

Linear Equations in Two Variables

MCQ Test, Set 09

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 $x = -4$ in $5x + 3y = -38$, then $y =$
A. -6 **B.** 6 **C.** -18 **D.** $-\frac{58}{3}$
2. If $(-1, -4)$ lies on the line $6x + ky = 2$, then $k =$
A. 8 **B.** 1 **C.** -2 **D.** 2
3. Which equation, taken with $5x - 6y = 5$, makes a pair with exactly one solution?
A. $20x - 24y = 20$ **B.** $20x - 24y = 19$ **C.** $20x + 24y = 20$ **D.** $10x - 12y = 10$
4. For the pair $x + 6y = -16$ and $3x + 7y = -26$, $\frac{a_1}{a_2} =$
A. 3 **B.** -3 **C.** $-\frac{1}{3}$ **D.** $\frac{1}{3}$
5. The pair $4x + ky = 1$, $2x + 6y = -6$ has no solution when $k =$
A. -1 **B.** -12 **C.** 3 **D.** 12
6. Which equation, taken with $2x - 3y = -8$, makes a pair with no solution?
A. $4x + 6y = -16$ **B.** $4x - 6y = -14$ **C.** $-6x + 4y = -16$ **D.** $4x - 6y = -16$
7. The pair $6x + 10y = 16$ and $9x + 15y = 24$ has
A. a unique solution **B.** exactly two solutions
C. infinitely many solutions **D.** no solution
8. Which equation, taken with $6x - 4y = -5$, makes a pair with infinitely many solutions?
A. $18x - 12y = -14$ **B.** $-12x + 18y = -15$ **C.** $18x - 12y = -15$ **D.** $18x + 12y = -15$
9. Solving $5x - 2y = 24$ and $2x + y = 6$ by the substitution method, $(x, y) =$
A. $(4, -2)$ **B.** $(12, 18)$ **C.** $(4, 2)$ **D.** $(-2, 4)$
10. From $x - 3y = -9$, $x =$
A. $9 + 3y$ **B.** $-9 - 3y$ **C.** $9 - 3y$ **D.** $-9 + 3y$
11. Solving $3x + y = 14$ and $9x - 4y = 7$ by the elimination method, $(x, y) =$
A. $(5, 3)$ **B.** $(3, -5)$ **C.** $(-3, -5)$ **D.** $(3, 5)$

12. To eliminate x from (1) $9x - 2y = 3$ and (2) $3x - 8y = 1$, we multiply
A. (1) by 1 and (2) by 3 **B.** (1) by 3 and (2) by 1
C. (1) by 9 and (2) by 3 **D.** (1) by 8 and (2) by 2

13. If $\frac{x}{-6} = \frac{y}{2} = \frac{1}{2}$, then $(x, y) =$
A. (3, 1) **B.** (-3, 1) **C.** (-3, -1) **D.** (1, -3)

14. For $x - 4y - 13 = 0$ and $2x + y - 8 = 0$, in the cross multiplication method $a_1b_2 - a_2b_1 =$
A. 45 **B.** -9 **C.** -7 **D.** 9

15. $\frac{2x}{5} - y = 3$ without fractions is
A. $2x + 5y = 15$ **B.** $2x - 5y = 15$ **C.** $10x - y = 15$ **D.** $2x - 5y = 3$

16. The solution of $x - 3y = -10$ and $\frac{2x}{3} + \frac{y}{6} = 2$ is $(x, y) =$
A. (-2, 4) **B.** (-22, 4) **C.** (2, 4) **D.** (-2, -4)

17. The solution of $\frac{5}{x} + \frac{4}{y} = -14$ and $\frac{3}{x} + \frac{4}{y} = -8$ is $(x, y) =$
A. $(\frac{1}{3}, 4)$ **B.** $(-\frac{1}{3}, 4)$ **C.** $(4, -\frac{1}{3})$ **D.** $(-\frac{1}{3}, -4)$

18. With $\frac{1}{x} = p$ and $\frac{1}{y} = q$, the equation $\frac{7}{x} + \frac{6}{y} = -9$ becomes
A. $\frac{p}{7} + \frac{q}{6} = -9$ **B.** $6p + 7q = -9$
C. $7p + 6q = -9$ **D.** $7p - 6q = -9$

19. The solution of $\frac{4}{x} - 5y = -6$ and $\frac{4}{x} + 4y = 3$ is $(x, y) =$
A. (-4, 1) **B.** (1, -4) **C.** (4, 1) **D.** (-4, -1)

