

$$9) 2x^2 + 6x + 4 = 0$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4 \cdot 2 \cdot 4}}{2 \cdot 2} = \frac{-6 \pm \sqrt{36 - 32}}{4} = \frac{-6 \pm \sqrt{4}}{4} = \frac{-6 \pm 2}{4}$$

$$x_1 = \frac{-6 + 2}{4} = \frac{-4}{4} = -1$$

$$x_2 = \frac{-6 - 2}{4} = \frac{-8}{4} = -2$$

$$1) 3x^2 - 15x + 18 = 0$$

$$x = \frac{15 \pm \sqrt{(-15)^2 - 4 \cdot 3 \cdot 18}}{2 \cdot 3} = \frac{15 \pm \sqrt{225 - 216}}{6} = \frac{15 \pm \sqrt{9}}{6}$$

$$x = \begin{cases} \frac{15+3}{6} = \frac{18}{6} = 3 \\ \frac{15-3}{6} = \frac{12}{6} = 2 \end{cases}$$

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

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

$$\text{■ } i) -4x^2 + 4x + 48 = 0 \quad a = -4 / b = 4 / c = 48 \quad \text{■}$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \cdot (-4) \cdot 48}}{2 \cdot (-4)} = \frac{-4 \pm \sqrt{16 + 768}}{-8} = \frac{-4 \pm \sqrt{784}}{-8}$$

$$x = \left\{ \begin{array}{l} \frac{-4 + 28}{-8} = \frac{24}{-8} = -3 \\ \frac{-4 - 28}{-8} = \frac{-32}{-8} = 4 \end{array} \right.$$

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

$$j) x^2 + 2x - 15 = 0$$

$$x = \frac{-2 \pm \sqrt{2^2 - 4 \cdot 1 \cdot (-15)}}{2 \cdot 1} = \frac{-2 \pm \sqrt{4 + 60}}{2} = \frac{-2 \pm \sqrt{64}}{2} = \frac{-2 \pm 8}{2}$$

$$x_1 = \frac{-2 + 8}{2} = \frac{6}{2} = 3$$

$$x_2 = \frac{-2 - 8}{2} = \frac{-10}{2} = -5$$

$$k) x^2 - 16x + 48 = 0$$

$$x = \frac{16 \pm \sqrt{(-16)^2 - 4 \cdot 1 \cdot 48}}{2 \cdot 1} = \frac{16 \pm \sqrt{256 - 192}}{2} = \frac{16 \pm \sqrt{64}}{2} = \frac{16 \pm 8}{2}$$

$$x = \begin{cases} \frac{16+8}{2} = \frac{24}{2} = 12 \\ \frac{16-8}{2} = \frac{8}{2} = 4 \end{cases}$$

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

$$l) 3x^2 + 6x - 45 = 0$$

$$x = \frac{-6 \pm \sqrt{6^2 - 4 \cdot 3 \cdot (-45)}}{2 \cdot 3} = \frac{-6 \pm \sqrt{36 + 540}}{6} = \frac{-6 \pm \sqrt{576}}{6} = \frac{-6 \pm 24}{6}$$

$$x = \frac{-6+24}{6} = \frac{18}{6} = 3$$

$$x = \frac{-6-24}{6} = \frac{-30}{6} = -5$$

$$\text{m) } 2x^2 + 10x - 168 = 0 \quad a=2 \quad b=10 \quad c=-168$$

$$x = \frac{-10 \pm \sqrt{10^2 - 4 \cdot 2 \cdot (-168)}}{2 \cdot 2} = \frac{-10 \pm \sqrt{100 + 1344}}{4} = \frac{-10 \pm \sqrt{1444}}{4}$$

$$x = \frac{-10 \pm 38}{4} = \begin{cases} \frac{-10+38}{4} = \frac{28}{4} = 7 \\ \frac{-10-38}{4} = \frac{-48}{4} = -12 \end{cases}$$

$$\text{n) } 3x^2 + 3x - 18 = 0$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4 \cdot 3 \cdot (-18)}}{2 \cdot 3} = \frac{-3 \pm \sqrt{9 + 216}}{6} = \frac{-3 \pm \sqrt{225}}{6} = \frac{-3 \pm 15}{6}$$

$$x_1 = \frac{-3+15}{6} = \frac{12}{6} = 2$$

$$x_2 = \frac{-3-15}{6} = \frac{-18}{6} = -3$$

$$o) 4(3x^2 + 2x) + 32 = 8x(x - 2)$$

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

$$12x^2 + 8x + 32 = 8x^2 - 16x$$

$$12x^2 + 8x + 32 - 8x^2 + 16x = 0$$

$$4x^2 + 24x + 32 = 0$$

$$x = \frac{-24 \pm \sqrt{24^2 - 4 \cdot 4 \cdot 32}}{2 \cdot 4} = \frac{-24 \pm \sqrt{576 - 512}}{8} = \frac{-24 \pm \sqrt{64}}{8}$$

$$x = \frac{-24 \pm 8}{8} = \begin{cases} \frac{-24 + 8}{8} = \frac{-16}{8} = -2 \\ \frac{-24 - 8}{8} = \frac{-32}{8} = -4 \end{cases}$$

