GRADE: 7

SUBJECT: Mathematics

Lesson: 09 - Linear Equations

DETAILED ANSWERS

SECTION A (4 × 10 = 40 marks)

1. Choose the correct option:

a) **Solution of** $2x - 3 = 7$

- $2x - 3 = 7$
- $2x = 7 + 3 = 10$
- $x = \frac{10}{2} = 5$
- **Correct Answer:** (a) 5

b) **Solution of** $5y - 2 = 3(y + 2)$

- $5y - 2 = 3y + 6$
- $5y - 3y = 6 + 2$
- $2y = 8$
- $y = 4$
- **Correct Answer:** (a) 4

c) **Identifying Non-Linear Equation**

- The equation $x^2 + 3x - 5 = 0$ is quadratic, not linear.
- **Correct Answer:** (c) $x^2 + 3x - 5 = 0$

2. Solve the following equations:

a) **Solving** $3(x-4)=2(x+1)$

- $3x-12=2x+2$
- $3x-2x=2+12$
- $x=14$

b) **Solving** $5x+3=2x+18$

- $5x-2x=18-3$
- $3x=15$
- $x=5$

3. Word Problems:

a) **Finding Two Consecutive Even Numbers**

- Let the numbers be x and x+2
- $x+(x+2)=42$
- $2x+2=42$
- $2x=40$
- x = 20, so numbers are **20 and 22**

b) **Finding Length and Breadth of Rectangle**

- Let breadth = x, then length = x + 3
- Perimeter formula: $2(l+b)=32$
- $2(x+x+3)=32$
- $2(2x+3)=32$
- $4x+6=32$
- $4x=26$
- $x=6.5$
- **Breadth = 6.5, Length = 9.5**

4. Graphical Representation:

a) **Plotting** $2x-5=3$ **on a number line**

- $2x=8$

- $x = 4$
- Mark **4** on the number line.

SECTION B (4 × 10 = 40 marks)

5. Solve for x:

a) **Solving** $4x - 3 = 2x + 5$

- $4x - 2x = 5 + 3$
- $2x = 8$
- $x = 4$

b) **Solving** $\frac{x+2}{3} = 4$

- $x + 2 = 12$
- $x = 10$

c) **Solving** $7x - 4 = 3x + 8$

- $7x - 3x = 8 + 4$
- $4x = 12$
- $x = 3$

6. Solve and Check:

a) **Solving** $\frac{3x-1}{2} = \frac{2x+5}{3}$

- Cross multiply: $3(3x - 1) = 2(2x + 5)$
- $9x - 3 = 4x + 10$
- $9x - 4x = 10 + 3$
- $5x = 13$
- $x = \frac{13}{5}$

b) **Solving** $5(x - 2) = 2(x + 6)$

- $5x - 10 = 2x + 12$
- $5x - 2x = 12 + 10$
- $3x = 22$

- $x = \frac{22}{3}$

7. Word Problems:

a) **Father's and Son's Age**

- Let son's age be x, then father's age = $3x$
- After 10 years: $3x + 10 = 2(x + 10)$
- $3x + 10 = 2x + 20$
- $3x - 2x = 10$
- x = 10, so son = **10 years**, father = **30 years**

b) **Sum of Two Numbers = 72**

- Let one number be x, other = 2x
- $x + 2x = 72$
- $3x = 72$
- $x = 24$, so numbers are **24 and 48**

8. Solve the inequality and represent on number line:

a) **Solving** $3x - 4 < 8$

- $3x < 12$
- $x < 4$
- Mark **all values less than 4** on a number line.

b) **Solving** $5 - 2x \geq 1$

- $-2x \geq -4$
- $x \leq 2$ (reversing inequality when dividing by negative)
- Mark **all values less than or equal to 2** on a number line.

9. Higher-Order Thinking Question:

- **Solving Notes Problem:**
  - Let ₹500 notes = x, ₹200 notes = 10 - x
  - Equation: 500x + 200(10 - x) = 3200

- 500x + 2000 - 200x = 3200
- 300x = 1200
- x = 4
- ₹500 notes = **4**, ₹200 notes = **6**

10. Application-Based Problem:

- **Books Ordered by School**
  - Let English books = x, Mathematics books = $100 - x$
  - $250x + 300(100 - x) = 27000$
  - $250x + 30000 - 300x = 27000$
  - $-50x = -3000$
  - x = 60, so English books = **60**, Mathematics books = **40**

END OF SOLUTIONS