

Board – CBSE

Class – 7th

Topic – Linear Equation

Q.1 Twice a number when decreased by 7 gives 45. Find the number.

Ans. Let the number be x .

Then, we have:

$$\Rightarrow 2x - 7 = 45$$

$$\Rightarrow 2x = 45 + 7$$

$$\Rightarrow x = \frac{45+7}{2}$$

$$\Rightarrow x = \frac{52}{2}$$

$$= x = 26$$

\therefore The required number is 26.

Q.2 A number is as much greater than 21 as it is less than 71. Find the number.

Ans. Let the number be x .

Then, we have:

$$(x - 21) = (71 - x)$$

$$\Rightarrow x + x = 71 + 21$$

$$\Rightarrow 2x = 92$$

$$\Rightarrow x = \frac{92}{2}$$

$$\Rightarrow x = 46$$

\therefore The required number is 46.

Q.3 Find two consecutive positive even integers whose sum is 90.

Ans. Let the three consecutive positive even integers be x , $(x+2)$ and $(x+4)$.

Let x be the even number.

Then, $x + x + 2 + x + 4 = 90$

$$\Rightarrow 3x = 90 - 6$$

$$\Rightarrow 3x = 84$$

$$\Rightarrow x = \frac{84}{3} = 28$$

\therefore The required numbers are 28, 30 and 32.

Q.4 Sumitra has 34 in 50-paise and 25-paise coins. If the number of 25-paise coins is twice the number of 50-paise coins, how many coins of each kind does she have?

Ans. Let the numbers of 50 paise coins and 25 paise coins be x and $2x$, respectively.

Then, we have:

$$50x + 25 \times 2x = 3400$$

$$\Rightarrow 50x + 50x = 3400$$

$$\Rightarrow 100x = 3400$$

$$\Rightarrow x = 34$$

\therefore Number of 50 paise coins = 34

and number of 25 paise coins = 68

Q.5 Raju is 19 years younger than his cousin. After 5 years, their ages will be in the ratio 2 : 3. Find their present ages.

Ans. Let the present ages of Raju and his cousin be $(x-19)$ yrs and x yrs.

According to the question, we have:

$$\frac{(x-19)+5}{x+5} = \frac{2}{3}$$

$$\Rightarrow 3(x-14) = 2x+10$$

$$\Rightarrow 3x-42 = 2x+10$$

$$\Rightarrow x = 52$$

\therefore Age of Raju's cousin = 52 yrs

and age of Raju = $52 - 19 = 33$ yrs

Q.6 A number consists of two digits whose sum is 8. If 18 is added to the number its digits are reversed. Find the number.

Ans. Let x be the digit in the units place.

Sum of the units and tens digits = 8

Then, tens digit = $(8-x)$

\therefore The number is $10(8-x) + x$.

$$\text{Now, } 10(8-x)+x+18=10x+(8-x)$$

$$\Rightarrow 80-10x+x+18=10x+8-x$$

$$\Rightarrow 98-9x=9x+8$$

$$\Rightarrow 18x=90$$

$$\Rightarrow x=5$$

$$\text{i.e., tens digit}=(8-5)=3$$

$$\therefore \text{Required number}=10(8-5)+5=10 \times 3+5=35$$

Q.7 The length of a rectangular field is twice its breadth. If the perimeter of the field is 150 metres, find its length and breadth.

Ans. Let the length and breadth of the rectangular field be l m and b m, respectively.

According to the question, we have:

$$2(l + b)=150 \quad \dots(i)$$

$$\Rightarrow l + b=75$$

$$\text{Given that } l=2b \quad \dots(ii)$$

Using (ii) in (i), we have:

$$2b+b=75$$

$$\Rightarrow 3b=75$$

$$\Rightarrow b=25$$

$$\therefore l=50 \text{ m and } b=25 \text{ m}$$

Q.8 Two supplementary angles differ by 44° . Find the angles.

