

Linear Equations in Two Variables

MCQ Test, Set 03

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 $y = 3$ in $3x - y = -18$, then $x =$
A. -15 **B.** -7 **C.** 5 **D.** -5
2. Which point lies on the line $2x + 5y = 19$?
A. $(2, 3)$ **B.** $(2, -3)$ **C.** $(-2, 3)$ **D.** $(3, 2)$
3. Which equation, taken with $5x - 2y = 8$, makes a pair with exactly one solution?
A. $10x - 4y = 16$ **B.** $20x - 8y = 34$ **C.** $20x - 8y = 32$ **D.** $20x + 8y = 32$
4. The pair $7x + 5y = -11$ and $2x + 3y = -11$ has
A. exactly two solutions **B.** no solution
C. a unique solution **D.** infinitely many solutions
5. The pair $kx - 3y = -10$, $4x - 4y = -8$ has no solution when $k =$
A. $\frac{16}{3}$ **B.** -3 **C.** 3 **D.** 5
6. The pair $6x + y = 8$ and $18x + 3y = 24$ has
A. a unique solution **B.** no solution
C. exactly two solutions **D.** infinitely many solutions
7. Which equation, taken with $5x + 3y = 6$, makes a pair with infinitely many solutions?
A. $10x + 6y = 12$ **B.** $10x + 6y = 11$ **C.** $10x - 6y = 12$ **D.** $6x + 10y = 12$
8. From $8x + y = 4$, $y =$
A. $-4 - 8x$ **B.** $-4 + 8x$ **C.** $4 + 8x$ **D.** $4 - 8x$
9. Substituting $y = 1 - 4x$ in $7x + 3y = 18$ gives
A. $3x + 1 = 18$ **B.** $-5x + 3 = 18$ **C.** $-12x + 3 = 18$ **D.** $19x + 3 = 18$
10. Solving $2x + y = 10$ and $4x - 3y = 10$ by the substitution method, $(x, y) =$
A. $(4, 2)$ **B.** $(2, 4)$ **C.** $(6, 2)$ **D.** $(10, -10)$
11. Solving $3x - 5y = -26$ and $5x - y = -14$ by the elimination method, $y =$
A. 2 **B.** 4 **C.** -2 **D.** -4

12. Solving $3x - 5y = -12$ and $x - 5y = -14$ by the elimination method, $(x, y) =$
A. $(1, 3)$ **B.** $(-\frac{13}{2}, -\frac{3}{2})$
C. $(3, 1)$ **D.** $(-9, 3)$
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13. For $3x + 2y - 2 = 0$ and $4x + 5y - 12 = 0$, in the cross multiplication method $a_1b_2 - a_2b_1 =$
A. -7 **B.** 7 **C.** -14 **D.** 23
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14. Solving $4x + 5y = 3$ and $5x - 4y = 14$ by the cross multiplication method, $(x, y) =$
A. $(-\frac{1}{2}, -1)$ **B.** $(-1, 2)$ **C.** $(-2, -1)$ **D.** $(2, -1)$
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15. $\frac{x}{6} - \frac{7y}{3} = 3$ without fractions is
A. $6x - 21y = 18$ **B.** $x + 14y = 18$ **C.** $x - 14y = 18$ **D.** $x - 14y = 3$
-
16. The solution of $\frac{5x}{4} - \frac{y}{6} = -3$ and $4x - y = -11$ is $(x, y) =$
A. $(-2, 3)$ **B.** $(-2, -3)$ **C.** $(2, -3)$ **D.** $(3, -2)$
-
17. With $\frac{1}{x} = p$ and $\frac{1}{y} = q$, the equation $\frac{4}{x} - \frac{5}{y} = 10$ becomes
A. $4p + 5q = 10$ **B.** $\frac{p}{4} - \frac{q}{5} = 10$
C. $-5p + 4q = 10$ **D.** $4p - 5q = 10$
-
18. The solution of $\frac{3}{x} - \frac{1}{y} = 4$ and $\frac{3}{x} + \frac{1}{y} = -2$ is $(x, y) =$
A. $(\frac{1}{3}, -3)$ **B.** $(-\frac{1}{3}, 3)$ **C.** $(3, -\frac{1}{3})$ **D.** $(3, \frac{1}{3})$
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19. With $\frac{1}{x} = p$, the equation $\frac{6}{x} + y = 11$ becomes
A. $6p - y = 11$ **B.** $6p + y = 11$ **C.** $\frac{6}{p} + y = 11$ **D.** $\frac{p}{6} + y = 11$
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20. The solution of $\frac{5}{x} + y = 24$ and $\frac{4}{x} + 3y = 28$ is $(x, y) =$
A. $(4, 4)$ **B.** $(-\frac{1}{4}, 4)$ **C.** $(\frac{1}{4}, 4)$ **D.** $(4, \frac{1}{4})$
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21. The solution of $\frac{3}{x-2} + \frac{1}{y+3} = -1$ and $\frac{5}{x-2} - \frac{1}{y+3} = -3$ is $(x, y) =$
A. $(0, -1)$ **B.** $(-2, 2)$
C. $(-4, 5)$ **D.** $(\frac{3}{2}, -\frac{5}{2})$
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22. If $\frac{1}{x+1} = \frac{1}{8}$, then $x =$
A. 8 **B.** 7 **C.** -7 **D.** 9
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23. $\frac{8x-y}{xy} =$
A. $\frac{8}{x} + \frac{1}{y}$ **B.** $\frac{8}{x} - \frac{1}{y}$
C. $\frac{8}{y} + \frac{1}{x}$ **D.** $\frac{8}{y} - \frac{1}{x}$
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24. The solution of $\frac{2}{\sqrt{x}} + \frac{5}{\sqrt{y}} = 2$ and $\frac{4}{\sqrt{x}} + \frac{5}{\sqrt{y}} = 3$ is $(x, y) =$
A. $(25, 4)$ **B.** $(2, 5)$ **C.** $(4, 25)$ **D.** $(4, 5)$
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25. If $\frac{4}{\sqrt{x}} = \frac{2}{3}$, then $x =$

