

Unit 9

LINEAR EQUATIONS

EXERCISE NO. 9.1

A. Solve the following equations:

(i) $x + 5 = 9$:

Solution:

$$\begin{aligned}x + 5 &= 9 \\ \text{or } x + 5 - 5 &= 9 - 5\end{aligned}$$

Ans: $x = 4$

(ii) $12 - x = 7$:

Solution:

$$\begin{aligned}12 - x &= 7 \\ \text{or } x &= 12 - 7\end{aligned}$$

Ans: $x = 5$

(iii) $5x = 3$:

Solution:

$$\begin{aligned}\text{or } 5x &= 3 \\ \text{Ans: } x &= \frac{3}{5}\end{aligned}$$

(iv) $4x + 10 = 2$:

Solution:

$$\begin{aligned}\text{or } 4x &= 2 - 10 \\ \text{or } \frac{4x}{4} &= \frac{-8}{4}\end{aligned}$$

Ans: $x = -2$

(v) $5 - 3x = -4$:

Solution:

$$\begin{aligned}5 - 3x &= -4 \\ \text{or } 3x &= 5 + 4 \\ \text{or } 3x &= 9 \\ \text{or } \frac{3x}{3} &= \frac{9}{3}\end{aligned}$$

Ans: $x = 3$

(vi) $2 + 14x = 30$:

Solution:

$$\begin{aligned}2 + 14x &= 30 \\ \text{or } 2 - 2 + 14x &= 30 - 2 \\ \text{or } 14x &= 28 \\ \text{or } \frac{14x}{14} &= \frac{28}{14}\end{aligned}$$

Ans: $x = 2$

(vii) $9 + 5x = 3x + 13$:

Solution:

$$\begin{aligned} 9 + 5x &= 3x + 13 \\ \text{or } 5x - 3x &= 13 - 9 \\ \text{or } 2x &= 4 \\ \text{or } \frac{2x}{2} &= \frac{4}{2} \end{aligned}$$

Ans: $x = 2$

(viii) $4 - 3x = 8 + x$:

Solution:

$$\begin{aligned} 4 - 3x &= 8 + x \\ \text{or } -3x - x &= 8 - 4 \\ \text{or } 4x &= 4 \\ \text{or } \frac{4x}{4} &= \frac{4}{4} \end{aligned}$$

Ans: $x = -1$

(ix) $4x + \frac{5}{2} = x + 4\frac{1}{2}$:

Solution:

$$\text{or } 4x + \frac{5}{2} = x + 4\frac{1}{2}$$

$$\text{or } 4x + \frac{5}{2} = x + \frac{9}{2}$$

$$\text{or } x\left(4x + \frac{5}{2}\right) = x\left(x + \frac{9}{2}\right)$$

$$\text{or } 4x + 5 = x + 9$$

$$\text{or } 4x - x = 9 - 5$$

$$\text{or } \frac{3x}{3} = \frac{4}{3}$$

$$\text{Ans: } x = \frac{4}{3}$$

B. Solve the following equation:

(i) $5 + 3(x - 1) = 5x - 6$:

Solution:

$$5 + 3(x - 1) = 5x - 6$$

$$\text{or } 5x + 5 + 3x - 3 = 5x - 6$$

$$\text{or } 5x - 5x + 3 = 12$$

$$\text{or } \frac{3x}{3} = \frac{12}{3}$$

$$\text{Ans: } x = 4$$

(ii) $6 - 4(x + 3) = 2(x - 1)$:

Solution:

$$6x + 18 - 4x + 12 = 2x - 2$$

$$\text{or } -12x = 4$$

$$\text{or } \frac{-12x}{12} = \frac{4}{12}$$

$$\text{Ans: } x = -\frac{2}{3}$$

(iii) $5(3 - x) - 2(4 - 3x) = 11 - 2(x - 1)$:

Solution:

$$\text{or } 15 - 5x - 8 - 12x = 11x - 11 - 2x - 2$$

$$\text{or } -5x - 12x + 11x = 15 - 8 + 11 - 2$$

$$\text{or } 6x = 40$$

$$\text{or } \frac{6x}{6} = \frac{40}{6}$$

$$\text{or } x = \frac{20}{3}$$

$$\text{Ans: } x = 6\frac{2}{3}$$

Rough work

$$\begin{array}{r} 6 \\ 3 \overline{)20} \\ 18 \\ \hline 2 \end{array}$$

(iv) $5(1 - 2x) + 2(3 - x) = 3(x + 4) + 14$:

