

CHAPTER ONE

Algebra

(Q1) If $\frac{x}{4} + 1 = 5$, find x .

Soln:

Multiply through using 4

$$\Rightarrow 4 \times \frac{x}{4} + 4 \times 1 = 4 \times 5,$$

$$\Rightarrow x + 4 = 20$$

$$\Rightarrow x = 20 - 4, \Rightarrow x = 16.$$

(Q2) If $2x = 5(x - 2) + 7$, find x .

Soln:

$$2x = 5(x - 2) + 7$$

$$\Rightarrow 2x = 5x - 10 + 7,$$

$$\Rightarrow 2x - 5x = -10 + 7,$$

$$\Rightarrow -3x = -3.$$

$$\text{Divide through using } -3. \Rightarrow \frac{-3x}{-3} = \frac{-3}{-3}, \Rightarrow x = 1.$$

(Q3) Solve $2x - 3(x - 1) = 1$.

Soln:

$$2x - 3(x - 1) = 1$$

$$\Rightarrow 2x - 3x + 3 = 1,$$

$$\Rightarrow -x + 3 = 1, \Rightarrow 3 - 1 = x,$$

$$\Rightarrow 2 = x \Rightarrow x = 2.$$

(Q4) Solve $\frac{1}{5}(2 + y) = \frac{1}{2}(y - 1)$.

Soln:

Multiply through using 10

i.e. $10 \times \frac{1}{5}(2 + y) = 10 \times \frac{1}{2}(y - 1)$,

$$\Rightarrow 2(2 + y) = 5(y - 1),$$

$$\Rightarrow 4 + 2y = 5y - 5,$$

$$\Rightarrow 4 + 5 = 5y - 2y,$$

$$\Rightarrow 9 = 3y.$$

Divide through using 3.

$$\Rightarrow \frac{9}{3} = \frac{3y}{3}, \Rightarrow 3 = y \Rightarrow y = 3.$$

(Q5) Solve $2 + \frac{x}{3} = 1 - 2x$.

Soln:

Multiplying through by 3

$$\Rightarrow 3 \times 2 + 3 \times \frac{x}{3} = 3 \times 1 - 3 \times 2x,$$

$$\Rightarrow 6 + x = 3 - 6x,$$

$$\Rightarrow x + 6x = 3 - 6,$$

$$\Rightarrow 7x = -3 \Rightarrow x = \frac{-3}{7} \text{ (i.e. divide through using 7).}$$

(Q6) Solve $\frac{1}{2p} = \frac{1}{8}$.

Soln:

Cross multiplying $\Rightarrow 2p \times 1 = 1 \times 8$,

$\Rightarrow 2p = 8$, and dividing through by 2

$$\Rightarrow \frac{2p}{2} = \frac{8}{2}, \Rightarrow p = 4.$$

(Q7) Solve $\frac{x}{4} + \frac{3}{5} = \frac{3x}{2} - 2$.

Soln:

Multiply through by 20.

$$\text{i.e. } 20 \times \frac{x}{4} + 20 \times \frac{3}{5} = 20 \times \frac{3x}{2} - 20 \times 2,$$

$$\Rightarrow 5x + 12 = 30x - 40,$$

$$\Rightarrow 5x + 12 = 30x - 40,$$

$$\Rightarrow 12 + 40 = 30x - 5x,$$

$$\Rightarrow 52 = 25x.$$

$$\text{Dividing through by } 25 \Rightarrow \frac{52}{25} = \frac{25x}{25} \Rightarrow 2\frac{2}{25} = x,$$

$$\Rightarrow x = 2\frac{2}{25}.$$

(Q8) Solve the equation $\frac{2x-1}{3} - \frac{x-2}{4} = 1$.

Soln:

$$\frac{2x-1}{3} - \frac{x-2}{4} = 1 \Rightarrow \frac{1}{3}(2x-1) - \frac{1}{4}(x-2) = 1.$$

Multiply through using 12

$$\Rightarrow 12 \times \frac{1}{3}(2x-1) - 12 \times \frac{1}{4}(x-2) = 12 \times 1,$$

$$\Rightarrow 4(2x-1) - 3(x-2) = 12,$$

$$\Rightarrow 8x - 4 - 3x + 6 = 12,$$

$$\Rightarrow 8x - 3x = 12 + 4 - 6,$$

$$\Rightarrow 5x = 10 \Rightarrow x = \frac{10}{5} \Rightarrow x = 2.$$

(Q9) Find the truth set of the equation $\frac{2}{3}(3y - 1) - (y + 2) = \frac{1}{3}$.

Soln:

Multiply through using 3

$$\Rightarrow 3 \times \frac{2}{3}(3y - 1) - 3 \times (y + 2) = 3 \times \frac{1}{3},$$

$$\Rightarrow 2(3y - 1) - 3(y + 2) = 1,$$

$$\Rightarrow 6y - 2 - 3y - 6 = 1,$$

$$\Rightarrow 6y - 3y = 1 + 2 + 6,$$

$$\Rightarrow 3y = 9, \Rightarrow y = \frac{9}{3} \Rightarrow y = 3.$$