A. 9

B. 6

C. 36

D. 12

Key sheet

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

Solutions

1. If $y = 3$ in $3x - y = -18$, then $x =$

$$3x - (3) = -18$$

$$\Rightarrow 3x - 3 = -18$$

$$\Rightarrow 3x = -18 + 3 = -15$$

$$\Rightarrow x = -5$$

Ans: (D) -5

2. Which point lies on the line $2x + 5y = 19$?

Put each point in $2x + 5y$; only $(2, 3)$ gives 19:

$$2(2) + 5(3) = 4 + 15 = 19$$

Ans: (A) $(2, 3)$

3. Which equation, taken with $5x - 2y = 8$, makes a pair with exactly one solution?

With $20x + 8y = 32$: $\frac{a_1}{a_2} = \frac{5}{20} = \frac{1}{4}$, $\frac{b_1}{b_2} = \frac{-2}{8} = -\frac{1}{4}$, $\frac{c_1}{c_2} = \frac{8}{32} = \frac{1}{4}$

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

Ans: (D) $20x + 8y = 32$

4. The pair $7x + 5y = -11$ and $2x + 3y = -11$ has

$$\frac{a_1}{a_2} = \frac{7}{2}, \frac{b_1}{b_2} = \frac{5}{3}, \frac{c_1}{c_2} = \frac{-11}{-11} = 1$$

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

Ans: (C) a unique solution

5. The pair $kx - 3y = -10$, $4x - 4y = -8$ has no solution when $k =$

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

$$\frac{k}{4} = \frac{-3}{-4}$$

$$\Rightarrow -4k = -12$$

$$\Rightarrow k = 3$$

Check: $\frac{c_1}{c_2} = \frac{-10}{-8} = \frac{5}{4} \neq \frac{3}{4}$, so the pair has no solution.

Ans: (C) 3

6. The pair $6x + y = 8$ and $18x + 3y = 24$ has

$$\frac{a_1}{a_2} = \frac{6}{18} = \frac{1}{3}, \frac{b_1}{b_2} = \frac{1}{3}, \frac{c_1}{c_2} = \frac{8}{24} = \frac{1}{3}$$

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

Ans: (D) infinitely many solutions

7. Which equation, taken with $5x + 3y = 6$, makes a pair with infinitely many solutions?

With $10x + 6y = 12$: $\frac{a_1}{a_2} = \frac{5}{10} = \frac{1}{2}$, $\frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2}$, $\frac{c_1}{c_2} = \frac{6}{12} = \frac{1}{2}$

