

## EXERCISE 9.1

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

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

**Solution:**

We have,

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

$$37/4 = y - 4/3$$

Upon solving we get,

$$y = 37/4 + 4/3$$

By taking LCM for 4 and 3 is 12

$$y = (37 \times 3)/12 + (4 \times 4)/12$$

$$= 111/12 + 16/12$$

$$= (111 + 16)/12$$

$$= 127/12$$

$$\therefore y = 127/12$$

Verification-

$$\text{RHS} = y - 1\frac{1}{3}$$

$$= 127/12 - 4/3$$

$$= (127 - 16)/12$$

$$= 111/12$$

$$= 37/4$$

$$= 9\frac{1}{4}$$

$$= \text{LHS}$$

2.  $5x/3 + 2/5 = 1$

**Solution:**

We have,

$$5x/3 + 2/5 = 1$$

$$5x/3 = 1 - 2/5 \text{ (by taking LCM)}$$

$$= (5-2)/5$$

By using cross-multiplication we get,

$$5x/3 = 3/5$$

$$5x = (3 \times 3)/5$$

$$x = 9/(5 \times 5)$$

$$= 9/25$$

$$\therefore x = 9/25$$

Verification-

$$\begin{aligned}\text{LHS} &= 5x/3 + 2/5 \\ &= 5/3 \times 9/25 + 2/5 \\ &= 3/5 + 2/5 \\ &= (3 + 2)/5 \\ &= 5/5 \\ &= 1 \\ &= \text{RHS}\end{aligned}$$

**3.  $x/2 + x/3 + x/4 = 13$**

**Solution:**

We have,

$$x/2 + x/3 + x/4 = 13$$

let us take LCM for 2, 3 and 4 which is 12

$$(x \times 6)/12 + (x \times 4)/12 + (x \times 3)/12 = 13$$

$$6x/12 + 4x/12 + 3x/12 = 13$$

$$(6x + 4x + 3x)/12 = 13$$

$$13x/12 = 13$$

By using cross-multiplication we get,

$$13x = 12 \times 13$$

$$x = 156/13$$

$$= 12$$

$$\therefore x = 12$$

Verification-

$$\text{LHS} = x/2 + x/3 + x/4$$

$$= 12/2 + 12/3 + 12/4$$

$$= 6 + 4 + 3$$

$$= 13$$

$$= \text{RHS}$$

**4.  $x/2 + x/8 = 1/8$**

**Solution:**

We have,

$$x/2 + x/8 = 1/8$$

let us take LCM for 2 and 8 which is 8

$$(x \times 4)/8 + (x \times 1)/8 = 1/8$$

$$4x/8 + x/8 = 1/8$$

$$5x/8 = 1/8$$

By using cross-multiplication we get,

$$5x = 8/8$$

$$5x = 1$$

$$x = 1/5$$

$$\therefore x = 1/5$$

Verification-

$$\text{LHS} = x/2 + x/8$$

$$= (1/5)/2 + (1/5)/8$$

$$= 1/10 + 1/40$$

$$= (4 + 1)/40$$

$$= 5/40$$

$$= 1/8$$

$$= \text{RHS}$$

**5.  $2x/3 - 3x/8 = 7/12$**

**Solution:**

We have,

$$2x/3 - 3x/8 = 7/12$$

By taking LCM for 3 and 8 is 24

$$(2x \times 8)/24 - (3x \times 3)/24 = 7/12$$

$$16x/24 - 9x/24 = 7/12$$

$$(16x - 9x)/24 = 7/12$$

$$7x/24 = 7/12$$

By using cross-multiplication we get,

$$7x \times 12 = 7 \times 24$$

$$x = (7 \times 24)/(7 \times 12)$$

$$= 24/12$$

$$= 2$$

$$\therefore x = 2$$

Verification-

$$\text{LHS} = 2x/3 - 3x/8$$

$$= 2(2)/3 - 3(2)/8$$

$$= 4/3 - 6/8$$

$$= 4/3 - 3/4$$

$$= (16 - 9)/12$$

$$= 7/12$$

$$= \text{RHS}$$

**6.  $(x + 2)(x + 3) + (x - 3)(x - 2) - 2x(x + 1) = 0$**

**Solution:**

We have,

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

Upon expansion we get,

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

$$-2x + 12 = 0$$

By dividing the equation using -2 we get,

$$x - 6 = 0$$

$$x = 6$$

$$\therefore x = 6$$

Verification-

$$\text{LHS} = (x + 2)(x + 3) + (x - 3)(x - 2) - 2x(x + 1)$$

$$= (6 + 2)(6 + 3) + (6 - 3)(6 - 2) - 2(6)(6 + 1)$$

$$= (8)(9) + (3)(4) - 12(7)$$

$$= 72 + 12 - 84$$

$$= 84 - 84$$

$$= 0$$

$$= \text{RHS}$$

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

**Solution:**

We have,

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

upon solving we get,

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

by taking LCM for 2, 5 and 10 which is 10

$$\frac{(x \times 5)}{10} + \frac{(x \times 2)}{10} + \frac{(3x \times 1)}{10} = \frac{5}{5}$$

