

Worksheet -9

Subject: - Mathematics

Class: - VIII

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Name: \_\_\_\_\_ Class &amp; Sec: \_\_\_\_\_ Roll No. \_\_\_\_\_ Date: 01.05.202

25/4/19

Ch-2  
Linear Equations in  
One Variable

Ex - 2.5

Q. Solve:

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

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

$\Rightarrow \frac{3x - 2x}{6} = \frac{5 + 4}{20}$

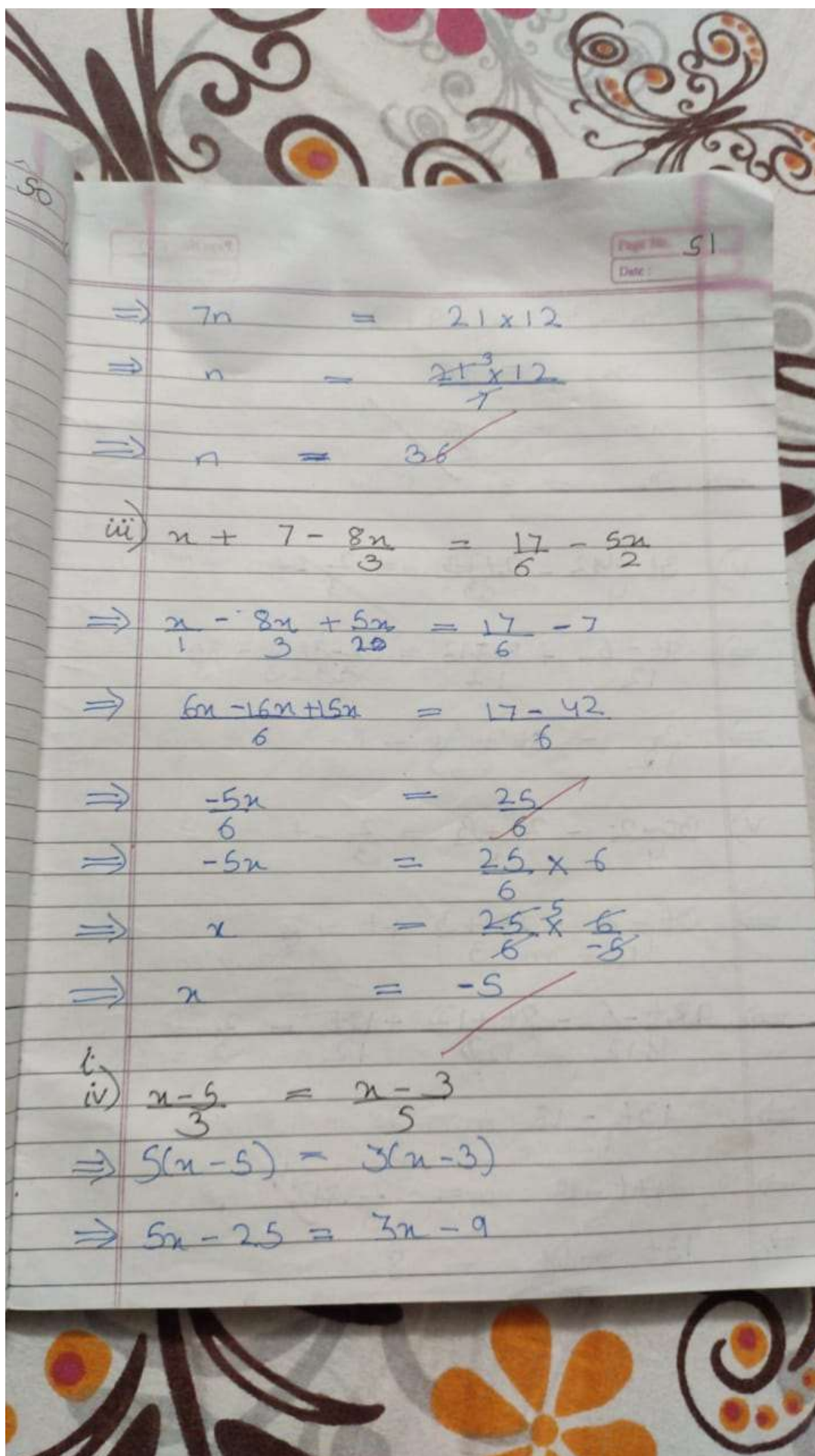
$\Rightarrow \frac{x}{6} = \frac{9}{20}$