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

Ans: (A) $10x + 6y = 12$

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

$$8x + y = 4$$

Move the x term to the right: $y = 4 - 8x$

Ans: (D) $4 - 8x$

9. Substituting $y = 1 - 4x$ in $7x + 3y = 18$ gives

$$7x + 3(1 - 4x) = 18$$

$$\Rightarrow 7x + 3 - 12x = 18$$

$$\Rightarrow -5x + 3 = 18$$

Ans: (B) $-5x + 3 = 18$

10. Solving $2x + y = 10$ and $4x - 3y = 10$ by the substitution method, $(x, y) =$

$$2x + y = 10 \quad (1)$$

$$4x - 3y = 10 \quad (2)$$

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

Substitute in (2): $4x - 3(10 - 2x) = 10$

$$\Rightarrow 4x - 30 + 6x = 10$$

$$\Rightarrow 10x - 30 = 10$$

$$\Rightarrow 10x = 10 + 30$$

$$\Rightarrow 10x = 40$$

$$\Rightarrow x = 4$$

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

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

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

11. Solving $3x - 5y = -26$ and $5x - y = -14$ by the elimination method, $y =$

$$3x - 5y = -26 \quad (1)$$

$$5x - y = -14 \quad (2)$$

$$(1) \times 5 \Rightarrow 15x - 25y = -130$$

$$(2) \times 3 \Rightarrow 15x - 3y = -42$$

Subtracting, $-22y = -88$

$$\Rightarrow y = 4$$

$$(1) \Rightarrow 3x - 5(4) = -26$$

$$\Rightarrow 3x - 20 = -26$$

$$\Rightarrow 3x = -26 + 20$$

$$\Rightarrow 3x = -6$$

$$\Rightarrow x = -2$$

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

Ans: (B) 4

12. Solving $3x - 5y = -12$ and $x - 5y = -14$ by the elimination method, $(x, y) =$

$$3x - 5y = -12 \quad (1)$$

$$x - 5y = -14 \quad (2)$$

$$(1) \Rightarrow 3x - 5y = -12$$

$$(2) \times 3 \Rightarrow 3x - 15y = -42$$

$$\text{Subtracting, } 10y = 30$$

$$\Rightarrow y = 3$$

$$(2) \Rightarrow x - 5(3) = -14$$

$$\Rightarrow x - 15 = -14$$

$$\Rightarrow x = -14 + 15$$

$$\Rightarrow x = 1$$

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

Ans: (A) (1, 3)

13. For $3x + 2y - 2 = 0$ and $4x + 5y - 12 = 0$, in the cross multiplication method $a_1b_2 - a_2b_1 =$

$$a_1b_2 - a_2b_1 = (3)(5) - (4)(2) = 15 - 8 = 7$$

Ans: (B) 7

14. Solving $4x + 5y = 3$ and $5x - 4y = 14$ by the cross multiplication method, $(x, y) =$

$$4x + 5y - 3 = 0 \quad (1)$$

$$5x - 4y - 14 = 0 \quad (2)$$

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

$$\frac{x}{-70 - 12} = \frac{y}{-15 + 56} = \frac{1}{-16 - 25}$$

$$\frac{x}{-82} = \frac{y}{41} = \frac{1}{-41}$$

$$\Rightarrow x = \frac{-82}{-41}, y = \frac{41}{-41}$$

$$\therefore (x, y) = (2, -1)$$

Ans: (D) (2, -1)

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

Multiply every term by the LCM 6:

$$\frac{x}{6} - \frac{7y}{3} = 3 \Rightarrow \frac{x - 14y}{6} = 3 \Rightarrow x - 14y = 18$$

