

24/08/19

Chapter-7

Simple linear equations
in one variable

Exercise: 7.1

Solve:-

① $8x - 5 = 32 + 55$ ② $\frac{x}{3} - 2 = \frac{x}{4} + 5$

$\Rightarrow 8x - 32 = 55 - 5$

$\Rightarrow 5x = 50$ $\Rightarrow \frac{x}{3} - \frac{x}{4} = 5 + 2$

$\Rightarrow x = 10$

Ans $\Rightarrow$ $x = 10$ $\Rightarrow 4x - 3x = 7$

③ $\frac{x}{5} + 3 = x + 12$

$\Rightarrow \frac{x}{12} = 4$

$\Rightarrow x - 2 = 12 - 3$

$\Rightarrow x = 9$

$\Rightarrow 6x - 52 = 9$

$\Rightarrow x = 9$

Ans $\Rightarrow$ $x = 9$

④ $\frac{3}{8}(x-5) = 9 - 2x$

$\Rightarrow 3(x-5) = 8(9-2x)$

$\Rightarrow 3x - 15 = 72 - 16x$

$\Rightarrow 3x - 16 = 72 + 15$

Ans $\Rightarrow$ $x = 87$

⑤ $2(3x-2) - 3(4-5x) = 4(1-2x) + 12$

$\Rightarrow 6x - 4 - 12 + 15x = 4 - 8x + 12$

$\Rightarrow 6x + 15x + 14x = 4 + 12 + 12 + 4$

$\Rightarrow 35x = 35$

Ans $\Rightarrow$ $x = 1$

⑥ $0.4(a+1.4) = 0.42$

$\Rightarrow 0.4a + 0.56 = 0.42$

$\Rightarrow 0.4a = 0.42 - 0.56$

$\Rightarrow a = 0.16$

$\Rightarrow a = 0.16$

$\Rightarrow a = 0.16$

Ans $\Rightarrow$ $a = 0.16$

$$\Rightarrow 3.3y - 1.6 = 5.45 - 0.8y$$

$$\Rightarrow 3.3y + 0.8y = 5.45 + 1.6$$

$$\Rightarrow 4.1y = 4.35$$

$$\Rightarrow y = 2.1$$

$$\Rightarrow y = 2.1$$

$$\Rightarrow y = 2.1$$

$$\Rightarrow 2.3x - 0.4 = 2.8 + 0.4x$$

$$\Rightarrow 2.3x - 0.4x = 2.8 + 0.4$$

$$\Rightarrow 1.9x = 3.2$$

$$\Rightarrow x = 1.6$$

$$\Rightarrow x = 1.6$$

$$\Rightarrow x = 1.6$$

$$\Rightarrow x = 1.6$$

$$\Rightarrow 4.9x + 2.6 = 5.8 - 1.5x$$

$$\Rightarrow 4.9x + 1.5x = 5.8 - 2.6$$

$$\Rightarrow 6.4x = 3.2$$

$$\Rightarrow x = 0.5$$

$$\Rightarrow x = 0.5$$

$$\Rightarrow x = 0.5$$

$$\Rightarrow x = 0.5$$

$$\Rightarrow x = 0.5$$

$$\Rightarrow \frac{x}{2} + \frac{x}{4} = 8 + 12 \quad (1) \quad \frac{x}{3} - \frac{x}{5} = \frac{x}{2} - 22$$

$$\Rightarrow \frac{x}{2} + \frac{x}{4} - \frac{x}{6} = \frac{x}{6} \Rightarrow \frac{x}{3} - \frac{x}{5} - \frac{x}{2} = -22$$

$$\Rightarrow \frac{6x + 3x - 2x}{6} = \frac{x}{6} \Rightarrow \frac{10x - 6x - 15x}{30} = -22$$

$$\Rightarrow \frac{7x}{12} = \frac{x}{6} \Rightarrow 4x - 15x = -2280$$

$$\Rightarrow 7x = 2x \Rightarrow 5x = 14 \Rightarrow x = 2.8$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$\Rightarrow 7x = 14 \Rightarrow x = 2$$

