

Solution of Equations and Graph Sketching 1 - ANSWERS

1) There are often alternatives to the method shown here:

a. $\frac{x-2}{3x-10} = 0$
Multiplying both sides by $(3x - 10)$: $x - 2 = 0$
Adding 2 to both sides: $x = 2$

b. $\frac{x}{4} - \frac{2x}{5} - \frac{3}{5} = 0$
Multiplying everything by 20 $5x - 8x - 12 = 0$
Collecting x on the left and constants on the right: $-3x = 12$
Dividing by -3 $x = -4$

2) $x^2 - 2x - 8 = (x + 2)(x - 4)$

If $(x + 2)(x - 4) = 0$ then either $x + 2 = 0$ and $x = -2$
or $x - 4 = 0$ and $x = 4$

3) First rearrange the equation to read $10x^2 - 9x + 2 = 0$

In the formula, $a = 10$, $b = -9$ and $c = 2$

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

$$x = \frac{9 \pm \sqrt{81 - 80}}{20}$$

$$x = \frac{9+1}{20} \quad \text{or} \quad x = \frac{9-1}{20}$$

$$x = \frac{1}{2} \quad \text{or} \quad x = \frac{2}{5}$$

4) At the intersection, x will be -2 (given) and $y = -2^2 + 2 \times 2 - 3 = 4 + 4 - 3 = 5$.
Hence the curves meet at (-2,5)

5) At the intersection

$$\frac{3}{4}x - \frac{3}{2} = x^2 + 2x - 3$$

Multiplying through by 4:

$$3x - 6 = 4x^2 + 8x - 12$$

Collecting terms on the right:

$$0 = 4x^2 + 5x - 6$$

By a tricky factorisation:

$$0 = (4x - 3)(x + 2)$$

so:

$$4x - 3 = 0 \quad \text{or} \quad x + 2 = 0$$

and:

$$x = \frac{3}{4} \quad \text{or} \quad x = -2$$