

1. Let the numbers be $8x$ and $3x$.
According to the given condition
 $8x + 3x = 143$
 $11x = 143$
 $x = \frac{143}{11}$
 $x = 13$
First number = $8 \times 13 = 104$
Second number = $3 \times 13 = 39$

2. Let the number be x
According to the given condition
 $\frac{2}{3}x = x - 20$
Multiplying both sides by 3
 $2x = 3x - 60$
 $60 = 3x - 2x$
 $x = 60$
 \therefore Required number = 60

3. Let the number be x .
According to the given condition
 $\frac{4}{5}x = \frac{2}{3}x + 10$
Multiplying both sides by 15
 $12x = 10x + 150$
 $12x - 10x = 150$
 $2x = 150$
 $x = 75$
 \therefore Required number = 75

4. Let the first part be x .

$$\text{Second part} = 24 - x$$

According to the given condition

$$7x + 5(24 - x) = 146$$

$$7x + 120 - 5x = 146$$

$$2x = 146 - 120$$

$$2x = 26$$

$$x = 13$$

$$\text{First part} = 13$$

$$\text{Second part} = 24 - 13 = 11$$

5. Let the number be x .

According to the given condition

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

Multiplying both sides by 20

$$4x + 100 = 5x - 100$$

$$100 + 100 = 5x - 4x$$

$$x = 200$$

$$\therefore \text{Required number} = 200$$

6. Let the numbers be $4x, 5x, 6x$

According to the given condition

$$6x + 4x = 5x + 55$$

$$10x - 5x = 55$$

$$5x = 55$$

$$x = 11$$

$$\text{First number} = 4 \times 11 = 44$$

$$\text{Second number} = 5 \times 11 = 55$$

$$\text{Third number} = 6 \times 11 = 66$$

7. Let the number be x .

According to the given condition

$$4x + 10 = 5x - 5$$

$$10 + 5 = 5x - 4x$$

$$x = 15$$

\therefore Required number = 15

8. Let the numbers be $3x$ and $5x$.

According to the given condition

$$(3x + 10) : (5x + 10) = 5 : 7$$

$$\frac{3x + 10}{5x + 10} = \frac{5}{7}$$

$$7(3x + 10) = 5(5x + 10)$$

$$21x + 70 = 25x + 50$$

$$70 - 50 = 25x - 21x$$

$$20 = 4x$$

$$x = 5$$

$$\text{First number} = 3 \times 5 = 15$$

$$\text{Second number} = 5 \times 5 = 25$$

9. Let the consecutive odd numbers be $x, x + 2, x + 4$

According to the given condition

$$x + x + 2 + x + 4 = 147$$

$$3x + 6 = 147$$

$$3x = 147 - 6$$

$$3x = 141$$

$$x = 47$$

$$\text{First number} = 47$$

$$\text{Second number} = 47 + 2 = 49$$

$$\text{Third number} = 47 + 4 = 51$$

10. Let three consecutive even numbers be $x, x + 2, x + 4$

According to the given condition

$$x + x + 2 + x + 4 = 234$$

$$3x + 6 = 234$$

$$3x = 234 - 6$$

$$3x = 228$$

$$x = 76$$

$$\text{First number} = 76$$

$$\text{Second number} = 76 + 2 = 78$$

$$\text{Third number} = 76 + 4 = 80$$

11. Let the digit at ones place = x

Digit at tens place = $12 - x$

Number = $x \times 1 + (12 - x) \times 10$

$$= x + 120 - 10x$$

$$= 120 - 9x$$

When the digits are reversed

Digit at ones place = $12 - x$

Digit at tens place = x

Reversed number = $(12 - x) \times 1 + x \times 10$

$$= 12 - x + 10x$$

$$= 12 + 9x$$

According to the given condition

$$12 + 9x - (120 - 9x) = 54$$

$$12 + 9x - 120 + 9x = 54$$

$$18x - 108 = 54$$

$$18x = 162$$

$$x = 9$$

$$\text{Required number} = 120 - 9 \times 9 = 120 - 81 = 39$$

12. Let the digit at units place = x

Digit at tens place = $3x$

Number = $x \times 1 + 3x \times 10$

$$= x + 30x$$

$$= 31x$$

When the digits are reversed

Digit at units place = $3x$

Digit at tens place = x

Reversed number = $3x \times 1 + x \times 10$

$$= 3x + 10x$$

$$= 13x$$

According to the given condition

$$31x - 13x = 36$$

$$18x = 36$$

$$x = 2$$

$$\therefore \text{Required number} = 31 \times 2 = 62$$

13. Let the numerator be x

$$\text{Denominator} = x + 7$$

$$\text{Number} = \frac{x}{x+7}$$

According to the given condition

$$\frac{x + 17}{x + 7 - 6} = 2$$