20. With $\frac{1}{x} = p$, the equation $\frac{7}{x} - 4y = -4$ becomes
A. $7p - 4y = -4$ **B.** $\frac{7}{p} - 4y = -4$ **C.** $7p + 4y = -4$ **D.** $\frac{p}{7} - 4y = -4$

21. If $\frac{1}{x-5} = \frac{1}{4}$, then $x =$
A. $\frac{21}{4}$ **B.** -1 **C.** 4 **D.** 9

22. $\frac{9x+y}{xy} =$
A. $\frac{9}{x} - \frac{1}{y}$ **B.** $\frac{9}{y} + \frac{1}{x}$
C. $\frac{9}{x} + \frac{1}{y}$ **D.** $\frac{9}{y} - \frac{1}{x}$

23. The solution of $\frac{4x-y}{xy} = 2$ and $\frac{4x-2y}{xy} = 3$ is $(x, y) =$
A. (4, -1) **B.** (-1, -4) **C.** (-1, 4) **D.** (1, 4)

24. The solution of $\frac{5}{\sqrt{x}} - \frac{3}{\sqrt{y}} = 4$ and $\frac{4}{\sqrt{x}} + \frac{3}{\sqrt{y}} = 5$ is $(x, y) =$
A. (1, 3) **B.** (2, 6) **C.** (1, 9) **D.** (9, 1)

25. The solution of $\frac{5}{\sqrt{x}} - \frac{5}{\sqrt{y}} = 4$ and $\frac{4}{\sqrt{x}} + \frac{5}{\sqrt{y}} = 5$ is $(x, y) =$
A. (2, 10) **B.** (1, 5) **C.** (25, 1) **D.** (1, 25)

Key sheet

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

Solutions

1. If $x = -4$ in $5x + 3y = -38$, then $y =$

$$5(-4) + 3y = -38$$

$$\Rightarrow -20 + 3y = -38$$

$$\Rightarrow 3y = -38 + 20 = -18$$

$$\Rightarrow y = -6$$

Ans: (A) -6

2. If $(-1, -4)$ lies on the line $6x + ky = 2$, then $k =$

$$\text{Put } x = -1, y = -4: 6(-1) + k(-4) = 2$$

$$\Rightarrow -6 - 4k = 2$$

$$\Rightarrow -4k = 2 + 6 = 8$$

$$\Rightarrow k = -2$$

Ans: (C) -2

3. Which equation, taken with $5x - 6y = 5$, makes a pair with exactly one solution?

$$\text{With } 20x + 24y = 20: \frac{a_1}{a_2} = \frac{5}{20} = \frac{1}{4}, \frac{b_1}{b_2} = \frac{-6}{24} = -\frac{1}{4}, \frac{c_1}{c_2} = \frac{5}{20} = \frac{1}{4}$$

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

Ans: (C) $20x + 24y = 20$

4. For the pair $x + 6y = -16$ and $3x + 7y = -26$, $\frac{a_1}{a_2} =$

$$\text{Here } a_1 = 1, a_2 = 3.$$

$$\frac{a_1}{a_2} = \frac{1}{3}$$

Ans: (D) $\frac{1}{3}$

5. The pair $4x + ky = 1$, $2x + 6y = -6$ has no solution when $k =$

$$\text{For no solution: } \frac{a_1}{a_2} = \frac{b_1}{b_2} \neq \frac{c_1}{c_2}$$

$$\frac{k}{6} = \frac{4}{2}$$

$$\Rightarrow 2k = 24$$

$$\Rightarrow k = 12$$

$$\text{Check: } \frac{c_1}{c_2} = \frac{1}{-6} = -\frac{1}{6} \neq 2, \text{ so the pair has no solution.}$$

Ans: (D) 12

6. Which equation, taken with $2x - 3y = -8$, makes a pair with no solution?

$$\text{With } 4x - 6y = -14: \frac{a_1}{a_2} = \frac{2}{4} = \frac{1}{2}, \frac{b_1}{b_2} = \frac{-3}{-6} = \frac{1}{2}, \frac{c_1}{c_2} = \frac{-8}{-14} = \frac{4}{7}$$

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

Ans: (B) $4x - 6y = -14$

7. The pair $6x + 10y = 16$ and $9x + 15y = 24$ has

$$\frac{a_1}{a_2} = \frac{6}{9} = \frac{2}{3}, \frac{b_1}{b_2} = \frac{10}{15} = \frac{2}{3}, \frac{c_1}{c_2} = \frac{16}{24} = \frac{2}{3}$$