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

$$\frac{(5x + 2x + 3x)}{10} = 1$$

$$\frac{10x}{10} = 1$$

$$x = 1$$

$$\therefore x = 1$$

Verification-

$$\text{LHS} = \frac{x}{2} - \frac{4}{5} + \frac{x}{5} + \frac{3x}{10}$$

$$= \frac{1}{2} - \frac{4}{5} + \frac{1}{5} + \frac{3(1)}{10}$$

$$= \frac{(5 - 8 + 2 + 3)}{10}$$

$$= \frac{(10 - 8)}{10}$$

$$= \frac{2}{10}$$

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

$$= \text{RHS}$$

**8.  $7/x + 35 = 1/10$**

**Solution:**

We have,

$$7/x + 35 = 1/10$$

$$7/x = 1/10 - 35$$

$$= ((1 \times 1) - (35 \times 10))/10$$

$$= (1 - 350)/10$$

$$7/x = -349/10$$

By using cross-multiplication we get,

$$x = -70/349$$

$$\therefore x = -70/349$$

Verification-

$$\text{LHS} = 7/x + 35$$

$$= 7/(-70/349) + 35$$

$$= (-7 \times 349)/70 + 35$$

$$= -349/10 + 35$$

$$= (-349 + 350)/10$$

$$= 1/10$$

$$= \text{RHS}$$

**9.  $(2x-1)/3 - (6x-2)/5 = 1/3$**

**Solution:**

We have,

$$(2x-1)/3 - (6x-2)/5 = 1/3$$

By taking LCM for 3 and 5 which is 15

$$((2x-1) \times 5)/15 - ((6x-2) \times 3)/15 = 1/3$$

$$(10x - 5)/15 - (18x - 6)/15 = 1/3$$

$$(10x - 5 - 18x + 6)/15 = 1/3$$

$$(-8x + 1)/15 = 1/3$$

By using cross-multiplication we get,

$$(-8x + 1)3 = 15$$

$$-24x + 3 = 15$$

$$-24x = 15 - 3$$

$$-24x = 12$$

$$x = -12/24$$

$$= -1/2$$

$$\therefore x = -1/2$$

Verification-

$$\text{LHS} = (2x - 1)/3 - (6x - 2)/5$$

$$\begin{aligned} &= [2(-1/2) - 1]/3 - [6(-1/2) - 2]/5 \\ &= (-1 - 1)/3 - (-3 - 2)/5 \\ &= -2/3 - (-5/5) \\ &= -2/3 + 1 \\ &= (-2 + 3)/3 \\ &= 1/3 \\ &\text{RHS} \end{aligned}$$

**10.  $13(y - 4) - 3(y - 9) - 5(y + 4) = 0$**

**Solution:**

We have,

$$13(y - 4) - 3(y - 9) - 5(y + 4) = 0$$

Upon expansion we get,

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

$$13y - 3y - 5y = 52 - 27 + 20$$

$$5y = 45$$

$$y = 45/5$$

$$= 9$$

$$\therefore y = 9$$

Verification-

$$\text{LHS} = 13(y - 4) - 3(y - 9) - 5(y + 4)$$

$$= 13(9 - 4) - 3(9 - 9) - 5(9 + 4)$$

$$= 13(5) - 3(0) - 5(13)$$

$$= 65 - 0 - 65$$

$$= 0$$

$$= \text{RHS}$$

**11.  $2/3(x - 5) - 1/4(x - 2) = 9/2$**

**Solution:**

We have,

$$2/3(x - 5) - 1/4(x - 2) = 9/2$$

Upon expansion we get,

$$2x/3 - 10/3 - x/4 + 2/4 = 9/2$$

$$2x/3 - 10/3 - x/4 + 1/2 = 9/2$$

$$2x/3 - x/4 = 9/2 + 10/3 - 1/2$$

By taking LCM for (3 and 4 is 12) (2 and 3 is 6)

$$(2x \times 4)/12 - (x \times 3)/12 = (9 \times 3)/6 + (10 \times 2)/6 - (1 \times 3)/6$$

$$8x/12 - 3x/12 = 27/6 + 20/6 - 3/6$$

$$(8x - 3x)/12 = (27 + 20 - 3)/6$$

$$5x/12 = 44/6$$

By using cross-multiplication we get,

$$5x \times 6 = 44 \times 12$$

$$30x = 528$$

$$x = 528/30$$

$$= 264/15$$

$$= 88/5$$

Verification-

$$\text{LHS} = \frac{2}{3}(x - 5) - \frac{1}{4}(x - 2)$$

$$= \frac{2}{3}[(88/5) - 5] - \frac{1}{4}[(88/5) - 2]$$

$$= \frac{2}{3}[(88 - 25)/5] - \frac{1}{4}[(88 - 10)/5]$$

$$= \frac{2}{3} \times \frac{63}{5} - \frac{1}{4} \times \frac{78}{5}$$

$$= \frac{42}{5} - \frac{39}{10}$$

$$= \frac{(84 - 39)}{10}$$

$$= \frac{45}{10}$$

$$= \frac{9}{2}$$

$$= \text{RHS}$$

