

Important Questions

Multiple Choice Questions-

Question 1. Solve: $3x = 12$

- (a) 15
- (b) 4
- (c) 9
- (d) 3

Question 2. Sum of two numbers is 95. If one exceeds the other by 15, find the numbers.

- (a) 40 and 60
- (b) 50 and 55
- (c) 50 and 60
- (d) 40 and 55

Question 3. The sum of two-digit number and the number formed by interchanging its digit is 110. If ten is subtracted from the first number, the new number is 4 more than 5 times of the sum of the digits in the first number. Find the first number.

- (a) 46
- (b) 48
- (c) 64
- (d) 84

Question 4. Solve: $7x = 21$

- (a) 3
- (b) 2
- (c) 14
- (d) none of these

Question 5. The digits of a two-digit number differ by 3. If the digits are interchanged, and the resulting number is added to the original number, we get 143. What can be the original number?

- (a) 85
- (b) 58
- (c) 36
- (d) 76

Question 6. The difference between two whole numbers is 66. The ratio of the two numbers is 2 : 5. What are the two numbers?

- (a) 22 and 88
- (b) 44 and 66
- (c) 44 and 110
- (d) 33 and 99

Question 7. Solve: $5x - 2(2x - 7) = (3x - 1) + \frac{7}{2}$

- (a) 2
- (b) 3
- (c) 12
- (d) $\frac{23}{4}$

Question 8. Amina thinks of a number and subtracts $\frac{5}{2}$ from it. She multiplies the result by 8. The result now obtained is 3 times the same number she thought of. What is the number?

- (a) 2
- (b) 3
- (c) 4
- (d) none of these

Question 9. Solve $2x - 3 = x + 2$

- (a) 4
- (b) 5
- (c) 3
- (d) 0

Question 10. Find the solution of $2x - 3 = 7$

- (a) 3
- (b) 4
- (c) 5
- (d) none of these

Very Short Questions:

1. Identify the algebraic linear equations from the given expressions.
 - (a) $x^2 + x = 2$
 - (b) $3x + 5 = 11$
 - (c) $5 + 7 = 12$
 - (d) $x + y^2 = 3$

- Check whether the linear equation $3x + 5 = 11$ is true for $x = 2$.
- Form a linear equation from the given statement: 'When 5 is added to twice a number, it gives 11.'
- If $x = a$, then which of the following is not always true for an integer k .

(a) $kx = ak$

(b) $\frac{x}{k} = \frac{a}{k}$

(c) $x - k = a - k$

(d) $x + k = a + k$

- Solve the following linear equations:

(a) $4x + 5 = 9$

(b) $x + \frac{3}{2} = 2x$

- Solve the given equation $3\frac{1}{x} \times 5\frac{1}{4} = 17\frac{1}{2}$

- Verify that $x = 2$ is the solution of the equation $4.4x - 3.8 = 5$.

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

- The angles of a triangle are in the ratio 2 : 3 : 4. Find the angles of the triangle.
- The sum of two numbers is 11 and their difference is 5. Find the numbers.

Short Questions:

- If the sum of two consecutive numbers is 11, find the numbers.
- The breadth of a rectangular garden is $\frac{2}{3}$ of its length. If its perimeter is 40 m, find its dimensions.
- The difference between two positive numbers is 40 and the ratio of these integers is 1 : 3. Find the integers.
- Solve for x :

$$\frac{7x+14}{3} - \frac{17-3x}{5} = 6x - \frac{4x+2}{3} - 5$$

- The sum of a two-digit number and the number obtained by reversing its digits is 121. Find the number if it's unit place digit is 5.

Long Questions:

- If the length of the rectangle is increased by 40% and its breadth is decreased by 40%, what will be the percentage change in its perimeter?

- A fruit seller buys some oranges at the rate of ₹ 5 per orange. He also buys an equal number of bananas at the rate of ₹ 2 per banana. He makes a profit of 20% on oranges and a profit of 15% on bananas. In the end, he sold all the fruits. If he earned a profit of ₹ 390, find the number of oranges.
- A steamer goes downstream from one point to another in 7 hours. It covers the same distance upstream in 8 hours. If the speed of stream be 2 km/h, find the speed of the steamer in still water and the distance between the ports.

Answer Key-

Multiple Choice questions-

- (b) 4
- (d) 40 and 55
- (c) 64
- (a) 3
- (a) 85
- (c) 44 and 110
- (d) $\frac{23}{4}$
- (c) 4
- (b) 5
- (c) 5

Very Short Answer:

- (a) $x^2 + x = 2$ is not a linear equation.

(b) $3x + 5 = 11$ is a linear equation.

(c) $5 + 7 = 12$ is not a linear equation as it does not contain variable.