$\Rightarrow x = \frac{9 \times 6}{20} = \frac{27}{10}$

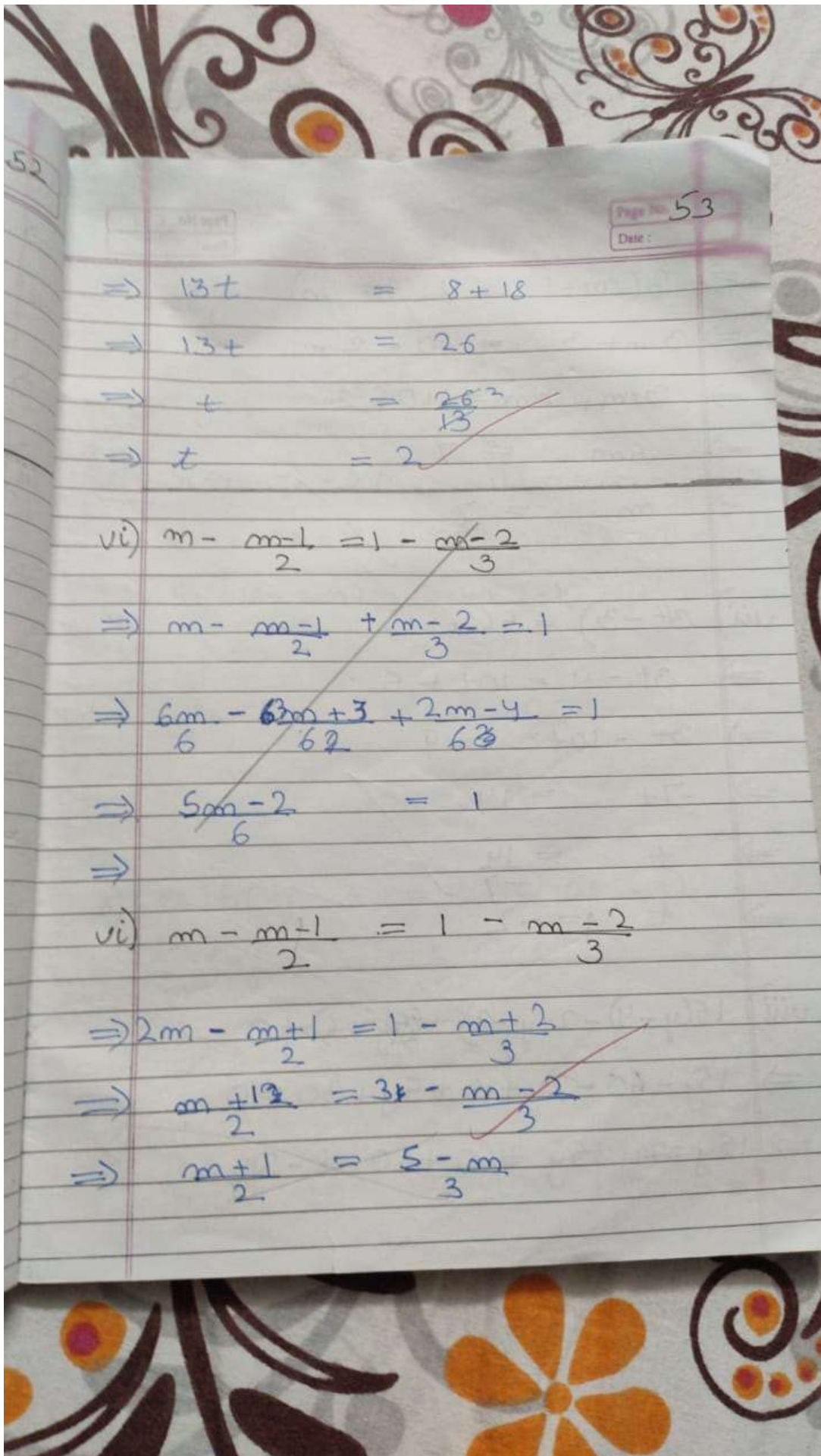
ii)  $\frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$

