Two Variables, One Line

Standard difficulty · 20 questions · 40 marks · Time: 36 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. Which point lies on the line x − y = 0?
(a) (2, 1) **(b)** (3, 2) **(c)** (1, 2) **(d)** (2, 2)

2. If (7, k) is a solution of 9x + 8y = 127, then k equals:
(a) 127 **(b)** 9 **(c)** 8 **(d)** −8

3. The equation y = −6x + 9 in the form ax + by + c = 0 is:
(a) −6x − y − 9 = 0 **(b)** x + 6y + 9 = 0
(c) −6x + y + 9 = 0 **(d)** −6x − y + 9 = 0

4. The line 8x + 6y = −24 meets the x-axis at:
(a) (−3, 0) **(b)** (−3, −3) **(c)** (0, −3) **(d)** (−24, 0)

5. A linear equation in two variables has:
(a) no solution **(b)** infinitely many solutions
(c) exactly one solution **(d)** exactly two solutions

6. The line 6x + 3y = 24 meets the y-axis at:
(a) (0, 8) **(b)** (0, −8) **(c)** (8, 0) **(d)** (0, 24)

7. Which equation has (−1, −5) as a solution?
(a) 3x + 9y = −48 **(b)** 3x − 9y = −48 **(c)** 3x + 9y = −47 **(d)** 3x + 9y = −51

8. Assertion (A): (1, 3) is a solution of 4x − 6y = −20.
Reason (R): A pair (x, y) is a solution if it makes both sides of the equation equal.
(a) Both A and R are true, and R is the correct explanation of A.
(b) Both A and R are true, but R is not the correct explanation of A.
(c) A is true, but R is false.
(d) A is false, but R is true.

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

9. Find two solutions of 2x + 7y = 70.

10. Is (3, −1) a solution of 8x + 3y = 23? Give a reason.

11. Find k if (2, 2) lies on the line kx + y = 14.

12. Express x in terms of y: 5x − 5y = −17

13. For the equation 9x + 2y = 81, find y when x = 7.

14. The cost of a bat is 9 times the cost of a ball. Write a linear equation (x = cost of a bat, y = cost of a ball).

15. Find the point on the line 4x − 6y = −12 whose x- and y-coordinates are equal.

16. Find where the line 8x + 9y = 216 meets the x-axis and the y-axis.

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

17. A taxi charges Rs 46 for the first km and Rs 16 for every km after that. Write an equation for the fare y for x km, and find the fare for 12 km.

18. Ananya's age is 8 years more than 4 times Isha's age. Write a linear equation (x = Ananya's age, y = Isha's age), and find Ananya's age when Isha is 11.

19. Temperature in Fahrenheit is F = (9/5)C + 32. Find F when C = 25, and find C when F = 14.

20. A mobile plan costs Rs 190 a month plus Rs 50 for each GB of data. Write an equation for the bill y when x GB are used. How many GB were used if the bill is Rs 290?

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Answer key

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Q	Answer	Working
1	**(d) (2, 2)**	1 × 2 + (−1) × 2 = 0
2	**(c) 8**	9 × 7 + 8k = 127, so k = 8
3	**(d) −6x − y + 9 = 0**	move y to the right-hand side
4	**(a) (−3, 0)**	put y = 0: 8x = −24, x = −3
5	**(b) infinitely many solutions**	—
6	**(a) (0, 8)**	put x = 0: 3y = 24, y = 8
7	**(a) 3x + 9y = −48**	3 × (−1) + 9 × (−5) = −48
8	**(d) A is false, but R is true.**	A is false: 4 × 1 + (−6) × 3 = −14, not −20. R is true.
9	**e.g. (0, 10) and (35, 0)**	x = 0 gives y = 10; y = 0 gives x = 35
10	**No**	8 × 3 + 3 × (−1) = 21, not 23
11	**k = 6**	2 × k + 1 × 2 = 14, so k = 6
12	**x = (−17 + 5y)/5**	5x = −17 + 5y
13	**y = 9**	9 × 7 + 2y = 81, so 2y = 18
14	**x − 9y = 0**	x = 9y
15	**(6, 6)**	put x = y: −2x = −12, so x = y = 6
16	**(27, 0) and (0, 24)**	y = 0 gives x = 27; x = 0 gives y = 24
17	**y = 16x + 30; Rs 222**	y = 46 + 16(x − 1) = 16x + 30; y = 16 × 12 + 30 = 222
18	**x − 4y − 8 = 0; 52 years**	x = 4y + 8 = 4 × 11 + 8 = 52
19	**F = 77; C = −10**	(9/5) × 25 + 32 = 77; (14 − 32) × 5/9 = −10
20	**y = 50x + 190; 2 GB**	50x + 190 = 290; 50x = 100; x = 2