$$x + 17 = 2(x + 1)$$

$$x + 17 = 2x + 2$$

$$17 - 2 = 2x - x$$

$$x = 15$$

$$\text{Number} = \frac{15}{15+7} = \frac{15}{22}$$

14. Let the numerator be x

$$\text{Denominator} = y$$

$$2x = y + 2$$

$$2x - 2 = y$$

$$\therefore \text{Denominator} = 2x - 2$$

$$\text{Fraction} = \frac{x}{2x-2}$$

According to the given condition

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

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

$$3x + 9 = 4x + 2$$

$$9 - 2 = 4x - 3x$$

$$7 = x$$

$$\therefore \text{Fraction} = \frac{7}{2 \times 7 - 2} = \frac{7}{12}$$

15. Let the breadth of the rectangle = x cm

$$\text{Length} = (x + 7) \text{ cm}$$

$$\text{Area} = l \times b = x(x + 7) = (x^2 + 7x) \text{ cm}^2$$

$$\text{New length} = (x + 7 - 4) = (x + 3) \text{ cm}$$

$$\text{New breadth} = (x + 3) \text{ cm}$$

$$\text{New area} = (x + 3)(x + 3) = x^2 + 6x + 9 \text{ cm}^2$$

According to the given condition

$$x^2 + 7x = x^2 + 6x + 9$$

$$7x - 6x = 9$$

$$x = 9$$

$$\therefore \text{Breadth of rectangle} = 9 \text{ cm}$$

$$\text{Length of rectangle} = 9 + 7 = 16 \text{ cm}$$

16. Let the length be x metres

$$\text{Breadth} = \frac{2}{3}x \text{ metres}$$

$$\text{Perimeter} = 180 \text{ metres}$$

$$2(l + b) = 180$$

$$l + b = 90$$

$$x + \frac{2}{3}x = 90$$

Multiplying both sides by 3

$$3x + 2x = 270$$

$$5x = 270$$

$$x = 54$$

$$\therefore \text{Length} = 54 \text{ m}$$

$$\text{Breadth} = \frac{2}{3} \times 54 = 2 \times 18 = 36 \text{ m}$$

17. Let the base be x cm.

$$\text{Altitude} = \frac{5}{3}x \text{ cm}$$

$$\text{Area of triangle} = \frac{1}{2} \times \text{base} \times \text{height}$$

$$= \frac{1}{2} \times x \times \frac{5}{3}x \text{ cm}^2$$

$$\text{New base} = (x - 2) \text{ cm}$$

$$\text{New altitude} = \left(\frac{5}{3}x + 4\right) \text{ cm}$$

$$\text{New area} = \frac{1}{2} \times (x - 2) \times \left(\frac{5}{3}x + 4\right) \text{ cm}^2$$

According to the given condition

$$\frac{1}{2} \times x \times \frac{5}{3}x = \frac{1}{2} \times (x - 2) \times \left(\frac{5}{3}x + 4\right)$$

Multiplying both sides by 6

$$5x^2 = (x - 2)(5x + 12)$$

$$5x^2 = 5x^2 + 12x - 10x - 24$$

$$0 = 2x - 24$$

$$2x = 24$$

$$x = 12$$

$$\text{Base} = 12 \text{ cm}$$

$$\text{Altitude} = \frac{5}{3} \times 12 = 20 \text{ cm}$$

18. Let the first angle be $4x^\circ$

$$\text{Second angle} = 5x^\circ$$

$$\text{Third angle} = 4x^\circ + 5x^\circ = 9x^\circ$$

Using angle sum property of triangle

$$4x^\circ + 5x^\circ + 9x^\circ = 180^\circ$$

$$18x^\circ = 180^\circ$$

$$x = 10^\circ$$

$$\text{First angle} = 4 \times 10 = 40^\circ$$

$$\text{Second angle} = 5 \times 10 = 50^\circ$$

$$\text{Third angle} = 9 \times 10 = 90^\circ$$

19. Let the speed of the steamer be x km/h

$$\text{Speed of stream} = 1 \text{ km/h}$$

$$\text{Speed while travelling downstream} = (x + 1) \text{ km/h}$$

$$\text{Speed while travelling upstream} = (x - 1) \text{ km/h}$$

$$\text{In 9 hours, distance covered downstream} = \text{speed} \times \text{time} = 9(x + 1) \text{ km}$$

$$\text{In 10 hours, distance covered upstream} = 10(x - 1) \text{ km}$$

According to the given condition

$$9(x + 1) = 10(x - 1)$$

$$9x + 9 = 10x - 10$$

$$9 + 10 = 10x - 9x$$

$$x = 19$$

$$\text{Speed of steamer} = 19 \text{ km/h}$$

$$\text{Distance} = 9(19 + 1) = 9 \times 20 = 180 \text{ km}$$

20. Distance = 300 km

$$\text{Let the speed of the first motorcyclist} = x \text{ km/h}$$

$$\text{Speed of second motorcyclist} = (x + 7) \text{ km/h}$$

$$\text{Distance covered by first motorcyclist in 2 hours} = \text{speed} \times \text{time} = 2x \text{ km}$$