$\Rightarrow \frac{6n - 9n + 10n}{12} = 21$

$\Rightarrow \frac{7n}{12} = 21$







$$\Rightarrow 5x - 3x = -9 + 25$$

$$\Rightarrow 2x = 16$$

$$\Rightarrow x = \frac{16}{2}$$

$$\Rightarrow x = 8$$

$$v) \frac{3t-42}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$\Rightarrow \frac{9t-6}{12} - \frac{8t+12}{12} = \frac{2-3t}{3} - \frac{3t}{3}$$

$$\Rightarrow \frac{3t}{12} - \frac{8t}{12} + \frac{3t}{3} =$$

$$v) \frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$\Rightarrow \frac{3t-2}{4} - \frac{2t+3}{3} + t = \frac{2}{3}$$

$$\Rightarrow \frac{9t-6}{12} - \frac{8t+12}{12} + \frac{12t}{12} = \frac{2}{3}$$

$$\Rightarrow \frac{13t-18}{12} = \frac{2}{3}$$

$$\Rightarrow 13t-18 = \frac{2}{3} \times 12$$

$$\Rightarrow 13t-18 = 8$$



$$\Rightarrow 3(m+1) = 2(5-m)$$

$$\Rightarrow 3m+3 = 10-2m$$

$$\Rightarrow 3m+2m = 10-3$$

$$\Rightarrow 5m = 7$$

$$\Rightarrow m = \frac{7}{5}$$

$$\text{vii) } 3(t-3) = 5(2t+1)$$

$$\Rightarrow 3t-9 = 10t+5$$

$$\Rightarrow 3t-10t = 5+9$$

$$\Rightarrow -7t = 14$$

$$\Rightarrow t = \frac{14}{-7}$$

$$\Rightarrow t = -2$$

$$\text{viii) } 15(y-4) - 2(y-9) + 5(y+6) = 0$$

$$\Rightarrow 15y-60-2y+18+5y+30=0$$

$$\Rightarrow 15y-2y+5y = 0+60-18-30$$

$$\Rightarrow 18y = -12$$

$$\Rightarrow y = \frac{-12}{18} \cdot \frac{2}{3}$$

$$\Rightarrow y = \frac{-2}{3}$$

$$(4) 3(5z - 7) - 2(9z - 11) = 4(8z - 13) - 17$$

$$\Rightarrow 15z - 21 - 18z + 22 = 32z - 52 - 17$$

$$\Rightarrow 15z - 18z - 32z = -52 - 17 + 21 - 22$$

$$\Rightarrow -35z = -70$$

$$\Rightarrow z = \frac{-70}{-35}$$

$$\Rightarrow z = 2$$

$$x) 0.25(4f - 3) = 0.05(10f - 9)$$

$$\Rightarrow \frac{25}{100}(4f - 3) = \frac{5}{100}(10f - 9)$$

$$\Rightarrow \frac{100f}{100} - \frac{75}{100} = \frac{50f}{100} - \frac{45}{100}$$

$$\Rightarrow \frac{100f}{100} - \frac{50f}{100} = \frac{-45}{100} + \frac{75}{100}$$