Ans. Let the two supplementary angles be x° and $(180-x)^\circ$.

$$\therefore x-(180-x)=44$$

$$\Rightarrow x-180+x=44^\circ$$

$$\Rightarrow 2x=224$$

$$\Rightarrow x=112$$

$$\therefore \text{The measures of the supplementary angles are } 112^\circ \text{ and } (180-112)^\circ, \text{ i.e., } 68^\circ$$

Q.9 if $2z + \frac{8}{3} = \frac{1}{4}z + 5$, then $z = ?$

Ans. We have:

$$2z + \frac{8}{3} = \frac{1}{4}z + 5$$

$$\Rightarrow 2z - \frac{1}{4}z = 5 - \frac{8}{3}$$

$$\Rightarrow \frac{8z-z}{4} = \frac{15-8}{3}$$

$$\Rightarrow \frac{7z}{4} = \frac{7}{3}$$

$$\Rightarrow z = \frac{7 \times 4}{3 \times 7}$$

$$\Rightarrow z = \frac{4}{3}$$

Q.10 if $\frac{x-1}{x+1} = \frac{7}{9}$, then $x = ?$

Ans. We have:

$$\frac{x-1}{x+1} = \frac{7}{9}$$

$$\Rightarrow 9(x-1) = 7(x+1)$$

$$\Rightarrow 9x - 9 = 7x + 7$$

$$\Rightarrow 9x - 7x = 7 + 9$$

$$\Rightarrow 2x = 16$$

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

$$x = 8$$

Q.11 The ages of A and B are in the ratio 5 : 3. After 6 years, their ages will be in the ratio 7: 5. The present age of A is

Ans. Let the present ages of A and B be $5x$ and $3x$, respectively.

According to the question, we have:

$$\frac{5x+6}{3x+6} = \frac{7}{5}$$

$$\Rightarrow 25x + 30 = 21x + 42$$

$$\Rightarrow 25x - 21x = 42 - 30$$

$$\Rightarrow 4x = 12$$

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

$$\Rightarrow x = 3$$

$\therefore A's \text{ present age} = 5 \times 3 \text{ years} = 15 \text{ years}$

Q.12 The length of a rectangle is three times its width and its perimeter is 96 m. The length is

Ans. Let the width of the rectangle be x .

Then, its length will be $3x$.

Perimeter of the rectangle = 96 m

Now, $2(l + b) = 96$

$\Rightarrow 2(3x + x) = 96$

$\Rightarrow 2 \times 4x = 96$

$\Rightarrow 8x = 96$

$\Rightarrow x = \frac{96}{8}$

$\Rightarrow x = 12$

\therefore Length of the rectangle = $3 \times 12 \text{ m} = 36 \text{ m}$

Q.13 Evaluate $x^3 + y^3 + z^3 - 3xyz$ when $x = -2$, $y = -1$ and $z = 3$.

Ans. We have:

$$x^3 + y^3 + z^3 - 3xyz$$

$$= (-2)^3 + (-1)^3 + (3)^3 - 3 \times (-2) \times (-1) \times 3$$

$$= -8 - 1 + 27 - 18$$

$$= -27 + 27$$

$$= 0$$

Q.14 Subtract $x^2 - 2xy + 5y^2 - 4$ from $4xy - 5x^2 - y^2 + 6$

Ans. We have:

$$(4xy - 5x^2 - y^2 + 6) - (x^2 - 2xy + 5y^2 - 4)$$

$$= 4xy - 5x^2 - y^2 + 6 - x^2 + 2xy - 5y^2 + 4$$

$$= -6x^2 - 6y^2 + 6xy + 10$$

$$= -2(3x^2 + 3y^2 - 3xy - 5)$$

Q.15 Find the product $\left(\frac{3}{5} abc^3\right) \times \left(\frac{-25}{12} a^3 b^2\right) \times (-8b^3c)$.

Ans. We have:

$$\begin{aligned} & \frac{3}{5} abc^3 \times \frac{(-25)}{12} a^3 b^2 \times (-8b^3c) \\ &= \frac{3}{5} abc^3 \times \frac{(-25)}{12} a^3 b^2 \times (-8b^3c) \\ &= abc^3 \times (-5a^3b^2) \times (-2b^3c) \\ &= 10 a^4 b^6 c^4 \end{aligned}$$