Chapter-9

Linear equation in one variable

Solve each of the following equations and also verify your solution:

Q.1 $9\frac{1}{4} = y - 1\frac{1}{3}$

Sol: $\frac{37}{4} = y - \frac{4}{3}$

$\Rightarrow \frac{37}{4} + \frac{4}{3} = y$ (Transposing $\frac{4}{3}$ to LHS)

$\Rightarrow \frac{111+16}{12} = y$

$\Rightarrow y = \frac{127}{12}$

Q.2 $\frac{5x}{3} + \frac{2}{5} = 1$

Sol: $\frac{5x}{3} + \frac{2}{5} = 1$

$\Rightarrow \frac{5x}{3} = 1 - \frac{2}{5}$

$\Rightarrow \frac{5x}{3} = \frac{5-2}{5} = \frac{3}{5}$

$\Rightarrow \frac{5x}{3} = \frac{3}{5}$

(By cross Multiplication)

$\Rightarrow 25x = 9$

$x = \frac{9}{25}$

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Q.3 $\frac{x}{2}+\frac{x}{3}+\frac{x}{4}=13$

Sol: $\because$ LCM $(2,3,4)=12$

$= \frac{6x+4x+3x}{12}=\frac{13}{1}$

$\Rightarrow \frac{13x}{12}=\frac{13}{1}$ (By cross Multiplication)

$\Rightarrow 13x=156$

$\Rightarrow x=\frac{156}{13}=12$

$\therefore x=12$

Q.4 $\frac{x}{2}+\frac{x}{8}=\frac{1}{8}$

Solution $\because \frac{x}{2}+\frac{x}{8}=\frac{1}{8}$

$\Rightarrow \frac{4x+x}{8}=\frac{1}{8}$

$\Rightarrow \frac{5x}{8}=\frac{1}{8}$

$\Rightarrow 5x=1$

$\Rightarrow x=\frac{1}{5}$

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Q.5 $\frac{2x}{3} - \frac{3x}{8} = \frac{7}{12}$

Sol: $\frac{16x - 9x}{24} = \frac{7}{12}$

$\Rightarrow \frac{7x}{24} = \frac{7}{12}$

$\Rightarrow 84x = 168$ (By cross Multiplication)

$\Rightarrow x = \frac{168}{84}$

$\Rightarrow x = 2$

Q6 $(x+2)(x+3) + (x-3)(x-2) - 2x(x+1) = 0$

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

$\Rightarrow (x^2 + x^2 - 2x^2) + (2x + 3x - 2x - 3x - 2x) + (6+6) = 0$

$= 0 - 2x + 12 = 0$

$\Rightarrow 2x = 12$

$\Rightarrow x = \frac{12}{2}$

$\Rightarrow x = 6$

Q.7 $\frac{x}{2} - \frac{4}{5} + \frac{x}{5} + \frac{3x}{10} = \frac{1}{5}$

Sol: $\because \frac{x}{2} - \frac{4}{5} + \frac{x}{5} + \frac{3x}{10} = \frac{1}{5}$

Transposing $\frac{4}{5}$ to RHS

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$$\Rightarrow \frac{x}{2}+\frac{x}{5}+\frac{3x}{10}=\frac{1}{5}+\frac{4}{5}$$

$$\Rightarrow \frac{5x+2x+3x}{10}=\frac{1+4}{5}$$

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

$$\Rightarrow x=1$$

Q.8 $\frac{7}{x}+35=\frac{1}{10}$

Transposing 35 to RHS.

$$\Rightarrow \frac{7}{x}=\frac{1}{10}-35$$

$$\Rightarrow \frac{7}{x}=\frac{1-350}{10}$$

$$\Rightarrow \frac{7}{x}=-\frac{349}{10}$$

$$\Rightarrow -349x=70$$

$$\Rightarrow x=\frac{-70}{349}$$

Q.9 $\frac{2x-1}{3}-\frac{6x-2}{5}=\frac{1}{3}$

Sol: $\frac{5(2x-1)-3(6x-2)}{15}=\frac{1}{3}$

$$\Rightarrow \frac{10x-5-18x+6}{15}=\frac{1}{3}$$

$$= \frac{-8x+1}{15}=\frac{1}{3}$$

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$\Rightarrow \quad -24x+3=15$ (By Cross Multiplying)

$\Rightarrow \quad -24x = 15-3$

$\Rightarrow \quad -24x = 12$

$\Rightarrow \quad x = \frac{-12}{24}$

$= \frac{-1}{2}$

Q.10 $\quad 13(y-4)-3(y-9)-5(y+4)=0$

Solution: $\quad 13(y-4)-3(y-9)-5(y+4)=0$

$\Rightarrow \quad 13y-52-3y+27-5y-20=0$

$\Rightarrow \quad (13y-3y-5y)+(-52+27-20)=0$

$= \quad 5y-45=0$

$\Rightarrow \quad 5y=45$

$\Rightarrow \quad y=\frac{45}{5}$

$y=9$

Q.11 $\quad \frac{2}{3}(x-5)-\frac{1}{4}(x-2)=\frac{9}{2}$

Sol: $\quad \frac{8(x-5)-3(x-2)}{12}=\frac{9}{2}$

$\Rightarrow \quad \frac{8x-40-3x+6}{12}=\frac{9}{2}$

$\Rightarrow \quad \frac{5x-34}{12}=\frac{9}{2}$ $\quad \Rightarrow \quad 10x-68=108$

$\Rightarrow \quad 10x=176$

$\Rightarrow \quad x=\frac{176}{10}=\frac{88}{5}$

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