$$\Rightarrow \frac{50f}{100} = \frac{100}{100} \frac{30}{100}$$

$$\Rightarrow f = \frac{30}{100} \times \frac{100}{50}$$

$$\Rightarrow f = \frac{0.3}{5}$$

$$\Rightarrow f = 0.6$$

or

$$0.25(4f - 3) = 0.05(10f - 9)$$

$$\Rightarrow 1.0f - 0.75 = 0.50f - 0.45$$

$$\Rightarrow 1.00f - 0.50f = -0.45 + 0.75$$

$$\Rightarrow 0.50f = 0.30$$

$$\Rightarrow f = \frac{0.30}{0.50}$$

$$\Rightarrow f = \frac{3}{5} = 0.6$$

## 2.6 Reducing Equations to Simpler Form

**Example 16:** Solve  $\frac{6x+1}{3} + 1 = \frac{x-3}{6}$

**Solution:** Multiplying both sides of the equation by 6,

$$\frac{6(6x+1)}{3} + 6 \times 1 = \frac{6(x-3)}{6}$$

or

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

or

$$12x + 2 + 6 = x - 3$$

(opening the brackets

or

$$12x + 8 = x - 3$$

or

$$12x - x + 8 = -3$$

or

$$11x + 8 = -3$$

or

$$11x = -3 - 8$$

or

$$11x = -11$$

or

$$x = -1$$

(required solution

$$\text{Check: LHS} = \frac{6(-1)+1}{3} + 1 = \frac{-6+1}{3} + 1 = \frac{-5}{3} + \frac{3}{3} = \frac{-5+3}{3} = \frac{-2}{3}$$

$$\text{RHS} = \frac{(-1)-3}{6} = \frac{-4}{6} = \frac{-2}{3}$$

$$\text{LHS} = \text{RHS.} \quad (\text{as required})$$



**Example 17:** Solve  $5x - 2(2x - 7) = 2(3x - 1) + \frac{7}{2}$

**Solution:** Let us open the brackets,

$$\text{LHS} = 5x - 4x + 14 = x + 14$$

$$\text{RHS} = 6x - 2 + \frac{7}{2} = 6x - \frac{4}{2} + \frac{7}{2} = 6x + \frac{3}{2}$$

$$\text{The equation is } x + 14 = 6x + \frac{3}{2}$$

or  $14 = 6x - x + \frac{3}{2}$

or  $14 = 5x + \frac{3}{2}$

or  $14 - \frac{3}{2} = 5x$

or  $\frac{28-3}{2} = 5x$

or  $\frac{25}{2} = 5x$

or  $x = \frac{25}{2} \times \frac{1}{5} = \frac{5 \times 5}{2 \times 5} = \frac{5}{2}$

Therefore, required solution is  $x = \frac{5}{2}$ .

$$\text{Check: LHS} = 5 \times \frac{5}{2} - 2 \left( \frac{5}{2} \times 2 - 7 \right)$$

$$= \frac{25}{2} - 2(5 - 7) = \frac{25}{2} - 2(-2) = \frac{25}{2} + 4 = \frac{25+8}{2} = \frac{33}{2}$$

$$\text{RHS} = 2 \left( \frac{5}{2} \times 3 - 1 \right) + \frac{7}{2} = 2 \left( \frac{15}{2} - \frac{2}{2} \right) + \frac{7}{2} = \frac{2 \times 13}{2} + \frac{7}{2}$$

$$= \frac{26+7}{2} = \frac{33}{2} = \text{LHS. (as required)}$$

LINEAR EQUATIONS IN ONE VARIABLE ■ 33



(transposing  $\frac{3}{2}$ )

Did you observe how we simplified the form of the given equation? Here, we had to multiply both sides of the equation by the LCM of the denominators of the terms in the expressions of the equation.

Note, in this example we brought the equation to a simpler form by opening brackets and combining like terms on both sides of the equation.

## EXERCISE 2.5

Solve the following linear equations.

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

$$2. \quad \frac{n}{2} - \frac{3n}{4} + \frac{5n}{6} = 21$$

$$3. \quad x + 7 - \frac{8x}{3} = \frac{17}{6} - \frac{5x}{2}$$



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$$4. \quad \frac{x-5}{3} = \frac{x-3}{5}$$

$$5. \quad \frac{3t-2}{4} - \frac{2t+3}{3} = \frac{2}{3} - t$$

$$6. \quad m - \frac{m-1}{2} = 1 - \frac{m-2}{3}$$

Simplify and solve the following linear equations.

$$7. \quad 3(t-3) = 5(2t+1) \quad 8. \quad 15(y-4) - 2(y-9) + 5(y+6) = 0$$

$$9. \quad 3(5z-7) - 2(9z-11) = 4(8z-13) - 17$$

$$10. \quad 0.25(4f-3) = 0.05(10f-9)$$