CHAPTER TEST: LINEAR EQUATIONS IN TWO VARIABLES
Mathematics | Class IX (2026/LINEQ/09/003)
Time: 1.5 Hours **Max. Marks: 40**

General Instructions:

1. All questions are compulsory.
2. Section A contains 8 MCQs (1 mark each).
3. Section B contains 4 Very Short Answer questions (2 marks each).
4. Section C contains 3 Short Answer questions (3 marks each).
5. Section D contains 2 Long Answer questions (5 marks each).
6. Section E contains 1 Case Study (5 marks total).

Section A (Multiple Choice Questions)

1. The linear equation $x = y$ represents a line that:
   (a) is parallel to X-axis
   (b) is parallel to Y-axis
   (c) passes through the origin
   (d) is coincident with X-axis

2. If $(p, 2p)$ is a solution of the equation $3x - 4y = -10$, then the value of p is:
   (a) 2
   (b) 1
   (c) 5
   (d) -2

3. The graph of $2x + 1 = 0$ is a line:
   (a) parallel to X-axis
   (b) parallel to Y-axis
   (c) passing through origin
   (d) perpendicular to Y-axis

4. How many points lie on the line represented by $x + y = 5$?
   (a) One
   (b) Two
   (c) Five
   (d) Infinitely many

5. If we multiply the whole linear equation by a factor $k \neq 0$, the graph of the new equation:

(a) shifts upwards

(b) shifts to the left

(c) remains exactly the same

(d) becomes a point

6. A point whose abscissa is twice its ordinate and which satisfies $x + y = 9$ is:

   (a) $(3, 6)$

   (b) $(6, 3)$

   (c) $(4, 5)$

   (d) $(2, 7)$

7. The point of intersection of the line $x/2 + y/3 = 1$ with the X-axis is:

   (a) $(0, 3)$

   (b) $(2, 0)$

   (c) $(3, 0)$

   (d) $(0, 2)$

8. Which of the following equations is NOT linear in two variables?

   (a) $3x + 4 = y$

   (b) $x/y = 5$

   (c) $\sqrt{2}x + y = 7$

   (d) $x = 0$

Section B (Very Short Answer Questions)

1. Find the point on the graph of the linear equation $2x + 5y = 20$ whose x-coordinate is $\frac{5}{2}$ times its y-coordinate. (2)

2. Write the linear equation $y = 7$ in the standard form $ax + by + c = 0$ and find any two solutions for it. (2)

3. Check whether the graph of the linear equation $2x + 3y = 12$ passes through the point $(3, 2)$. Justify mathematically. (2)

4. Express x in terms of y for the equation $3x + 4y = 18$. Find the value of x when $y = 3$. (2)

Section C (Short Answer Questions)

1. Solve the equation $3x + 2 = x - 8$ and represent the solution on the Cartesian plane. Is this a point or a line in two variables? (3)

2. Find the value of k if the line $2x + ky = 10$ passes through the point $(2, -2)$. Using this value of k, find one more point on the line in the second quadrant. (3)

3. For the equation $y - x = 2$, create a table of values for $x = -2, 0, 2$. Draw the graph and find the area of the triangle formed by this line and the axes. (3)

Section D (Long Answer Questions)

1. Two years ago, a father's age was three times the age of his son. (i) Taking the present age of father as x and son as y, write a linear equation to represent this. (ii) Express the equation in the form $ax + by + c = 0$. (iii) Draw the graph of this equation. (iv) If the son's present age is 12 years, find the father's present age from the graph. (5)

2. (i) Draw the graph of the equation $3x + 2y = 12$. (ii) From the graph, find the coordinates of the points where the line cuts the coordinate axes. (iii) Shade the region bounded by this line, the X-axis, and the Y-axis. Calculate its area. (5)

Section E (Case Study Based Question)

Case Study: The Monthly Electricity Bill
A consumer in a smart city receives an electricity bill which consists of two parts: a fixed monthly service charge of Rs 150 and a variable charge of Rs 8 per unit consumed. Let the number of units consumed be x and the total monthly bill be Rs y. This relationship is linear because the rate of change is constant. The utility company provides a mobile app where consumers can input their expected consumption to predict their monthly expenses. The app uses the linear equation $y = 8x + 150$ to generate a graph. This allows users to see that even with zero consumption, the bill remains at Rs 150 due to the service charge. Understanding this helps families plan their budgets and motivates them to save energy to reduce the variable component of their bill.

Based on the above information, answer the following questions:

1. What is the total bill if the consumer uses 50 units in a month?
   (a) Rs 400
   (b) Rs 550
   (c) Rs 650
   (d) Rs 150

2. If the total bill is Rs 1150, how many units were consumed?
   (a) 100 units
   (b) 120 units
   (c) 125 units
   (d) 150 units

3. At what point does the graph of the bill equation $y = 8x + 150$ cross the Y-axis?
   (a) $(150, 0)$
   (b) $(0, 8)$
   (c) $(0, 150)$
   (d) $(8, 150)$

4. What is the value of the slope (coefficient of x) in this linear model?
   (a) 150

(b) 8

(c) 158

(d) 142

5. If the consumer wants to keep the bill under Rs 950, what is the maximum number of units they can use?

   (a) 100 units

   (b) 80 units

   (c) 110 units

   (d) 90 units