(d) $x + y^2 = 3$ is not a linear equation.
- Given that $3x + 5 = 11$

For $x = 2$, we get

$$\text{LHS} = 3 \times 2 + 5 = 6 + 5 = 11$$
$$\text{LHS} = \text{RHS} = 11$$

Hence, the given equation is true for $x = 2$
- As per the given statement we have
- Correct answer is (b).
- (a) We have $4x + 5 = 9$

$$\Rightarrow 4x = 9 - 5 \text{ (Transposing 5 to RHS)}$$

$$\Rightarrow 4x = 4$$

$$\Rightarrow x = 1 \text{ (Transposing 4 to RHS)}$$

(b) We have $x + \frac{3}{2} = 2x$

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

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

6. We have $3\frac{1}{x} \times 5\frac{1}{4} = 17\frac{1}{2}$

$$\Rightarrow \frac{3x+1}{x} \times \frac{21}{4} = \frac{35}{2}$$

$$\Rightarrow \frac{3x+1}{x} = \frac{35}{2} \div \frac{21}{4}$$

(Transposing $\frac{21}{4}$ to RHS)

$$\Rightarrow \frac{3x+1}{4} = \frac{35}{2} \times \frac{4}{21}$$

$$\Rightarrow \frac{3x+1}{4} = \frac{10}{3}$$

$$\Rightarrow 3(3x+1) = 4 \times 10 \text{ (Cross-multiplication)}$$

$$\Rightarrow 9x+3 = 40 \text{ (Solving the brackets)}$$

$$\Rightarrow 9x = 40 - 3 \text{ (Transposing 3 to RHS)}$$

$$\Rightarrow 9x = 37$$

$$\therefore x = \frac{37}{9}$$

Hence the required solution is $x = \frac{37}{9}$

7. We have $4.4x - 3.8 = 5$

Putting $x = 2$, we have

$$4.4 \times 2 - 3.8 = 5$$

$$\Rightarrow 8.8 - 3.8 = 5$$

$$\Rightarrow 5 = 5$$

L.H.S. = R.H.S.

Hence verified.

8.

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

LCM of 2, 3 and 4 = 12

$$\therefore \frac{3x}{4} \times 12 - \frac{2x+5}{3} \times 12 = \frac{5}{2} \times 12$$

(Multiplying both sides by 12)

$$\Rightarrow 3x \times 3 - (2x + 5) \times 4 = 5 \times 6$$

$$\Rightarrow 9x - 8x - 20 = 30 \text{ (Solving the bracket)}$$

$$\Rightarrow x - 20 = 30$$

$$\Rightarrow x = 30 + 20 \text{ (Transposing 20 to RHS)}$$

$$\Rightarrow x = 50$$

Hence $x = 50$ is the required solution.

9. Let the angles of a given triangle be $2x^\circ$, $3x^\circ$ and $4x^\circ$.

$$2x + 3x + 4x = 180 \text{ (}\because \text{ Sum of the angles of a triangle is } 180^\circ\text{)}$$

$$\Rightarrow 9x = 180$$

$$\Rightarrow x = 20 \text{ (Transposing 9 to RHS)}$$

Angles of the given triangles are

$$2 \times 20 = 40^\circ$$

$$3 \times 20 = 60^\circ$$

$$4 \times 20 = 80^\circ$$

10. Let one of the two numbers be x .

Other number = $11 - x$.

As per the conditions, we have

$$x - (11 - x) = 5$$

$$\Rightarrow x - 11 + x = 5 \text{ (Solving the bracket)}$$

$$\Rightarrow 2x - 11 = 5$$

$$\Rightarrow 2x = 5 + 11 \text{ (Transposing 11 to RHS)}$$

$$\Rightarrow 2x = 16$$

$$\Rightarrow x = 8$$

Hence the required numbers are 8 and $11 - 8 = 3$

Short Answer:

1. Let the two consecutive numbers be x and $x + 1$.

As per the conditions, we have

$$x + x + 1 = 11$$

$$\Rightarrow 2x + 1 = 11$$

$$\Rightarrow 2x = 11 - 1 \text{ (Transposing 1 to RHS)}$$

$$\Rightarrow 2x = 10$$

$$x = 5$$

Hence, the required numbers are 5 and $5 + 1 = 6$.

2. Let the length of the garden be x m

$$\text{its breadth} = \frac{2}{3} \times x \text{ m.}$$

$$\text{Perimeter} = 2 [\text{length} + \text{breadth}]$$

$$2 \left(x + \frac{2}{3}x \right) = 40$$

$$\Rightarrow 2x + \frac{4}{3}x = 40 \quad \text{(Solving the bracket)}$$

$$\Rightarrow 3 \times 2x + 3 \times \frac{4}{3}x = 3 \times 40$$

(Multiplying both sides by 3)

$$\Rightarrow 6x + 4x = 120$$

$$\Rightarrow 10x = 120$$

$$\therefore x = \frac{120}{10} = 12$$

$$\therefore \text{Length} = 12 \text{ m and breadth } \frac{2}{3}x = 12 \times \frac{2}{3} = 8 \text{ m.}$$

3. Let one integer be x .

$$\text{Other integer} = x - 40$$

As per the conditions, we have

$$\frac{x - 40}{x} = \frac{1}{3}$$

$$\Rightarrow 3(x - 40) = x$$

$$\Rightarrow 3x - 120 = x$$

$$\Rightarrow 3x - x = 120$$

$$\Rightarrow 2x = 120$$

$$\Rightarrow x = 60$$

Hence the integers are 60 and $60 - 40 = 20$.