Solution:

$$\text{or } 5(1 - 2x) + 2(3 - x) = 3(x + 4) + 14$$

$$\text{or } 5 - 10x + 6 - 2x = 3x + 12 + 14$$

$$\text{or } 10x + 2x - 3x$$

$$\text{or } -15x = 5 + 6 - 12 + 14$$

$$\text{or } -15x = 15$$

$$\text{or } \frac{-15x}{-15} = \frac{15}{-15} - 1$$

$$\text{Ans: } x = -1$$

(v) $(x + 2)(x + 3) = (x - 3)(x - 2) = 20$:

Solution:

or $x^2 + 3x + 2x + 6 = x^2 + 2x - 3x - 6 = 20$

or $2x + 2x = 20 - 6 + 6$

or $4x = 8$

or $\frac{4x}{4} = \frac{8}{4} \quad 2$

Ans: $x = 2$

C. Solve the following equations:

(i) $6x + 2 = 29 - 3x$:

Solution:

or $6x + 2 = 29 - 3x$

or $6x + 3x = 29 - 2$

or $9x = 27$

or $\frac{9x}{9} = \frac{27}{9} \quad 3$

Ans: $x = 3$

(ii) $\frac{3x}{4} = \frac{2}{5}$:

Solution:

or $^{20}\left(\frac{3x}{4}\right) = ^{20}\left(\frac{2}{5}\right)$

or $15x = 8$

or $15x = \frac{8}{15}$

or $15x = \frac{8}{15}$

Ans: $x = \frac{8}{15}$

(iii) $\frac{8}{x} = 2$:

Solution:

$\frac{8}{x} = 2$

or $^x\left(\frac{8}{x}\right) = ^x(2)$

or $8 = 2x$

or $2x = 8$

or $\frac{2x}{2} = \frac{8}{2} \quad 4$

Ans: $x = 4$

(iv) $\frac{7}{3x} = 2$:

Solution:

or $^{2x}\left(\frac{7}{3x}\right) = (2)^{3x}$

or $7 = 6x$

or $6x = 7$

or $\frac{6x}{6} = \frac{7}{6} = 1 \frac{1}{6}$

or $x = 1 \frac{1}{6}$

Ans: $x = 1 \frac{1}{6}$

$$(v) \frac{3}{x+1} = \frac{6}{5x-1}:$$

Solution:

$$\text{or } \frac{3}{x+1} = \frac{6}{5x-1}$$

$$\text{or } \frac{x+1}{3} = \frac{5x-1}{6}$$

$$\text{or } \left(\frac{x+1}{3} \right) = \left(\frac{5x-1}{6} \right)$$

$$\text{or } 2x+2 = 5x-1$$

$$\text{or } 5x-2x = 2+1$$

$$\text{or } 3x = 3 \Rightarrow \frac{3}{3} = \frac{3}{3}$$

Ans: $x = 1$

D. Solve the equation:

$$(i) 5 + \frac{x}{3} = 7:$$

Solution:

$$5 + \frac{x}{3} = 7$$

$$\text{or } 3(5) + \left(\frac{x}{3} \right)^3 = (7)^3$$

$$\text{or } 15 + x = 21$$

$$\text{or } x = 21 - 15$$

$$\text{or } x = 6$$

Ans: $x = 6$

$$(ii) \frac{x}{2} - 1 = 5:$$

Solution:

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

$$\text{or } \left(\frac{x}{2} \right) (-1)^2 = (5)^2$$

$$\text{or } x - 2 = 25$$

$$\text{or } x^2 + 1 = 25 - 1$$

$$\text{or } \frac{2x}{-2} = \frac{24}{-2} \quad 12$$

Ans: $x = 12$

$$(iii) \frac{3x}{4} - 2 = \frac{x}{3} + 3:$$

Solution:

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

$$\text{or } \left(\frac{3x}{4}\right)(-2)^{12} = \left(\frac{x}{3}\right)(3)^{12}$$

$$\text{or } 9x - 24 = 4x + 36$$

$$\text{or } 9x - 24 = 4x + 36$$

$$\text{or } 9x - 4x = 36 + 24$$

$$\text{or } \frac{5x}{5} = \frac{60}{5} \quad 12$$

$$\text{Ans: } x = 12$$

$$(iv) 4 - \frac{2x}{3} = \frac{x+2}{5}:$$

Solution:

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

$$\text{or } \left(4\right)\left(\frac{-2x}{3}\right) = \left(\frac{x+2}{5}\right)$$

$$\text{or } 60 - 10x = 3x + 6$$

$$\text{or } 10x + 3x = 60 - 6$$

$$13x = 54$$

$$\text{or } \frac{13x}{13} = \frac{54}{13}$$

$$\text{or } x = 4 \frac{2}{13}$$

$$\text{Ans: } = 4 \frac{2}{13}$$

$$(v) \frac{x+2}{3} = \frac{1-2x}{5}; \quad (vi) \frac{4x+3}{3} = \frac{x+7}{2};$$

Solution:

$$\begin{aligned} \frac{x+2}{3} &= \frac{1-2x}{5} \\ \text{or } {}^{15}\left(\frac{x+2}{3}\right) &= \left(\frac{1-2x}{5}\right)^{15} \\ \text{or } 5x+10 &= 3-6x \\ \text{or } 5x+6x &= 10-3 \\ \text{or } 11x &= 7 \\ \text{or } \frac{11x}{11} &= \frac{7}{11} \end{aligned}$$

$$\text{Ans: } x = \frac{7}{11}$$

Solution:

$$\begin{aligned} \frac{4x+3}{3} &= \frac{x+7}{2} \\ \text{or } {}^6\left(\frac{4x+3}{3}\right) &= \left(\frac{x+7}{2}\right)^6 \\ \text{or } 8x+6 &= 3x+21 \\ \text{or } 8x-3x &= 21-6 \\ \text{or } 5x &= 15 \\ \text{or } \frac{5x}{5} &= \frac{15}{5} \end{aligned}$$

$$\text{Ans: } x = 3$$

$$(vii) \frac{5x+1}{2} - \frac{x+2}{6} = \frac{2x+4}{3};$$

Solution:

$$\begin{aligned} \frac{5x+1}{2} - \frac{x+2}{6} &= \frac{2x+4}{3} \\ \text{or } {}^6\left(\frac{5x+1}{2}\right) - {}^6\left(\frac{x+2}{6}\right) &= \left(\frac{2x+4}{3}\right)^6 \\ \text{or } 3(5x+1) - (x+2) &= 2(2x+4) \\ \text{or } 15x+3-x+2 &= 4x+8 \\ \text{or } 15x-x+3-2 &= 4x+8 \\ \text{or } 14x+1 &= 4x+8 \\ \text{or } \frac{14x}{14} &= \frac{7}{14} \\ \text{or } x &= \frac{7}{14} \\ \text{Ans: } x &= \frac{7}{14} \end{aligned}$$

$$(viii) \frac{x-3}{3} - \frac{7}{2} = \frac{4x-3}{3} - \frac{2}{3}:$$

Solution:

$$\frac{x-3}{3} - \frac{7}{2} = \frac{4x-3}{3} - \frac{2}{3}$$

$$\text{or } \left(\frac{x-3}{3}\right) - \left(\frac{7}{2}\right) = \left(\frac{4x-3}{3}\right) - \left(\frac{2}{3}\right)$$

$$\text{or } 2x - 6 - 21 = 8x - 6 - 4$$

$$\text{or } 8x - 2x - 27 = 10$$

$$\text{or } 6x = 27 + 10$$

$$\text{or } 6x = 37$$

$$\text{or } x = \frac{37}{6} = 2\frac{5}{6}$$

$$\text{Ans: } x = \frac{37}{6}$$

EXERCISE 9.2

1. Solve and verify the following equation:

(i) $3x + 9 = 18:$

Solution:

$$3x + 9 = 18$$

$$\text{or } 3x + 9 - 9 = 18 - 9$$

$$\text{or } 3x = 9$$

$$\text{or } \frac{3x}{3} = \frac{9}{3}$$

$$\text{Ans: } x = 3$$

Verification

$$x = 3$$

$$\text{or } 3x + 9 = 18$$

$$\text{or } 3(3) + 9 = 18$$

$$\text{or } 9 + 9 = 18$$

$$18 = 18$$

(ii) $2x - 5 = 9$:

Solution:

$$2x - 5 = 9$$

$$\text{or } 2x - 5 + 5 = 9 + 5$$

$$\text{or } 2x = 14$$

$$\text{or } \frac{2x}{2} = \frac{14}{2} \quad 7$$

$$\text{Ans: } x = 7$$

Verification

$$x = 7$$

$$\text{or } 2(7) - 5 = 9$$

$$\text{or } 14 - 5 = 9$$

$$\text{or } 14 = 9 + 5$$

$$14 = 14$$

(iii) $4x - 5 = 11$

Solution:

$$4x - 5 = 11$$

$$\text{or } 4x + 5 - 5 = 11 + 5$$

$$\text{or } 4x = 16$$

$$\text{or } \frac{4x}{4} = \frac{16}{4} \quad 4$$

$$\text{Ans: } x = 4$$

Verification

$$x = 4$$

$$\text{or } 4x + 5 = 11$$

$$\text{or } 4(4) + 5 = 11 + 5$$

$$\text{or } 16 + 5 = 11 + 5$$

$$21 = 16$$

(iv) $5x - 20 = 30$:

Solution:

$$5x - 20 = 30$$

$$\text{or } 5x + 20 - 20 = 30 + 20$$

$$\text{or } 5x = 50$$

$$\text{or } \frac{5x}{5} = \frac{50}{5} \quad 10$$

$$\text{Ans: } x = 10$$

Verification

$$x = 10$$

$$\text{or } 5x + 20 = 30$$

$$\text{or } 5(10) + 20 = 30$$

$$\text{or } 50 + 20 = 30$$

$$70 = 30$$

(v) $3x + -17 = 2$:

Solution:

$$\text{or } 3x = 17 - 2$$

$$\text{or } 3x = 15$$

$$\text{or } \frac{3x}{3} = \frac{15}{3} \quad 5$$

$$\text{Ans: } x = 5$$

(vi) $13 = 3x = -2$:

Solution:

$$\text{or } 13 - 3x = -2$$

$$\text{or } 3x = -13 - 2$$

$$\text{or } \frac{3x}{3} = \frac{15}{3}$$

$$\text{Ans: } x = 5$$

(vii) $4x + 8 = 2$:

Solution:

$$\begin{aligned} 4x + 8 &= 2 \\ \text{or } 4x &= 8 - 2 \\ \text{or } \frac{4x}{4} &= \frac{-6}{4} \\ \text{or } x &= \frac{-3}{2} \end{aligned}$$

Ans: $x = -1\frac{1}{2}$

(viii) $\frac{x+3}{x-1} = \frac{6}{7}$:

Solution:

$$\begin{aligned} \text{or } \frac{(x+3)}{(x-1)} &= \frac{6}{7} \\ \text{or } 7(x+3) &= 6(x-1) \\ \text{or } 8x + 21 &= 6x - 6 \\ \text{or } 7x - 6x &= -21 - 6 \\ x &= -27 \end{aligned}$$

Ans: $x = -27$

(ix) $5x + 1 = \frac{6}{5}$:

Solution:

$$\begin{aligned} \text{or } 5(5x + 1) &= \left(\frac{6}{5}\right)^5 \\ \text{or } 25x + 5 &= 6 \\ \text{or } 25x &= 6 - 5 \\ \text{or } \frac{25x}{25} &= \frac{1}{25} \end{aligned}$$

Ans: $x = \frac{1}{25}$

(x) $\frac{x-1}{x+2} = \frac{4}{3}$:

Solution:

$$\begin{aligned} \text{or } 3(x-1) &= 4(x+2) \\ \text{or } 3x - 3 &= 4x + 8 \\ \text{or } 4x - 3x &= -8 + 3 \\ \text{or } x &= -11 \end{aligned}$$