$$D) 18x^2 - 3(2x - 60) = 12x^2 + 360$$

$$18x^2 - 6x + 180 = 12x^2 + 360$$

$$18x^2 - 6x + 180 - 12x^2 - 360 = 0$$

$$6x^2 - 6x - 180 = 0$$

$$a = 6 / b = -6 / c = -180$$

$$x = \frac{6 \pm \sqrt{(-6)^2 - 4 \cdot 6 \cdot (-180)}}{2 \cdot 6} = \frac{6 \pm \sqrt{36 + 4320}}{12} = \frac{6 \pm \sqrt{4356}}{12}$$

$$x = \frac{6 \pm 66}{12} = \begin{cases} \frac{6+66}{12} = \frac{72}{12} = 6 \\ \frac{6-66}{12} = \frac{-60}{12} = -5 \end{cases}$$

$$9) 6x^2 + 8(x+1) = 5x^2 + 3x + 2$$

$$6x^2 + 8x + 8 = 5x^2 + 3x + 2$$

$$6x^2 + 8x + 8 - 5x^2 - 3x - 2 = 0$$

$$x^2 + 5x + 6 = 0$$

$$x = \frac{-5 \pm \sqrt{5^2 - 4 \cdot 1 \cdot 6}}{2 \cdot 1} = \frac{-5 \pm \sqrt{25 - 24}}{2} = \frac{-5 \pm 1}{2} = \begin{cases} \frac{-5+1}{2} = \frac{-4}{2} = -1 \\ \frac{-5-1}{2} = \frac{-6}{2} = -3 \end{cases}$$

$$p) x(x-3) = -2(x-3)$$

$$x^2 - 3x = -2x + 6$$

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

$$x^2 - x - 6 = 0$$

$$a = 1 / b = -1 / c = -6$$

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4 \cdot 1 \cdot (-6)}}{2 \cdot 1} = \frac{1 \pm \sqrt{1+24}}{2} = \frac{1 \pm \sqrt{25}}{2} = \frac{1 \pm 5}{2} \begin{cases} \frac{6}{2} = 3 \\ \frac{-4}{2} = -2 \end{cases}$$

$$s) x(x-2) = 2-x$$

$$x^2 - 2x = 2 - x$$

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

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

$$x = \frac{1 \pm \sqrt{(-1)^2 - 4 \cdot 1 \cdot (-2)}}{2 \cdot 1} = \frac{1 \pm \sqrt{1+8}}{2}$$

$$x = \frac{1 \pm \sqrt{9}}{2} = \frac{1 \pm 3}{2} \begin{cases} \frac{1+3}{2} = \frac{4}{2} = 2 \\ \frac{1-3}{2} = \frac{-2}{2} = -1 \end{cases}$$

$$H) X(X+5) = 4(X+5)$$

$$X^2 + 5X = 4X + 20$$

$$X^2 + 5X - 4X - 20 = 0$$

$$X^2 + X - 20 = 0$$

$$X = \frac{-1 \pm \sqrt{1^2 - 4 \cdot 1 \cdot (-20)}}{2 \cdot 1} = \frac{-1 \pm \sqrt{1+80}}{2} = \frac{-1 \pm \sqrt{81}}{2} = \frac{-1 \pm 9}{2}$$

$$X = \frac{-1+9}{2} = \frac{8}{2} = 4$$

$$\frac{-1-9}{2} = \frac{-10}{2} = -5$$

$$u) X(6x+21) = -18(2x+7)$$

$$6x^2 + 21x = -36x - 126$$

$$6x^2 + 21x + 36x + 126 = 0$$

$$6x^2 + 57x + 126 = 0$$

$$x = \frac{-57 \pm \sqrt{57^2 - 4 \cdot 6 \cdot 126}}{2 \cdot 6} = \frac{-57 \pm \sqrt{3249 - 3024}}{12} = \frac{-57 \pm \sqrt{225}}{12}$$

$$x = \frac{-57 \pm 15}{12} = \begin{cases} \frac{-57+15}{12} = \frac{-42}{12} = -3.5 \\ \frac{-57-15}{12} = \frac{-72}{12} = -6 \end{cases}$$

$$v) 8x + x(x-3) = 4(7+2x)$$

$$8x + x^2 - 3x = 28 + 8x$$

$$8x + x^2 - 3x - 28 - 8x = 0$$

$$x^2 - 3x - 28 = 0$$

$$x = \frac{3 \pm \sqrt{(-3)^2 - 4 \cdot 1 \cdot (-28)}}{2 \cdot 1} = \frac{3 \pm \sqrt{9 + 112}}{2} = \frac{3 \pm \sqrt{121}}{2} = \frac{3 \pm 11}{2}$$

$$x = \begin{cases} \frac{3+11}{2} = \frac{14}{2} = 7 \\ \frac{3-11}{2} = \frac{-8}{2} = -4 \end{cases}$$

$$w) 4x + x(x+4) = (8+x)4$$

$$4x + x^2 + 4x = 32 + 4x$$

$$4x + x^2 + 4x - 32 - 4x = 0$$

$$x^2 + 4x - 32 = 0$$

$$x = \frac{-4 \pm \sqrt{4^2 - 4 \cdot 1 \cdot (-32)}}{2 \cdot 1} = \frac{-4 \pm \sqrt{16 + 128}}{2} = \frac{-4 \pm \sqrt{144}}{2}$$

$$x = \frac{-4 \pm 12}{2} = \begin{cases} \frac{-4+12}{2} = \frac{8}{2} = 4 \\ \frac{-4-12}{2} = \frac{-16}{2} = -8 \end{cases}$$