$$(13) \quad \frac{8}{3}x - \frac{3}{4}x + \frac{4}{5}x = \frac{2}{15}$$

$$\Rightarrow \frac{2x}{3} - \frac{3}{4}x + \frac{4x}{5} = \frac{2}{15}$$

$$\Rightarrow \frac{40x}{60} - \frac{45x}{60} + \frac{48x}{60} = \frac{2}{15}$$

$$\Rightarrow -5x + 48x = \frac{2}{15} \times 60$$

$$\Rightarrow 43x = 8$$

$$ax \Rightarrow \frac{0}{43} \quad \boxed{x = \frac{8}{43}}$$

$$(14) \quad \frac{d-t}{5} = \frac{8-5t}{9}$$

$$\Rightarrow 9 \times (d-t) = 5 \times (8-5t)$$

$$\Rightarrow 9d - 63 = 40 - 25t$$

$$\Rightarrow 9d + 25t = 40 + 63$$

$$\Rightarrow \frac{34t}{103} = \frac{103}{34}$$

$$\boxed{t = \frac{103}{34}}$$

$$(15) \quad \frac{(3y-4)}{2} = \frac{(5-2y)}{4}$$

$$\Rightarrow 4 \times (3y-4) = 2 \times (5-2y)$$

$$\Rightarrow 12-4y = 10-4y$$

$$\Rightarrow 2y + 4y = 16 + 10$$

$$\Rightarrow 16y = \frac{26}{16}$$

$$\Rightarrow \boxed{y = \frac{13}{8}}$$

$$\Rightarrow \frac{3}{x} (2-4x) - \frac{4}{5} (3-2x) + \frac{63}{5} = 0$$

$$\Rightarrow \frac{6-12x}{2} - \frac{12-8x}{5} = -\frac{63}{5}$$

$$\Rightarrow \frac{5(6-12x) - 2(12-8x)}{10} = -\frac{63}{5}$$

$$\Rightarrow \frac{30-60x-24+16x}{10} = -\frac{63}{5}$$

$$\Rightarrow \frac{6-44x}{10} = -\frac{63}{5}$$

$$\Rightarrow 6-44x = -63 \times 2$$

$$\Rightarrow 6-44x = -126-6$$

$$\Rightarrow 44x = 132$$

$$\Rightarrow x = \frac{132}{44}$$

$$\Rightarrow \boxed{x = 3}$$

$$(17) \frac{34}{4} - \frac{2}{2} - \frac{3}{2} + \frac{4}{3} \quad (18) \frac{2}{3}x + \frac{3}{2}x - \frac{3}{4}x = 1$$

$$\Rightarrow \frac{34}{4} - \frac{2}{2} = \frac{3}{2} + \frac{2}{2} \Rightarrow \frac{2x + 3x - 3x}{4} = \frac{1}{4}$$

$$\Rightarrow \frac{24 - 4}{14} = \frac{21 + 4}{14} \Rightarrow \frac{8x + 18x - 9x}{12} = \frac{1}{4}$$

$$\Rightarrow \frac{54}{142} = \frac{85}{142} \Rightarrow \frac{26x - 9x}{12} = \frac{1}{4}$$

$$\Rightarrow \frac{5}{2} \times \frac{1}{5} \Rightarrow \frac{17}{39x} \times \frac{1}{4} = \frac{1}{4}$$

$$\Rightarrow \frac{4}{7} = \frac{30}{7} \Rightarrow x = \frac{17}{17} \times \frac{3}{17}$$

$$A_1 \Rightarrow \boxed{y = \frac{4}{2}} \quad A_2 \Rightarrow \boxed{x = 3}$$

$$(19) \frac{(5x-3) - (2x-1)}{6} = \frac{(4-3x)}{2}$$

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

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

$$\Rightarrow \frac{x-1}{6} = \frac{4-3x}{2}$$

$$\Rightarrow \frac{2x-2}{20x} = \frac{24-18x}{24+2}$$

$$A_2 \Rightarrow \boxed{x = \frac{13}{10}}$$

$$(20) \frac{2x - (3x - (2x+5))}{8} = \frac{2x+9}{4}$$

$$\Rightarrow \frac{2x - [3x - (2x+5)]}{8} = \frac{2x+9}{4}$$

$$\Rightarrow \frac{2x - [24x - 2x - 5]}{8} = \frac{2x+9}{4}$$

$$\Rightarrow \frac{2x - [22x - 5]}{8} = \frac{2x+9}{4}$$

$$\Rightarrow \frac{2x - [22x - 5 - 2x]}{8} = \frac{-9}{4}$$

$$\Rightarrow \frac{2x + [22x - 5]}{8} = \frac{9}{4}$$

$$\Rightarrow \frac{22x - 5}{2} = \frac{9}{4}$$

$$\Rightarrow 2x - 5 = 18$$

$$\Rightarrow 2x = 18 + 5$$

$$\Rightarrow 2x = 23$$

$$\Rightarrow x = \frac{23}{2}$$

Ans: $\boxed{x = \frac{23}{2}}$

Example-709

3. 5 less than one-third of a number is 6. Find the number.

