

Linear Equations in Two Variables

MCQ Test, Set 04

Time: 30 minutes

Maximum marks: 25

Name: _____ Class: _____ Date: _____

1. There are 25 questions. Each has exactly one correct answer: choose A, B, C or D.
2. Each correct answer carries 1 mark. There is no negative marking.
3. The key sheet and worked solutions are at the end of this test.

1. If $y = -1$ in $5x + 4y = 1$, then $x =$
A. $-\frac{3}{5}$ **B.** 1 **C.** 5 **D.** -1
2. Which point lies on the line $3x - 4y = -3$?
A. $(-3, -5)$ **B.** $(-5, 3)$ **C.** $(5, -3)$ **D.** $(-5, -3)$
3. Which equation, taken with $4x - 5y = -9$, makes a pair with exactly one solution?
A. $16x + 20y = -36$ **B.** $16x - 20y = -36$ **C.** $16x - 20y = -37$ **D.** $12x - 15y = -28$
4. The pair $3x - 12y = -4$ and $4x - 16y = 5$ has
A. no solution **B.** infinitely many solutions
C. exactly two solutions **D.** a unique solution
5. Which equation, taken with $x - 4y = -1$, makes a pair with no solution?
A. $2x + 8y = -2$ **B.** $2x - 8y = -2$ **C.** $-8x + 2y = -2$ **D.** $2x - 8y = -4$
6. The pair $kx - 4y = -6$, $20x - 8y = -12$ has infinitely many solutions when $k =$
A. -40 **B.** 40 **C.** 10 **D.** -10
7. Which equation, taken with $4x - 2y = -5$, makes a pair with infinitely many solutions?
A. $8x - 4y = -10$ **B.** $8x - 4y = -7$ **C.** $8x + 4y = -10$ **D.** $-4x + 8y = -10$
8. From $4x + y = -5$, $y =$
A. $5 - 4x$ **B.** $-5 + 4x$ **C.** $5 + 4x$ **D.** $-5 - 4x$
9. Substituting $x = 8 - 4y$ in $2x - 5y = -36$ gives
A. $16 + 3y = -36$ **B.** $16 - 13y = -36$ **C.** $16 - 8y = -36$ **D.** $8 - 9y = -36$
10. Solving $2x + 5y = 1$ and $3x - 2y = 11$ by the elimination method, $y =$
A. -3 **B.** 3 **C.** 1 **D.** -1
11. Solving $2x - 3y = 5$ and $4x + y = 17$ by the elimination method, $(x, y) =$
A. $(1, 1)$ **B.** $(-4, -1)$ **C.** $(4, 1)$ **D.** $(4, -1)$

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Key sheet

1. B	2. D	3. A	4. A	5. D
6. C	7. A	8. D	9. B	10. D
11. C	12. A	13. C	14. D	15. A
16. B	17. C	18. B	19. B	20. A
21. C	22. A	23. B	24. C	25. B

Solutions

1. If $y = -1$ in $5x + 4y = 1$, then $x =$

$$5x + 4(-1) = 1$$

$$\Rightarrow 5x - 4 = 1$$

$$\Rightarrow 5x = 1 + 4 = 5$$

$$\Rightarrow x = 1$$

Ans: (B) 1

2. Which point lies on the line $3x - 4y = -3$?

Put each point in $3x - 4y$; only $(-5, -3)$ gives -3 :

$$3(-5) - 4(-3) = -15 + 12 = -3$$

Ans: (D) $(-5, -3)$

3. Which equation, taken with $4x - 5y = -9$, makes a pair with exactly one solution?

With $16x + 20y = -36$: $\frac{a_1}{a_2} = \frac{4}{16} = \frac{1}{4}$, $\frac{b_1}{b_2} = \frac{-5}{20} = -\frac{1}{4}$, $\frac{c_1}{c_2} = \frac{-9}{-36} = \frac{1}{4}$

$\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$, so the lines intersect: a unique solution.

Ans: (A) $16x + 20y = -36$

4. The pair $3x - 12y = -4$ and $4x - 16y = 5$ has

$$\frac{a_1}{a_2} = \frac{3}{4}, \frac{b_1}{b_2} = \frac{-12}{-16} = \frac{3}{4}, \frac{c_1}{c_2} = \frac{-4}{5}$$

$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$, so the lines are parallel: no solution.