Distance covered by second motorcyclist = $2(x + 7) = 2x + 14$ km

According to the given condition

$$2x + 2x + 14 + 34 = 300$$

$$4x + 48 = 300$$

$$4x = 252$$

$$x = 63$$

∴ Speed of first motorcyclist = 63 km/h

Speed of second motorcyclist = $63+7 = 70$ km/h

Check:

Distance travelled by first motorcyclist in 2 hours = $63 \times 2 = 126$ km

Distance travelled by second motorcyclist in 2 hours = $70 \times 2 = 140$ km

The distance between the two motorcyclists after 2 hours

$$= 300 - (126 + 140) = 300 - 266 = 34 \text{ km}$$

21. Let the first number be x .

$$\text{Second number} = \frac{5}{6}x$$

$$\text{Third number} = \frac{4}{5} \times \frac{5}{6}x = \frac{2}{3}x$$

According to the given condition

$$x + \frac{5}{6}x + \frac{2}{3}x = 150$$

Multiplying both sides by 6

$$6x + 5x + 4x = 900$$

$$15x = 900$$

$$x = 60$$

First number = 60

$$\text{Second number} = \frac{5}{6} \times 60 = 50$$

$$\text{Third number} = \frac{2}{3} \times 60 = 40$$

22. Let the first part be x

Second part = $4500 - x$

According to the given condition

$$5\% \text{ of } x = 10\% \text{ of } (4500 - x)$$

$$\frac{5}{100}x = \frac{10}{100} \times (4500 - x)$$

$$5x = 45000 - 10x$$

$$15x = 45000$$

$$x = 3000$$

$$\therefore \text{First part} = 3000$$

$$\text{Second part} = 4500 - 3000 = 1500$$

23. Let present age of Rakhi = x years

Mother's present age = $4x$ years

After 5 years

Age of Rakhi = $(x + 5)$ years

Mother's age = $(4x + 5)$ years

According to the given condition

$$4x + 5 = 3(x + 5)$$

$$4x + 5 = 3x + 15$$

$$4x - 3x = 15 - 5$$

$$x = 10$$

Present age of Rakhi = 10 years

Present age of mother = $4 \times 10 = 40$ years

24. Let age of Monu = x years

Age of father = $(x + 29)$ years

Age of grandfather = $(x + 29 + 26) = (x + 55)$ years

According to the given condition

$$x + x + 29 + x + 55 = 135$$

$$3x + 84 = 135$$

$$3x = 135 - 84$$

$$3x = 51$$

$$x = \frac{51}{3}$$

$$x = 17$$

Age of Monu = 17 years

Age of father = $17 + 29 = 46$ years

Age of grandfather = $46 + 26 = 72$ years

25. Let the age of grandson = x years

Age of man = $10x$ years

According to the given condition

$$10x = x + 54$$

$$10x - x = 54$$

$$9x = 54$$

$$x = \frac{54}{9}$$

$$x = 6$$

\therefore Present age of grandson = 6 years

Present age of man = $10 \times 6 = 60$ years

26. Let the present age of younger cousin = x years

Present age of elder cousin = $(x + 10)$ years

15 years ago

Age of younger cousin = $(x - 15)$ years

Age of elder cousin = $(x + 10 - 15) = (x - 5)$ years

According to the given condition

$$x - 5 = 2(x - 15)$$

$$x - 5 = 2x - 30$$

$$30 - 5 = 2x - x$$

$$25 = x$$

\therefore Present age of younger cousin = 25 years

Present age of elder cousin = $25 + 10 = 35$ years

27. Let the total number of deer be x .

Number of deer grazing in the field = $\frac{x}{2}$

Remaining deer = $x - \frac{x}{2} = \frac{2x - x}{2} = \frac{x}{2}$

Number of deer playing nearby = $\frac{3}{4} \times \frac{x}{2} = \frac{3x}{8}$

Number of deer drinking water = 9

According to the given condition

$$\frac{x}{2} + \frac{3x}{8} + 9 = x$$

Multiplying both sides by 8

$$4x + 3x + 72 = 8x$$

$$7x + 72 = 8x$$

$$72 = 8x - 7x$$

$$x = 72$$

Total number of deer = 72

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