm 20}{8}$
 $K = \frac{5}{2}$
 $K = -\frac{5}{2}$

16) $9n^2 = 4 + 7n$
 $9n^2 - 7n - 4 = 0$
 $a=9 \quad b=-7 \quad c=-4$
 $n = \frac{7 \pm \sqrt{49 - 4(9)(-4)}}{18}$
 $= \frac{7 \pm \sqrt{193}}{18}$

17) $8n^2 + 4n - 16 = -n^2$
 $9n^2 + 4n - 16 = 0$
 $a=9 \quad b=4 \quad c=-16$
 $n = \frac{-4 \pm \sqrt{16 - 4(9)(-16)}}{18}$
 $n = \frac{-4 \pm \sqrt{592}}{18} = \frac{-4 \pm 4\sqrt{37}}{18}$
 $= \frac{-2 \pm 2\sqrt{37}}{9}$



18) $8n^2 + 7n - 15 = -7$
 $8n^2 + 7n - 8 = 0$
 $a=8 \quad b=7 \quad c=-8$
 $n = \frac{-7 \pm \sqrt{49 - 4(8)(-8)}}{16}$
 $= \frac{-7 \pm \sqrt{305}}{16}$

305
 5 61