Ans: (A) no solution

5. Which equation, taken with $x - 4y = -1$, makes a pair with no solution?

With $2x - 8y = -4$: $\frac{a_1}{a_2} = \frac{1}{2}$, $\frac{b_1}{b_2} = \frac{-4}{-8} = \frac{1}{2}$, $\frac{c_1}{c_2} = \frac{-1}{-4} = \frac{1}{4}$

$\frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$, so the lines are parallel: no solution.

Ans: (D) $2x - 8y = -4$

6. The pair $kx - 4y = -6$, $20x - 8y = -12$ has infinitely many solutions when $k =$

For infinitely many solutions: $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

$$\frac{k}{20} = \frac{-4}{-8}$$

$$\Rightarrow -8k = -80$$

$$\Rightarrow k = 10$$

Also $\frac{c_1}{c_2} = \frac{-6}{-12} = \frac{1}{2}$, equal to the other ratios.

Ans: (C) 10

7. Which equation, taken with $4x - 2y = -5$, makes a pair with infinitely many solutions?

With $8x - 4y = -10$: $\frac{a_1}{a_2} = \frac{4}{8} = \frac{1}{2}$, $\frac{b_1}{b_2} = \frac{-2}{-4} = \frac{1}{2}$, $\frac{c_1}{c_2} = \frac{-5}{-10} = \frac{1}{2}$

$\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$, so the lines coincide: infinitely many solutions.

Ans: (A) $8x - 4y = -10$

8. From $4x + y = -5$, $y =$

$$4x + y = -5$$

Move the x term to the right: $y = -5 - 4x$

Ans: (D) $-5 - 4x$

9. Substituting $x = 8 - 4y$ in $2x - 5y = -36$ gives

$$2(8 - 4y) - 5y = -36$$

$$\Rightarrow 16 - 8y - 5y = -36$$

$$\Rightarrow 16 - 13y = -36$$

Ans: (B) $16 - 13y = -36$

10. Solving $2x + 5y = 1$ and $3x - 2y = 11$ by the elimination method, $y =$

$$2x + 5y = 1 \quad (1)$$

$$3x - 2y = 11 \quad (2)$$

$$(1) \times 3 \Rightarrow 6x + 15y = 3$$

$$(2) \times 2 \Rightarrow 6x - 4y = 22$$

$$\text{Subtracting, } 19y = -19$$

$$\Rightarrow y = -1$$

$$(1) \Rightarrow 2x + 5(-1) = 1$$

$$\Rightarrow 2x - 5 = 1$$

$$\Rightarrow 2x = 1 + 5$$

$$\Rightarrow 2x = 6$$

$$\Rightarrow x = 3$$

$$\therefore (x, y) = (3, -1)$$

Ans: (D) -1

11. Solving $2x - 3y = 5$ and $4x + y = 17$ by the elimination method, $(x, y) =$

$$2x - 3y = 5 \quad (1)$$

$$4x + y = 17 \quad (2)$$

$$(1) \times 2 \Rightarrow 4x - 6y = 10$$

$$(2) \Rightarrow 4x + y = 17$$

$$\text{Subtracting, } -7y = -7$$

$$\Rightarrow y = 1$$

$$(1) \Rightarrow 2x - 3(1) = 5$$

$$\Rightarrow 2x - 3 = 5$$

$$\Rightarrow 2x = 5 + 3$$

$$\Rightarrow 2x = 8$$

$$\Rightarrow x = 4$$

$$\therefore (x, y) = (4, 1)$$

Ans: (C) $(4, 1)$

12. To eliminate x from (1) $4x - 5y = -6$ and (2) $2x + 9y = 5$, we multiply

The LCM of 4 and 2 is 4.

$$(1) \times 1 \Rightarrow 4x - 5y = -6$$

$$(2) \times 2 \Rightarrow 4x + 18y = 10$$

Now the x terms are equal, and subtracting removes x .

Ans: (A) (1) by 1 and (2) by 2

13. Solving $3x + 5y = 19$ and $2x - 3y = -19$ by the cross multiplication method, $(x, y) =$

$$3x + 5y - 19 = 0 \quad (1)$$

$$2x - 3y + 19 = 0 \quad (2)$$

$$\frac{x}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

$$\frac{x}{95 - 57} = \frac{y}{-38 - 57} = \frac{1}{-9 - 10}$$

$$\frac{x}{38} = \frac{y}{-95} = \frac{1}{-19}$$

$$\Rightarrow x = \frac{38}{-19}, y = \frac{-95}{-19}$$

$$\therefore (x, y) = (-2, 5)$$

Ans: (C) $(-2, 5)$

14. If $\frac{x}{9} = \frac{y}{-18} = \frac{1}{-9}$, then $(x, y) =$

$$x = \frac{9}{-9} = -1$$

$$y = \frac{-18}{-9} = 2$$

Ans: (D) $(-1, 2)$

15. The solution of $4x + 4y = 16$ and $\frac{5x}{2} + \frac{5y}{6} = 5$ is $(x, y) =$

$$4x + 4y = 16 \quad (1)$$

$$\frac{5x}{2} + \frac{5y}{6} = 5 \Rightarrow \frac{15x + 5y}{6} = 5 \Rightarrow 15x + 5y = 30 \quad (2)$$