Ans: $x = -11$

(xi) $\frac{2x+3}{7x+1} = \frac{7}{15}$:

Solution:

$$\begin{aligned} \text{or } 15(2x+3) &= 7(7x+1) \\ \text{or } 30x + 45 &= 49x + 7 \\ \text{or } 49x - 30x &= 45 - 7 \\ \text{or } 19x &= 38 \\ \text{or } \frac{19x}{19} &= \frac{38}{19} \end{aligned}$$

Ans: $x = 2$

(xii) $\frac{3x-8}{5x+2} = 1$:

Solution:

$$\begin{aligned} \text{or } 1(3x-8) &= 1(5x+2) \\ \text{or } 3x - 8 &= 5x + 2 \\ \text{or } 5x - 3x &= -8 - 2 \\ \text{or } 2x &= -10 \\ \text{or } \frac{2x}{2} &= \frac{-10}{2} \end{aligned}$$

Ans: $x = -5$

EXERCISE 9.3

1. Aslam had 35 in his pocket. He purchased three Pencils still he has Rs. 5 in pocket. Find the price of pencils.

Solution:

Suppose the price of pencils = x

Total amount Rs. = 30

Remaining amount Rs. = 5

Linear equation $x - 35 = 5$

$$x - 35 = 5$$

$$\text{or } x = 35 + 5$$

$$\text{or } x = 40$$

Ans: He paid Rs. = 40

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2. Ali has some amount of rupees. If Rs. 7 is added to thrice of that amount it makes Rs. 22. what amount is with him?

Solution:

Linear equation $3x + 7 = 22$

$$\text{or } 3x + 7 = 22 \quad \text{or } 3x = 15$$

$$\text{or } \frac{3x}{3} = \frac{15}{3} \quad \text{or } x = 5$$

Ans: = Rs. 5 .

3. The length of a room is 1.5m more than its breadth. If the perimeter of the room is 63 m. Find the length and breadth of the room.

Solution:



$$\text{Formula} = 2 (L + b)$$

Suppose the breadth of room = x

Length of room = $x + 1.5$ m

Perimeter of room = 63m

Perimeter = 2 + (length + breadth)

$$(x + x + 1.5) \times 2$$

$$(2x + 1.5) \times 2$$

$$4x + 3$$

$\therefore$ The required linear equation

$$4x + 3 = 63$$

$$\text{or } 4x + 3 - 3 = 63 - 3$$

$$\text{or } \frac{4x}{4} = \frac{60}{4} \quad 15$$

$$15 + 1.5 = 16.5$$

Ans: $\approx$ breadth = 15m and length = 16.5m

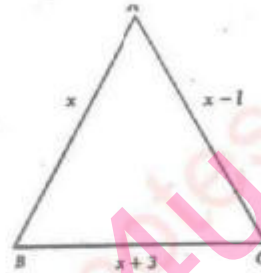
4. The perimeter of a triangle ABC is 11cm sides AB and BC differ in length by 1cm and the sides AC and BC differ in length by 3 cm. Find the length of each side.

Solution:

Suppose $AB = x$

$BC = x - 1$

$AC = (x - 1 - 3)$
 $= (x - 4)$



Perimeter of the triangle = $m\angle A + m\angle B + m\angle C$

equation = $x(x - 1) + (x - 4) = 11$

or $x + x - 1 + x - 4 = 11$

or $3x = 11 - 5$

or $\frac{3x}{3} = \frac{-6}{-3}$

$x = 2$

$m\angle AB = 2\text{cm}$

$m\angle BC = 2 + 1$

$= 3\text{cm}$

$m\angle AC = 3 + 3$

$= 6\text{ cm}$

Ans: $mAB = 2\text{cm}$, $mBC = 3\text{cm}$, $mAC = 6\text{cm}$

5. A 32 cm long wire is bent to form a square what is the length of each side of the square?

Solution:

Suppose length of side = x

4 side of square = $4x$

length of wire = 32m

required linear equation is $4x = 32$

$$\text{or } \frac{4x}{4} = \frac{32}{4} \quad 8$$

$$\text{or } x = 8$$

Ans: = The length of each side of the square = 8 meter.