- 4.

We have

$$\frac{7x+14}{3} - \frac{17-3x}{5} = 6x - \frac{4x+2}{3} - 5$$

LCM of 3 and 5 = 15

$$\frac{7x+14}{3} \times 15 - \frac{17-3x}{5} \times 15 =$$

$$6x \times 15 - \frac{4x+2}{3} \times 15 - 5 \times 15$$

(Multiplying both sides by 15)

$$\Rightarrow (7x+14) \times 5 - (17-3x) \times 3$$

$$= 90x - (4x+2) \times 5 - 75$$

$$\Rightarrow 35x + 70 - 51 + 9x$$

$$= 90x - 20x - 10 - 75$$

(Solving the brackets)

$$\Rightarrow 44x + 19 = 70x - 85$$

$$\Rightarrow 44x - 70x = -85 - 19$$

(Transposing 70x to LHS and 19 to RHS)

$$\Rightarrow -26x = -104$$

$$\therefore x = \frac{-104}{-26} = 4$$

Hence $x = 4$ is the required number

5. Unit place digit is given as 5

Let x be the tens place digit

Number formed = $5 + 10x$

Number obtained by reversing the digits = $5 \times 10 + x = 50 + x$

As per the conditions, we have

$$5 + 10x + 50 + x = 121$$

$$\Rightarrow 11x + 55 = 121$$

$$\Rightarrow 11x = 121 - 55 \text{ (Transposing 55 to RHS)}$$

$$\Rightarrow 11x = 66$$

$$\Rightarrow x = 6$$

Thus, the tens place digit = 6

Hence the required number = $5 + 6 \times 10 = 5 + 60 = 65$

Long Answer:

1. Let the length of the rectangle be x m and its breadth be y m

$$\text{Perimeter} = 2(x + y)$$

Now the length of the rectangle becomes after a 40% increase

$$= x + \frac{40}{100}x = \frac{140}{100}x = \frac{7}{5}x$$

Breadth of the rectangle becomes after 40% decrease

$$= y - \frac{40}{100}y = \frac{60}{100}y = \frac{3}{5}y$$

$$\text{New perimeter} = 2\left[\frac{7x}{5} + \frac{3y}{5}\right] \text{ m}$$

\therefore Change in perimeter

$$= 2\left[\frac{7x}{5} + \frac{3y}{5}\right] - 2(x + y)$$

$$= \frac{14x}{5} + \frac{6y}{5} - 2x - 2y = \frac{14x}{5} - 2x + \frac{6y}{5} - 2y$$

$$= \left(\frac{4x}{5} - \frac{4y}{5}\right) \text{ m}$$

$$\text{Percentage of change} = \frac{\frac{4x}{5} - \frac{4y}{5}}{2(x + y)} \times 100$$

$$= \frac{\frac{4}{5}(x - y)}{2(x + y)} \times 100 = \frac{4}{5 \times 2} \left(\frac{x - y}{x + y}\right) \times 100$$

$$= 40 \left(\frac{x - y}{x + y}\right) \%$$

Hence the required change percentage

$$= 40 \left(\frac{x - y}{x + y}\right) \%$$

2. Let the number of oranges bought by him be x and also the number of bananas be x .

Cost of x oranges at the rate of ₹ 5 per orange = ₹ $5x$

Cost of x bananas at the rate of ₹ 2 per banana = ₹ $2x$

$$\text{Profit earned on oranges} = \frac{20}{100} \times 5x = ₹ x$$

$$\text{Profit earned on bananas} = \frac{15}{100} \times 2x = ₹ \frac{3}{10}x$$

As per the conditions, we have

$$x + \frac{3}{10}x = 390$$

$$\Rightarrow \frac{10x + 3x}{10} = 390$$

$$\Rightarrow \frac{13x}{10} = 390$$

$$\Rightarrow x = 390 \times \frac{10}{13}$$

$$\Rightarrow \left(\text{Transposing } \frac{13}{10} \text{ to RHS} \right)$$

$$\Rightarrow x = 30 \times 10 = 300$$

Hence, the number of oranges = 300.

3. Let speed of steamer in still water = x km/h

Speed of stream = 2 km/h

Speed downstream = $(x + 2)$ km/h

Speed upstream = $(x - 2)$ km/h

Distance covered in 7 hours while downstream = $7(x + 2)$

Distance covered in 8 hours while upstream = $8(x - 2)$

According to the condition,

$$7(x + 2) = 8(x - 2)$$

$$\Rightarrow 7x + 14 = 8x - 16$$

$$\Rightarrow x = 30 \text{ km/h}$$

Total Distance = $7(x + 2)$ km = $7(30 + 2)$ km = 7×32 km = 224 km.