Sol: Let the number = x

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

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

$$\frac{x}{3} = \frac{17}{1}$$

$$x = 17 \times 3$$

$$x = 51$$

$$\boxed{x = 51} \text{ Ans}$$

Que-2 Three sevenths of a number is greater than two fifths of the number by 4. Find the number.

Sol: Let the number = x

$$\Rightarrow \text{Three-sevenths of } x = \frac{3x}{7}$$

$$\Rightarrow \text{Two-fifths of } x = \frac{2x}{5}$$

$$\Rightarrow \frac{3x}{7} - \frac{2x}{5} = 4$$

$$\Rightarrow \frac{15x - 14x}{35} = 4$$

$$\Rightarrow \frac{x}{35} = 4$$

$$\Rightarrow x = 4 \times 35$$

$$\boxed{x = 140} \text{ Ans}$$

Que-3 One number is 4 times the other and the difference between the two numbers is 21. Find the two numbers.

Sol: Let the other number = x

$$\Rightarrow \text{First number} = x + 4$$

$$\Rightarrow 4x - x = 21$$

$$\Rightarrow 3x = 21$$

$$\Rightarrow x = 7$$

$$\Rightarrow \text{Each number} = 7$$

$$\Rightarrow \text{First number} = 7 \times 4$$

$$= 28 \text{ days}$$

$\Rightarrow$ They make their given friend a number as 34. Find the number.

Solⁿ:- Let the number = x

$$\Rightarrow \text{A.T.Q}$$

$$4x + 6 = 34$$

$$4x = 34 - 6$$

$$4x = 28$$

$$x = \frac{28}{4}$$

$$x = 7$$

$\Rightarrow$ Hence required number = 7

Ques:- The sum of the tens digit and the multiple of 3 is 74. Find the number.

Solⁿ:- Let the multiple of 3 = $3x$

Second multiple of 3 = $3 + 3$

Third multiple of 3 = $3 + 3 + 3$

$$= 6x$$

$\Rightarrow \text{A.T.Q}$

$$\Rightarrow 3x + 3 + 3 + 3 = 74$$

$$3x + 9 = 74$$

$$3x = 74 - 9$$

$$3x = 65$$

$$x = \frac{65}{3}$$

$$x = 21 \frac{2}{3}$$

$\Rightarrow$ 1st multiple of 3 = 3

$\Rightarrow$ 2nd multiple of 3 = 3 + 3 = 6

$\Rightarrow$ 3rd multiple of 3 = 3 + 3 + 3 = 9

Ques:- The sum of the digit of a two-digit number is 11. If the digits are reversed, the number is increased. Find the number.

Solⁿ:- Let one's digit = x

Ten's digit = $11 - x$

Number = $10(11 - x) + x$

$\Rightarrow \text{A.T.Q}$

$$10(11 - x) + x + 63 = 10x + 11 - x$$

$$110 - 10x + x + 63 = 9x + 11$$

$$-9x + 173 = 9x + 11$$

$$-9x - 9x = 11 - 173$$

$$-18x = -162$$

$$x = \frac{-162}{-18}$$

$$x = 9$$

$\Rightarrow \boxed{x = 9}$

$\Rightarrow$ One's digit = 9

$\Rightarrow$ Ten's digit = 11 - 9

$$= 2$$

$\Rightarrow$ Required Number = 29

Ques:- A given number is doubled to get a second number. This number is added to the first number. The sum of these three numbers is 27. Find the number.

three number is 10% more than finding the original number. find the original number

Soln:- let original number is $= x$
 after 10% increase
 $= 3x$
 $3x \times 3x = 9x$

10% of $x = \frac{10}{100} \times x = 10\% \times x = 10\%$
 $x + 10\% \times x = 1.1x$
 $1.1x = 1.1x$

10, original no. = 12.

Question:- Father is four times as old as Vithu. 3 years from now their ages will be 20 years and 12 years respectively.

Soln:- let Vithu's age = x years
 Father's age = $4x$ years

3 years from now
 $x + 3 = 20$
 $4x + 3 = 12$
 $x = 2$
 $4x = 8$

$x = 4$

Question:- When we give things as old as the mother, Father, after five years, when will the three be old as Father.