6. Hassan and Asghar had 800 rupees. Hassan had four times as many as Asghar had. How many rupees did each of Hassan and Asghar have?

Solution:

Suppose Asghar had rupees = x

Hassan had four times more than Asghar = $4x$

Total amount Rs. = 800

required linear equation = $x + 4x = 800$

$$\text{or } 5x = 800$$

$$\text{or } \frac{5x}{5} = \frac{800}{5}$$

$$\text{or } x = 160$$

$$\text{or } = 160 \times 4 = 640$$

Ans: Asghar has Rs. 160 and Hassan has Rs. 640

- 400
7. Ask your friend to think a number. Add 3 to it and then multiply by 2. Now subtract 6 from it and then divide the result by 2. What is the number? Did he get the same number that he initially thought of?

Solution:

He think a number = 2

$$2 + 3 \times 2 - 6 \div 2$$

$$\text{or } 5 \times 2 - 6 \div 2$$

$$\text{or } 10 - 6 \div 2$$

$$\text{or } 4 \div 2$$

$$\text{or } = \frac{4}{2}$$

$$= 2$$

Ans: Yes

8. Which of the two consecutive numbers add up to give 43?

Solution:

Suppose number = x

Given = 43

linear equation $x + x = 43$

$$\text{or } 2x = 43$$

$$\text{or } \frac{2x}{2} = \frac{43}{2}$$

because number are consecutive can not be equal so one number is = 21 and other number = 22.

Ans: 21, 22 are the numbers

9. What are three consecutive whole numbers. Whose sum is 48?

Solution:

Suppose x is a whole number

$\therefore$ required linear equation.

$$x + x + x = 48$$

$$\text{or } 3x = 48$$

$$\text{or } \frac{3x}{3} = \frac{48}{3}$$

$$\text{or } x = 16$$

because number are consecutive whole numbers can not be equal so 1st number 15, second 16 & third = 17.

Ans: 15, 16, 17 are the required odd numbers.

10. The sum of one-third and one fourth of an amount is Rs. 14. what is the amount?

Solution:

Suppose required number = x

$$\text{One third required number} = \frac{1}{3} x$$

$$\text{One fourth required number} = \frac{1}{4} x$$

given amount Rs. = 14

required linear equation

$$\frac{1}{3} x + \frac{1}{4} x = 14$$

$$\text{or } \frac{x}{3} + \frac{x}{4} = 14$$

$$\text{or } \frac{4x + 3x}{12} = 14$$

$$\text{or } \frac{7x}{12} = 14$$

$$\text{or } 7x = 14 \times 12$$

$$\text{or } 7x = 168$$

$$\text{or } \frac{7x}{7} = \frac{168}{7}$$

$$\text{or } x = 24$$

$$\text{Ans: } = 24$$

11. The sum of two numbers is 9. The difference between five times of first and four times of the second is 9 what are the numbers?

Solution:

Suppose first number = x

Suppose second number = y

according to the condition

$$= x + y = 9 \dots\dots (i)$$

$$= 5x + 4y = 9 \dots\dots (ii)$$

equation (i) multiplied by 4

$$= 4(x + y) = 9 \times 4$$

$$= 4x + 4y = 36 \dots\dots (iii)$$

addition to equation (ii) and (iii)

$$\begin{array}{r} 5x - 4y = 9 \\ + \quad 4x + 4y = 36 \\ \hline 9x = 45 \end{array}$$

$$\frac{9x}{9} = \frac{45}{9} \quad 5$$

$$x = 5$$

$$\text{or } x + y = 9$$

$$\text{or } 5 + y = 9$$

$$\text{or } y = 9 - 5$$

$$\text{or } y = 4$$

Ans: 4 and 5 are the required numbers.

12. The sum of four consecutive numbers is 120. What are the numbers?

Solution:

Suppose x is an odd numbers

$\therefore$ required linear equation

$$x + x + x + x = 12$$

or $4x = 120$

or $\frac{4x}{4} = \frac{120}{4}$

$$x = 30$$

because numbers are consecutive odd so they can not be equal.

1st number 27, second number = 29.

third number = 31 and fourth is = 33.

