Introduction to Linear Polynomials

Standard difficulty · 20 questions · 40 marks · Time: 30 minutes

Name: _____ Date: _____ Score: ____ / 40

Show your working for Sections B and C. Answers are on the last page — try every question first!

Section A — Choose the correct answer — 8 × 1 = 8 marks

1. If p(x) = −6x, then p(2) is:
(a) 12 **(b)** −4 **(c)** −13 **(d)** −12

2. The zero of 9x + 5 is:
(a) −5/9 **(b)** 5/9 **(c)** −1 4/5 **(d)** 5

3. A linear polynomial has degree:
(a) 3 **(b)** 2 **(c)** 1 **(d)** 0

4. The graph of y = −5x − 1 crosses the y-axis at:
(a) (0, −5) **(b)** (−5, −1) **(c)** (−1, 0) **(d)** (0, −1)

5. A line passes through (5, 40) and (8, 61). Its slope is:
(a) 7 **(b)** 1/7 **(c)** 21 **(d)** −7

6. Which point lies on the line y = −x − 1?
(a) (1, −3) **(b)** (1, −1) **(c)** (2, −2) **(d)** (1, −2)

7. The line y = −2x + 6 crosses the x-axis at:
(a) (6, 0) **(b)** (−3, 0) **(c)** (0, 6) **(d)** (3, 0)

8. A delivery costs Rs 56 plus Rs 19 per km. Which polynomial gives the cost for x km?
(a) 56 + 19x **(b)** 56x − 19 **(c)** 75x **(d)** 19 + 56x

Section B — Short answer — 8 × 2 = 16 marks

9. Find the values of p(x) = −9x + 3 at x = −1, 1, 3. By how much does p(x) change each time x goes up by 1?

10. Find the zero of −7x + 11 and check it.

11. A line passes through (−1, 4) and (0, 7). Find its slope and its equation in the form y = mx + c.

12. Where does the line y = x + 6 cross each axis?

13. A gym charges a joining fee of Rs 106 and Rs 19 per visit. Write the cost for x visits as a linear polynomial and find it for 28 visits.

14. A candle 53 cm tall burns 3 cm every hour. Write its height after t hours, find it after 15 hours, and find when it burns out.

15. Are the lines y = 4x + 7 and y = 4x + 15 parallel? Do they meet?

16. For which x is 2x − 8 equal to 16?

Section C — Word problems — 4 × 4 = 16 marks

17. Plan A costs Rs 83 plus Rs 8 per hour; plan B costs Rs 66 plus Rs 10 per hour. Write each as a linear polynomial. After how many hours do they cost the same, and which is cheaper for longer use?

18. Isha has Rs 310 and saves Rs 417 every week. Write the savings after w weeks as a linear polynomial. After how many weeks will Isha have Rs 6,982?

19. A tank has 30 litres of water and a pipe adds 4 litres a minute. Write the amount after t minutes. How much is there after 18 minutes, and what is the slope of the graph?

20. Temperature in °F is a linear polynomial of °C: F = 1.8C + 32. Find F when C = 4. What is the slope, and what does it mean?

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Answer key

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Q	Answer	Working
1	**(d) −12**	−6 × 2 + 0
2	**(a) −5/9**	9x + 5 = 0 → x = −5/9
3	**(c) 1**	the highest power of x is 1
4	**(d) (0, −1)**	put x = 0
5	**(a) 7**	(61 − 40) ÷ (8 − 5)
6	**(d) (1, −2)**	−1 × 1 − 1 = −2
7	**(d) (3, 0)**	−2x + 6 = 0
8	**(a) 56 + 19x**	—
9	**12, −6, −24; by −9**	down by 9 each step
10	**1 4/7**	−7x + 11 = 0 → −7x = −11 → x = 1 4/7
11	**slope 3; y = 3x + 7**	slope 3 ÷ 1 = 3; then c = 4 − 3 × (−1) = 7
12	**y-axis (0, 6); x-axis (−6, 0)**	x = 0 gives y = 6; y = 0 gives x = −6
13	**106 + 19x; Rs 638**	106 + 19 × 28
14	**53 − 3t; 8 cm; after 17 2/3 hours**	53 − 3t = 0 → t = 17 2/3
15	**parallel; they never meet**	same slope 4, different y-intercepts 7 and 15
16	**12**	2x = 16 − (−8) = 24
17	**A: 83 + 8h; B: 66 + 10h; equal at h = 8 1/2; A is cheaper after that**	83 + 8h = 66 + 10h → 2h = 17
18	**310 + 417w; 16 weeks**	310 + 417w = 6982
19	**30 + 4t; 102 litres; slope 4 litres per minute**	30 + 4 × 18
20	**39.2; 1.8: each 1 °C rise is a 1.8 °F rise**	1.8 × 4 + 32

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