

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

Use when $ax^2 + bx + c = 0$

Using the Quadratic Formula

Solve each equation with the quadratic formula.

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

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

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

$$x = \frac{5 \pm \sqrt{81}}{2} = \frac{5 \pm 9}{2}$$

$$= \frac{5+9}{2}, \frac{5-9}{2}$$

$$= 7, -2$$

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

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

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

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

$$= \frac{-2 \pm 10}{4}$$

$$= \frac{-2+10}{4}, \frac{-2-10}{4} = \boxed{2, -3}$$

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

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

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

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

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

$$= \boxed{-3, -1}$$

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

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

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

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

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

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

$$= -\frac{12}{8}, -\frac{4}{8}$$

$$= \boxed{-\frac{3}{2}, -\frac{1}{2}}$$

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

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

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

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

$$= \frac{4}{2} = \boxed{2}$$

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

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

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

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

$$= \frac{3 \pm 7}{4}$$

$$= \frac{10}{4}, \frac{-4}{4} = \boxed{\frac{5}{2}, -1}$$

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

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

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

$$= \frac{-3 \pm \sqrt{169}}{4} = \frac{-3 \pm 13}{4}$$

$$= \frac{-16}{4}, \frac{10}{4} = \boxed{-4, \frac{5}{2}}$$

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

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

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

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

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

$$= \frac{-8+4}{2} = \boxed{-\frac{3}{2}, -2}$$

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

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

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

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

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

$$= \frac{3 \pm 13}{4} = \boxed{4, -\frac{5}{2}}$$

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

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

$$a=2 \quad b=9 \quad c=7$$

$$x = \frac{-9 \pm \sqrt{81 - 4(2)(7)}}{2(2)}$$

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

$$= \frac{-9 \pm 5}{4} = \boxed{-1, -\frac{7}{2}}$$

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

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

$$a=2 \quad b=-1 \quad c=-36$$

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

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

$$= \frac{1 \pm 17}{4} = \boxed{\frac{9}{2}, 4}$$

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

$$4k^2 - 25 + 0k = 0$$

$$a=4 \quad b=0 \quad c=-25$$

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

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

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

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

$$+n^2 \quad +n^2$$

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

$$a=9 \quad b=4 \quad c=-16$$

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

$$= \frac{-4 \pm \sqrt{16 + 144}}{18}$$

$$= \frac{-4 \pm \sqrt{160}}{18}$$

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

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

$$a=1 \quad b=2 \quad c=-3$$

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

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

$$= \frac{-2 \pm 4}{2} = \boxed{-3, 1}$$

$$12) 5r^2 = 80$$

2 ways to solve. use quadratic formula

$$5r^2 + 0x - 80 = 0$$

$$a=5, b=0, c=-80$$

$$\text{or } \frac{5r^2}{5} = \frac{80}{5} \Rightarrow r^2 = 16$$

$$\boxed{r = \pm 4}$$

take square root of both sides

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

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

$$a=5 \quad b=9 \quad c=4$$

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

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

$$= \boxed{-1, -\frac{4}{5}}$$

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

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

$$a=9 \quad b=-7 \quad c=-4$$

$$x = \frac{7 \pm \sqrt{49 - 4(9)(-4)}}{2(9)}$$

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

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

$$+7 \quad +7$$

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

$$a=8 \quad b=7 \quad c=-8$$

$$x = \frac{-7 \pm \sqrt{49 - 4(8)(-8)}}{2(8)}$$

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

will simplify more will simplify