$$(1) \times 15 \Rightarrow 60x + 60y = 240$$

$$(2) \times 4 \Rightarrow 60x + 20y = 120$$

$$\text{Subtracting, } 40y = 120$$

$$\Rightarrow y = 3$$

$$(1) \Rightarrow 4x + 4(3) = 16$$

$$\Rightarrow 4x + 12 = 16$$

$$\Rightarrow 4x = 16 - 12$$

$$\Rightarrow 4x = 4$$

$$\Rightarrow x = 1$$

$$\therefore (x, y) = (1, 3)$$

Ans: (A) $(1, 3)$

16. $\frac{3x}{2} - \frac{y}{6} = 7$ without fractions is

Multiply every term by the LCM 6:

$$\frac{3x}{2} - \frac{y}{6} = 7 \Rightarrow \frac{9x - y}{6} = 7 \Rightarrow 9x - y = 42$$

Ans: (B) $9x - y = 42$

17. The solution of $\frac{2}{x} + \frac{2}{y} = 9$ and $\frac{4}{x} + \frac{1}{y} = 6$ is $(x, y) =$

Let $\frac{1}{x} = p$ and $\frac{1}{y} = q$.

$$2p + 2q = 9 \quad (1)$$

$$4p + q = 6 \quad (2)$$

$$(1) \times 2 \Rightarrow 4p + 4q = 18$$

$$(2) \Rightarrow 4p + q = 6$$

Subtracting, $3q = 12$

$$\Rightarrow q = 4$$

$$(1) \Rightarrow 2p + 2(4) = 9$$

$$\Rightarrow 2p + 8 = 9$$

$$\Rightarrow 2p = 9 - 8$$

$$\Rightarrow 2p = 1$$

$$\Rightarrow p = \frac{1}{2}$$

$$\therefore (p, q) = \left(\frac{1}{2}, 4\right)$$

$$\frac{1}{x} = \frac{1}{2} \Rightarrow x = 2$$

$$\frac{1}{y} = 4 \Rightarrow y = \frac{1}{4}$$

$$\therefore (x, y) = \left(2, \frac{1}{4}\right)$$

Ans: (C) $\left(2, \frac{1}{4}\right)$

18. With $\frac{1}{x} = p$ and $\frac{1}{y} = q$, the equation $\frac{1}{x} + \frac{7}{y} = 1$ becomes

$$\frac{1}{x} = 1 \times \frac{1}{x} = 1p \text{ and } \frac{7}{y} = 7q$$

$$\text{So } p + 7q = 1$$

Ans: (B) $p + 7q = 1$

19. The solution of $\frac{5}{x} - y = -1$ and $\frac{5}{x} - 3y = -5$ is $(x, y) =$

Let $\frac{1}{x} = p$.

$$5p - y + 1 = 0 \quad (1)$$

$$5p - 3y + 5 = 0 \quad (2)$$

$$\frac{p}{b_1c_2 - b_2c_1} = \frac{y}{c_1a_2 - c_2a_1} = \frac{1}{a_1b_2 - a_2b_1}$$

$$\frac{p}{-5+3} = \frac{y}{5-25} = \frac{1}{-15+5}$$

$$\frac{p}{-2} = \frac{y}{-20} = \frac{1}{-10}$$

$$\Rightarrow p = \frac{-2}{-10}, y = \frac{-20}{-10}$$

$$\therefore (p, y) = \left(\frac{1}{5}, 2\right)$$

$$\frac{1}{x} = \frac{1}{5} \Rightarrow x = 5$$

$$\therefore (x, y) = (5, 2)$$

Ans: (B) $(5, 2)$

20. The solution of $\frac{4}{x-3} + \frac{1}{y-2} = -1$ and $\frac{5}{x-3} - \frac{4}{y-2} = -3$ is $(x, y) =$

Let $\frac{1}{x-3} = p$ and $\frac{1}{y-2} = q$.