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

Ans: (C) infinitely many solutions

8. Which equation, taken with $6x - 4y = -5$, makes a pair with infinitely many solutions?

With $18x - 12y = -15$: $\frac{a_1}{a_2} = \frac{6}{18} = \frac{1}{3}$, $\frac{b_1}{b_2} = \frac{-4}{-12} = \frac{1}{3}$, $\frac{c_1}{c_2} = \frac{-5}{-15} = \frac{1}{3}$

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

Ans: (C) $18x - 12y = -15$

9. Solving $5x - 2y = 24$ and $2x + y = 6$ by the substitution method, $(x, y) =$

$$5x - 2y = 24 \quad (1)$$

$$2x + y = 6 \quad (2)$$

$$(2) \Rightarrow y = 6 - 2x$$

$$\text{Substitute in (1): } 5x - 2(6 - 2x) = 24$$

$$\Rightarrow 5x - 12 + 4x = 24$$

$$\Rightarrow 9x - 12 = 24$$

$$\Rightarrow 9x = 24 + 12$$

$$\Rightarrow 9x = 36$$

$$\Rightarrow x = 4$$

$$(2) \Rightarrow y = 6 - 2(4) = -2$$

$$\therefore (x, y) = (4, -2)$$

Ans: (A) $(4, -2)$

10. From $x - 3y = -9$, $x =$

$$x - 3y = -9$$

$$\text{Move the } y \text{ term to the right: } x = -9 + 3y$$

Ans: (D) $-9 + 3y$

11. Solving $3x + y = 14$ and $9x - 4y = 7$ by the elimination method, $(x, y) =$

$$3x + y = 14 \quad (1)$$

$$9x - 4y = 7 \quad (2)$$

$$(1) \times 3 \Rightarrow 9x + 3y = 42$$

$$(2) \Rightarrow 9x - 4y = 7$$

$$\text{Subtracting, } 7y = 35$$

$$\Rightarrow y = 5$$

$$(1) \Rightarrow 3x + (5) = 14$$

$$\Rightarrow 3x + 5 = 14$$

$$\Rightarrow 3x = 14 - 5$$

$$\Rightarrow 3x = 9$$

$$\Rightarrow x = 3$$

$$\therefore (x, y) = (3, 5)$$

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

12. To eliminate x from (1) $9x - 2y = 3$ and (2) $3x - 8y = 1$, we multiply

The LCM of 9 and 3 is 9.

$$(1) \times 1 \Rightarrow 9x - 2y = 3$$

$$(2) \times 3 \Rightarrow 9x - 24y = 3$$

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

Ans: (A) (1) by 1 and (2) by 3

13. If $\frac{x}{-6} = \frac{y}{2} = \frac{1}{2}$, then $(x, y) =$

$$x = \frac{-6}{2} = -3$$

$$y = \frac{2}{2} = 1$$

Ans: (B) $(-3, 1)$

14. For $x - 4y - 13 = 0$ and $2x + y - 8 = 0$, in the cross multiplication method $a_1b_2 - a_2b_1 =$

$$a_1b_2 - a_2b_1 = (1)(1) - (2)(-4) = 1 + 8 = 9$$

Ans: (D) 9

15. $\frac{2x}{5} - y = 3$ without fractions is

Multiply every term by the LCM 5:

$$\frac{2x}{5} - y = 3 \Rightarrow \frac{2x-5y}{5} = 3 \Rightarrow 2x - 5y = 15$$

Ans: (B) $2x - 5y = 15$

16. The solution of $x - 3y = -10$ and $\frac{2x}{3} + \frac{y}{6} = 2$ is $(x, y) =$

$$x - 3y = -10 \quad (1)$$

$$\frac{2x}{3} + \frac{y}{6} = 2 \Rightarrow \frac{4x+y}{6} = 2 \Rightarrow 4x + y = 12 \quad (2)$$