Ans: (C) $x - 14y = 18$

16. The solution of $\frac{5x}{4} - \frac{y}{6} = -3$ and $4x - y = -11$ is $(x, y) =$
- $$\frac{5x}{4} - \frac{y}{6} = -3 \Rightarrow \frac{15x-2y}{12} = -3 \Rightarrow 15x - 2y = -36 \quad (1)$$
- $$4x - y = -11 \quad (2)$$
- $$(1) \times 4 \Rightarrow 60x - 8y = -144$$
- $$(2) \times 15 \Rightarrow 60x - 15y = -165$$
- Subtracting, $7y = 21$
- $$\Rightarrow y = 3$$
- $$(2) \Rightarrow 4x - (3) = -11$$
- $$\Rightarrow 4x - 3 = -11$$
- $$\Rightarrow 4x = -11 + 3$$
- $$\Rightarrow 4x = -8$$
- $$\Rightarrow x = -2$$
- $$\therefore (x, y) = (-2, 3)$$
- Ans: (A) $(-2, 3)$**
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17. With $\frac{1}{x} = p$ and $\frac{1}{y} = q$, the equation $\frac{4}{x} - \frac{5}{y} = 10$ becomes
- $$\frac{4}{x} = 4 \times \frac{1}{x} = 4p \text{ and } \frac{5}{y} = 5q$$
- So $4p - 5q = 10$
- Ans: (D) $4p - 5q = 10$**
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18. The solution of $\frac{3}{x} - \frac{1}{y} = 4$ and $\frac{3}{x} + \frac{1}{y} = -2$ is $(x, y) =$
- Let $\frac{1}{x} = p$ and $\frac{1}{y} = q$.
- $$3p - q = 4 \quad (1)$$
- $$3p + q = -2 \quad (2)$$
- Subtracting, $-2q = 6$
- $$\Rightarrow q = -3$$
- $$(1) \Rightarrow 3p - (-3) = 4$$
- $$\Rightarrow 3p + 3 = 4$$
- $$\Rightarrow 3p = 4 - 3$$
- $$\Rightarrow 3p = 1$$
- $$\Rightarrow p = \frac{1}{3}$$
- $$\therefore (p, q) = \left(\frac{1}{3}, -3\right)$$
- $$\frac{1}{x} = \frac{1}{3} \Rightarrow x = 3$$
- $$\frac{1}{y} = -3 \Rightarrow y = -\frac{1}{3}$$
- $$\therefore (x, y) = \left(3, -\frac{1}{3}\right)$$
- Ans: (C) $\left(3, -\frac{1}{3}\right)$**
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19. With $\frac{1}{x} = p$, the equation $\frac{6}{x} + y = 11$ becomes
- $$\frac{6}{x} = 6 \times \frac{1}{x} = 6p$$
- So $6p + y = 11$
- Ans: (B) $6p + y = 11$**
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20. The solution of $\frac{5}{x} + y = 24$ and $\frac{4}{x} + 3y = 28$ is $(x, y) =$

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

$$5p + y - 24 = 0 \quad (1)$$

$$4p + 3y - 28 = 0 \quad (2)$$

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

$$\frac{p}{-28+72} = \frac{y}{-96+140} = \frac{1}{15-4}$$

$$\frac{p}{44} = \frac{y}{44} = \frac{1}{11}$$

$$\Rightarrow p = \frac{44}{11}, y = \frac{44}{11}$$

$$\therefore (p, y) = (4, 4)$$

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

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

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

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

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

$$3p + q = -1 \quad (1)$$

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

$$(1) \Rightarrow q = -1 - 3p$$

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

$$\Rightarrow 5p + 1 + 3p = -3$$

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

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

$$\Rightarrow 8p = -4$$

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

$$(1) \Rightarrow q = -1 - 3\left(-\frac{1}{2}\right) = \frac{1}{2}$$

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

$$\frac{1}{x-2} = -\frac{1}{2} \Rightarrow x - 2 = -2 \Rightarrow x = 0$$

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

$$\therefore (x, y) = (0, -1)$$

Ans: (A) $(0, -1)$

22. If $\frac{1}{x+1} = \frac{1}{8}$, then $x =$

$$\frac{1}{x+1} = \frac{1}{8} \Rightarrow x + 1 = 8$$

$$\Rightarrow x = 7$$

Ans: (B) 7

23. $\frac{8x-y}{xy} =$

$$\text{Divide each term by } xy: \frac{8x-y}{xy} = \frac{8x}{xy} - \frac{y}{xy}$$

$$= \frac{8}{y} - \frac{1}{x}$$

Ans: (D) $\frac{8}{y} - \frac{1}{x}$

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

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

$$2p + 5q = 2 \quad (1)$$

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

$$(1) \times 2 \Rightarrow 4p + 10q = 4$$

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

Subtracting, $5q = 1$

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

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

$$\Rightarrow 2p + 1 = 2$$

$$\Rightarrow 2p = 2 - 1$$

$$\Rightarrow 2p = 1$$

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

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

$$\frac{1}{\sqrt{x}} = \frac{1}{2} \Rightarrow \sqrt{x} = 2 \Rightarrow x = 4$$

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

$$\therefore (x, y) = (4, 25)$$

Ans: (C) (4, 25)

25. If $\frac{4}{\sqrt{x}} = \frac{2}{3}$, then $x =$

$$\sqrt{x} = 6$$

$$\Rightarrow x = 6^2 = 36$$

Ans: (C) 36