$$4p + q = -1 \quad (1)$$

$$5p - 4q = -3 \quad (2)$$

$$(1) \Rightarrow q = -1 - 4p$$

$$\text{Substitute in (2): } 5p - 4(-1 - 4p) = -3$$

$$\Rightarrow 5p + 4 + 16p = -3$$

$$\Rightarrow 21p + 4 = -3$$

$$\Rightarrow 21p = -3 - 4$$

$$\Rightarrow 21p = -7$$

$$\Rightarrow p = -\frac{1}{3}$$

$$(1) \Rightarrow q = -1 - 4\left(-\frac{1}{3}\right) = \frac{1}{3}$$

$$\therefore (p, q) = \left(-\frac{1}{3}, \frac{1}{3}\right)$$

$$\frac{1}{x-3} = -\frac{1}{3} \Rightarrow x - 3 = -3 \Rightarrow x = 0$$

$$\frac{1}{y-2} = \frac{1}{3} \Rightarrow y - 2 = 3 \Rightarrow y = 5$$

$$\therefore (x, y) = (0, 5)$$

Ans: (A) (0, 5)

21. If $\frac{1}{x+1} = -\frac{1}{3}$, then $x =$

$$\frac{1}{x+1} = -\frac{1}{3} \Rightarrow x + 1 = -3$$

$$\Rightarrow x = -4$$

Ans: (C) -4

22. The solution of $\frac{x+5y}{xy} = -11$ and $\frac{x-4y}{xy} = 7$ is $(x, y) =$

$$\frac{x+5y}{xy} = -11 \Rightarrow \frac{1}{y} + \frac{5}{x} = -11$$

$$\frac{x-4y}{xy} = 7 \Rightarrow \frac{1}{y} - \frac{4}{x} = 7$$

Let $\frac{1}{x} = p$ and $\frac{1}{y} = q$.

$$5p + q = -11 \quad (1)$$

$$-4p + q = 7 \quad (2)$$

$$\text{Subtracting, } 9p = -18$$

$$\Rightarrow p = -2$$

$$(1) \Rightarrow q + 5(-2) = -11$$

$$\Rightarrow q - 10 = -11$$

$$\Rightarrow q = -11 + 10$$

$$\Rightarrow q = -1$$

$$\therefore (p, q) = (-2, -1)$$

$$\frac{1}{x} = -2 \Rightarrow x = -\frac{1}{2}$$

$$\frac{1}{y} = -1 \Rightarrow y = -1$$

$$\therefore (x, y) = \left(-\frac{1}{2}, -1\right)$$

Ans: (A) $\left(-\frac{1}{2}, -1\right)$

23. $\frac{3x-6y}{xy} =$

Divide each term by xy : $\frac{3x-6y}{xy} = \frac{3x}{xy} - \frac{6y}{xy}$

$$= \frac{3}{y} - \frac{6}{x}$$

Ans: (B) $\frac{3}{y} - \frac{6}{x}$

24. The solution of $\frac{4}{\sqrt{x}} - \frac{5}{\sqrt{y}} = 3$ and $\frac{5}{\sqrt{x}} + \frac{5}{\sqrt{y}} = 6$ is $(x, y) =$

Let $\frac{1}{\sqrt{x}} = p$ and $\frac{1}{\sqrt{y}} = q$.

$$4p - 5q = 3 \quad (1)$$

$$5p + 5q = 6 \quad (2)$$

$$(1) \times 5 \Rightarrow 20p - 25q = 15$$

$$(2) \times 4 \Rightarrow 20p + 20q = 24$$

Subtracting, $-45q = -9$

$$\Rightarrow q = \frac{1}{5}$$

$$(1) \Rightarrow 4p - 5\left(\frac{1}{5}\right) = 3$$

$$\Rightarrow 4p - 1 = 3$$

$$\Rightarrow 4p = 3 + 1$$

$$\Rightarrow 4p = 4$$

$$\Rightarrow p = 1$$

$$\therefore (p, q) = \left(1, \frac{1}{5}\right)$$

$$\frac{1}{\sqrt{x}} = 1 \Rightarrow \sqrt{x} = 1 \Rightarrow x = 1$$

$$\frac{1}{\sqrt{y}} = \frac{1}{5} \Rightarrow \sqrt{y} = 5 \Rightarrow y = 25$$

$$\therefore (x, y) = (1, 25)$$

Ans: (C) $(1, 25)$

25. If $\frac{3}{\sqrt{x}} = \frac{1}{3}$, then $x =$

$$\sqrt{x} = 9$$

$$\Rightarrow x = 9^2 = 81$$

Ans: (B) 81
