

INTRODUCTION TO LINEAR POLYNOMIALS

Multiple Choice Questions

- Q 1. Abscissa of all points on the **y**-axis is:
(a) 0 (b) 1 (c) -1 (d) None of these
- Q 2. If the point (3,4) lies on the graph of the equation $3y = ax + 7$, the value of **a** is:
(a) $\frac{5}{3}$ (b) $\frac{3}{5}$ (c) 1 (d) $\frac{2}{5}$
- Q 3. If ($\sqrt{2}, -\sqrt{2}$) lies on the graph $4x - 3ay = \sqrt{2}$, then the value of **a** equals:
(a) 1 (b) -1 (c) 0 (d) -2
- Q 4. The coefficient of the variable **y** in the linear equation $5(2x - y) + 3x + 4y - 7 = 0$ is:
(a) 13 (b) -9 (c) -1 (d) 5
- Q 5. The graph of equation $5x = 4$ is parallel to:
(a) the **x**-axis at a distance of $\frac{4}{5}$ units (b) the **y**-axis at a distance of $\frac{5}{4}$ units
(c) the **y**-axis at a distance of $\frac{4}{5}$ units (d) the **x**-axis at a distance of 4 units
- Q 6. A linear equation such that each point on its graph has its ordinate equal to twice its abscissa is:
(a) $x + y = 2$ (b) $y = 2x$
(c) $x = 2y$ (d) $x - y = 2$
- Q 7. Which of these is a polynomial in one variable?
(a) The perimeter of a square whose side length is represented by the expression $\sqrt{x}$.
(b) The area of a square whose side length is represented by the expression $1 + \sqrt{x}$.
(c) The area of a rectangle whose side lengths are represented by the expressions $2 + \sqrt{x}$ and $\sqrt{x}$.
(d) The perimeter of a rectangle whose side lengths are represented by the expressions $x^2 + \sqrt{x}$ and $5 - \sqrt{x}$.



Very Short Answer Questions

- Q 8. The cost of book (x) exceed twice the cost of pen (y) by 10 rupees. Express this statement as linear equation.
- Q9. Find the points where the graph of the equation $3 = 2x + y$ cuts the x -axis and the y -axis.
- Q 10. Ravi took a cab to go to his office. For the first kilometre, the fare is ₹50 and for the subsequent distance it is ₹ 10 per kilometre. Take the distance covered as x km and (0) as fare as ₹ y . Form a linear equation in two variables. If Ravi covered 7 km then how much fare he has to pay?
- Q 11. In a playground, the length of a rectangular track is four more than twice its width. If the perimeter of the track is 56 m , find its dimensions.
- Q 12. For the first 3 km , the fare is ₹45. For every additional kilometre, the fare is ₹10 per km . Taking distance as x km and total fare as ₹ y , write a linear equation.

Short Answer Questions

- Q 13. Write an equation of the line parallel to the x -axis whose y -intercept is:
(i) -6 (ii) 4 (iii) $-\frac{3}{2}$
- Q 14. If $(m - 2, 2m + 1)$ lies on equation $2x + 3y - 10 = 0$, find m .
- Q 15. Find the value of a and b , if the line $6ax + by = 24$ passes through $(2,0)$ and $(1,2)$.
- Q 16. A large bottle holds 4 times as much juice as a small glass. You pour 250 ml more juice into both the bottle and the glass. Now, the bottle contains exactly double the amount of juice that is in the glass. What was the original volume of juice in the glass and the bottle?

Long Question Answer Questions

- Q 17. Draw the graphs of the following sets of lines.
(i) $y = 8x, y = 4x, y = 2x$
(ii) $y = -3x + 2, y = 2x - 2, y = -4x + 1$
- Q 18. A courier service calculates the cost of delivering a package based on a fixed handling fee plus a specific rate per kilometre travelled. A customer notices that a delivery over a distance of 15 km costs ₹ 220 , while a delivery over 25 km costs ₹ 320 . If the total cost y depends on the distance x (in km) according to the linear relation $y = ax + b$:
- (i) Find the values of a and b .
- (ii) Determine the cost of a delivery for a distance of 40 km



Case Study Based Questions

- Q19. An architect is designing a straight decorative border for a floor tiling project. To ensure the border is perfectly aligned, she marks specific points on a grid (x, y) . Each point represents a corner where the tile colors change. The recorded coordinates are: $(-1, 7)$, $(0, 5)$, $(1, 3)$, $(2, 1)$, and $(3, -1)$

Based on the above information, answer the following questions:

- (i) Mark these five coordinates on a graph paper and draw the line.
- (ii) Find the linear equation that represents this decorative border.
- (iii) Find slope and y -intercept of this line.

- Q 20. A student has ₹1,200 in a savings account. He decides to withdraw ₹50 every week to cover his transportation costs.

Based on the above information, answer the following questions:

- (i) Find the amount of money remaining in the account after 12 weeks.
- (ii) Make a table of values for t (time in weeks) varying from 0 to 8 weeks to show the remaining balance B .
- (iii) Find an expression that relates the balance B to the time t , and explain why it represents linear decay.

- Q 21. A cloud storage server currently has 150 GB of data stored. A backup process is started that uploads additional data at a constant rate of 40 GB every hour.

Based on the above information, answer the following questions:

- (i) Find the total amount of data on the server after 8 hours.
- (ii) Make a table of values for t (time in hours) varying from 0 to 5 hours to show the total data D .
- (iii) Find an expression that relates the total data D to the time t , and explain why it represents linear growth.

ANSWER KEY

1. a 2. a 3. b 4. c 5. c 6. b 7. d
8. $x - 2y - 10 = 0$
9. x -axis: $(\frac{3}{2}, 0)$; y -axis: $(0, 3)$
10. $y = 10x + 40$; ₹ 110
11. Width = 8 m; Length = 20 m
12. $y = 10x + 15$, where $x \geq 3$
13. (i) $y + 6 = 0$ (ii) $y - 4 = 0$ (iii) $2y + 3 = 0$
14. $\frac{11}{8}$



15. $a = 2; b = 6$

16. 125ml; 500ml

18. (i) $a = 10; b = 70$ (ii) ₹ 470

19. (ii) $y = -2x + 5$ (iii) Slope = -2 ; y-intercept = 5

20. (i) ₹ 600

(iii) $B = 1200 - 50t$

21. (i) 470 GB

(iii) $D = 150 + 40t$

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