Soln:- let Father's age = x

After five years
 Father's age = $x + 5$
 Mother's age = $x + 5$

10% of $x = \frac{10}{100} \times x = 10\% \times x = 10\%$

$x + 10\% \times x = 1.1x$
 $1.1x = 1.1x$

$x = 5$

When is 45 years older than Rajat. After six years their ages will be in the ratio 5:2, find their ages.

Soln:- let Rajat's age is x
 When is age = $x + 45$

After six years
 Rajat's age = $x + 6$
 When's age = $x + 45 + 6$
 $x + 6 = x + 51$

10% of $x = \frac{10}{100} \times x = 10\% \times x = 10\%$

$x + 10\% \times x = 1.1x$

$1.1x = 1.1x$

$x = 24$

⇒ Hence, Total age = 24 years
 ⇒ Arjun's age = 24 + 15 = 39 years

Ques 1 The length of a rectangular room is twice its breadth. If the Perimeter of the room is 180cm, find the sides of the room.

Soln: Let breadth = x
 length = x

⇒ Perimeter of room = 180 cm.
 $2x(1+b) = 180 \text{ cm.}$

⇒ $1+b = 180 \text{ cm.}$

⇒ $1+b = 180 \text{ cm.}$

⇒ $2x + x = 90 \text{ cm.}$

⇒ $3x = 90 \text{ cm.}$

⇒ $x = \frac{90}{3} \text{ cm.}$

$$x = 30$$

⇒ Hence, breadth of room = 30 cm.
 length of room = $30 \times 2 = 60 \text{ cm.}$

Ques 2 A rectangular field is such that its length is one and a half times its breadth. A thick white line

is drawn all along the edges of the field. If the total length of the white line is 200m, find the length of the sides of the field.

Soln: Let breadth = x
 length = $1\frac{1}{2}x$

⇒ $3x + x + 3x + x = 200 \text{ m}$

⇒ $3x + 2x + 3x + 2x = 200 \text{ m}$

⇒ $10x = 200 \text{ m.}$

⇒ $5x = 200$

⇒ $x = \frac{200}{5}$

⇒ Hence, breadth = 40 m.

⇒ length = $\frac{3}{2} \times 40$

⇒ $= 60 \text{ m.}$ And.

Ques 3 If two complementary angles differ by 40° , find the angles.

Soln: Let one angle = x°
 complementary angle = $90^\circ - x^\circ$

$$\Rightarrow \text{A.O.P.} - x - (90 - x) = 14$$

$$\Rightarrow x - 90 + x = 14$$

$$\Rightarrow 2x - 90 = 14$$

$$\Rightarrow 2x = 14 + 90$$

$$\Rightarrow 2x = 104$$

$$\Rightarrow x = 52$$

Quantity of these supplementary angles is 360, find the angles

Ans:- Let one angle = x°

It's supplementary angle = $(180 - x)$

$$\Rightarrow \text{A.O.P.} - x - (180 - x) = 36$$

$$\Rightarrow x - 180 + x = 36$$

$$\Rightarrow 2x - 180 = 36$$

$$\Rightarrow 2x = 36 + 180$$

$$\Rightarrow 2x = 216$$

$$\Rightarrow x = 108 \text{ Ang}$$

$$\Rightarrow \text{Hence the angle} = 180^\circ$$

$$\Rightarrow \text{supplementary} = 180^\circ - 108^\circ$$

$$\Rightarrow = 72^\circ \text{ Ang}$$

Ques 15 An isosceles triangle, each of the two equal sides is 10cm less than three times the base. If the perimeter of the triangle is 330cm, find the length of the sides of the triangle.

Ans:- Let base = x
equal side = $3x - 10$

$$\Rightarrow \text{A.O.P.} - \text{Perimeter of triangle} = 330$$

$$\Rightarrow x + 3x - 10 + 3x = 330$$

$$\Rightarrow 7x = 330 + 10$$

$$\Rightarrow 7x = 340$$

$$\Rightarrow x = \frac{340}{7}$$

$$\Rightarrow x = 48.57$$

$$\Rightarrow \text{Hence, base} = 48.57$$

$$\Rightarrow \text{equal sides} = 3 \times 48.57 - 10$$

$$\Rightarrow = 350.11 - 10$$

$$\Rightarrow = 340.11 \text{ cm}$$

$$\Rightarrow = 340.11 \text{ cm}$$