$$(1) \times 4 \Rightarrow 4x - 12y = -40$$

$$(2) \Rightarrow 4x + y = 12$$

$$\text{Subtracting, } -13y = -52$$

$$\Rightarrow y = 4$$

$$(1) \Rightarrow x - 3(4) = -10$$

$$\Rightarrow x - 12 = -10$$

$$\Rightarrow x = -10 + 12$$

$$\Rightarrow x = 2$$

$$\therefore (x, y) = (2, 4)$$

Ans: (C) $(2, 4)$

17. The solution of $\frac{5}{x} + \frac{4}{y} = -14$ and $\frac{3}{x} + \frac{4}{y} = -8$ is $(x, y) =$

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

$$5p + 4q = -14 \quad (1)$$

$$3p + 4q = -8 \quad (2)$$

$$(1) \times 3 \Rightarrow 15p + 12q = -42$$

$$(2) \times 5 \Rightarrow 15p + 20q = -40$$

Subtracting, $-8q = -2$

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

$$(2) \Rightarrow 3p + 4\left(\frac{1}{4}\right) = -8$$

$$\Rightarrow 3p + 1 = -8$$

$$\Rightarrow 3p = -8 - 1$$

$$\Rightarrow 3p = -9$$

$$\Rightarrow p = -3$$

$$\therefore (p, q) = \left(-3, \frac{1}{4}\right)$$

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

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

$$\therefore (x, y) = \left(-\frac{1}{3}, 4\right)$$

Ans: (B) $\left(-\frac{1}{3}, 4\right)$

18. With $\frac{1}{x} = p$ and $\frac{1}{y} = q$, the equation $\frac{7}{x} + \frac{6}{y} = -9$ becomes

$$\frac{7}{x} = 7 \times \frac{1}{x} = 7p \text{ and } \frac{6}{y} = 6q$$

$$\text{So } 7p + 6q = -9$$

Ans: (C) $7p + 6q = -9$

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

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

$$4p - 5y + 6 = 0 \quad (1)$$

$$4p + 4y - 3 = 0 \quad (2)$$

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

$$\frac{p}{15 - 24} = \frac{y}{24 + 12} = \frac{1}{16 + 20}$$

$$\frac{p}{-9} = \frac{y}{36} = \frac{1}{36}$$

$$\Rightarrow p = \frac{-9}{36}, y = \frac{36}{36}$$

$$\therefore (p, y) = \left(-\frac{1}{4}, 1\right)$$

$$\frac{1}{x} = -\frac{1}{4} \Rightarrow x = -4$$

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

Ans: (A) $(-4, 1)$

20. With $\frac{1}{x} = p$, the equation $\frac{7}{x} - 4y = -4$ becomes

$$\frac{7}{x} = 7 \times \frac{1}{x} = 7p$$

$$\text{So } 7p - 4y = -4$$

Ans: (A) $7p - 4y = -4$

21. If $\frac{1}{x-5} = \frac{1}{4}$, then $x =$
 $\frac{1}{x-5} = \frac{1}{4} \Rightarrow x - 5 = 4$
 $\Rightarrow x = 9$

Ans: (D) 9

22. $\frac{9x+y}{xy} =$
 Divide each term by xy : $\frac{9x+y}{xy} = \frac{9x}{xy} + \frac{y}{xy}$
 $= \frac{9}{y} + \frac{1}{x}$

Ans: (B) $\frac{9}{y} + \frac{1}{x}$

23. The solution of $\frac{4x-y}{xy} = 2$ and $\frac{4x-2y}{xy} = 3$ is $(x, y) =$

$$\frac{4x-y}{xy} = 2 \Rightarrow \frac{4}{y} - \frac{1}{x} = 2$$

$$\frac{4x-2y}{xy} = 3 \Rightarrow \frac{4}{y} - \frac{2}{x} = 3$$

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

$$-p + 4q = 2 \quad (1)$$

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

Subtracting, $p = -1$

$$(1) \Rightarrow 4q - (-1) = 2$$

$$\Rightarrow 4q + 1 = 2$$

$$\Rightarrow 4q = 2 - 1$$

$$\Rightarrow 4q = 1$$

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

$$\therefore (p, q) = (-1, \frac{1}{4})$$

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

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

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

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

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

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

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

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

$$(1) \times 4 \Rightarrow 20p - 12q = 16$$

$$(2) \times 5 \Rightarrow 20p + 15q = 25$$

Subtracting, $-27q = -9$

$$\Rightarrow q = \frac{1}{3}$$

$$(2) \Rightarrow 4p + 3\left(\frac{1}{3}\right) = 5$$

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

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

$$\Rightarrow 4p = 4$$

$$\Rightarrow p = 1$$

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

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

$$\frac{1}{\sqrt{y}} = \frac{1}{3} \Rightarrow \sqrt{y} = 3 \Rightarrow y = 9$$

$$\therefore (x, y) = (1, 9)$$

Ans: (C) (1, 9)

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

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

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

$$4p + 5q = 5 \quad (2)$$

$$(1) \times 4 \Rightarrow 20p - 20q = 16$$

$$(2) \times 5 \Rightarrow 20p + 25q = 25$$

Subtracting, $-45q = -9$

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

$$(2) \Rightarrow 4p + 5\left(\frac{1}{5}\right) = 5$$

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

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

$$\Rightarrow 4p = 4$$

$$\Rightarrow p = 1$$

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

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

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

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

Ans: (D) (1, 25)