Ans: 27, 29, 31, 33 are required odd number

REVIEW EXERCISE 9

1. Write liner equation of the following:

(i) Sum of two consecutive even numbers is 42.

Ans: $x + (x + 2) = 42$

(ii) Sum of three consecutive odd numbers is 21.

Ans: $x + (x + 1) + (x + 3) = 21$

(iii) Sum of four consecutive natural numbers is 46.

Ans: $x + (x + 1) + (x + 2) + (x + 3) = 46$

(ii) $1\frac{1}{2}x = 1$, then $x = ?$

- (a) $\frac{1}{2}$ (b) $\frac{3}{2}$ (c) 1 (d) $\frac{2}{3}$

Ans: (d) $\frac{2}{3}$

(iii) The equation $2x + 1 = 6$ is a linear equation with degree.

- (a) 1 (b) 2 (c) 3 (d) 4

Ans: (a) 1

(iv) The solution of $1 + 6x = 7$ is:

- (a) $x = 0$ (b) $x = 1$
(c) $x = 2$ (d) $x = 3$

Ans: (b) $x = 1$

6. Verify:

(i) $\frac{x}{2} - 4 = 2$:

Solution:

$$\frac{x}{2} - 4 = 2$$

$$\text{or } \left(\frac{x}{2}\right) - (4)^2 = (2)^2$$

$$\text{or } x - 8 = 4$$

$$\text{or } x - 8 + 8 = 4 + 8$$

Ans: $x = 12$

(ii) $\frac{x-7}{4} = 3$:

Solution:

$$\frac{x-7}{4} = 3$$

$$\text{or } \left(\frac{x-7}{4}\right)^4 = (3)^4$$

$$\text{or } x - 7 = 12$$

$$\text{or } x - 7 + 7 = 12 + 7$$

$$\text{or } x = 12 + 7$$

Ans: $x = 19$

(iii) $\frac{x-5}{2}$:

Solution:

$$\frac{x-5}{2}$$

$$\text{or } \left(\frac{x-5}{2} \right)^2$$

$$\text{or } x-5 =$$

$$\text{or } x-5+5 =$$

$$\text{or } x = +5$$

$$\text{Ans: } = 5$$

(iv) $\frac{x+1}{x-3} = \frac{5}{3}$:

Solution:

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

$$\text{or } \frac{x+1}{x-3} = \frac{3}{5}$$

$$\text{or } 3(x+1) = 5(x-3)$$

$$\text{or } 5x - 3x = 15 + 3$$

$$\text{or } 2x = 18$$

$$\text{or } \frac{x}{2} = \frac{18}{2}$$

$$\text{Ans: } x = 9$$

(v) $\frac{x-2}{x-1} = \frac{3}{4}$:

Solution:

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

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

$$\text{or } 4(x-2) = 3(x-1)$$

$$\text{or } 4x - 8 = 3x - 3$$

$$\text{or } 4x - 3x = 8 - 3$$

$$\text{Ans: } = x = 5$$

(vi) $\frac{x+3}{3} = \frac{x+6}{2}$:

Solution:

$$\frac{x+3}{3} = \frac{x+6}{2}$$

$$\text{or } \left(\frac{x+3}{3} \right)^2 = \left(\frac{x+6}{2} \right)^3$$

$$\text{or } 2x + 6 = 3x + 18$$

$$\text{or } 3x - 2x = 18 + 6$$

$$\text{or } x = -12$$

$$\text{Ans: } = x = -12$$

7. A 120 cm long wire is given the shape of a rectangle such that its length is 10cm more than the breadth. Find the length and breadth of the rectangle.

Solution:

Suppose the breadth of rectangle = x

Suppose the length of rectangle = $x + 10\text{cm}$

Perimeter of wire (rectangle) = 120 cm

Perimeter = 2 (length + breadth)

Perimeter = $(x + x + 10) \times 2$

= $(2x + 10) \times 2$

$4x + 20$

$\therefore$ The required linear equation

$4x + 20 = 120$

$4x + 20 - 20 = 120 - 20$

$4x = 100$

$\frac{4x}{4} = \frac{100}{4}$

$x = 25$ length is 10cm more than breadth.

$25 + 10 = 35$

Ans: Length is 35cm breadth is 25 cm

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