Class 9 Maths Chapter 13: Two Variables, One Line - Notes, Important Questions and MCQs (2026-27)

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These Class 9 Maths Chapter 13 notes (Part II, Chapter 13) cover “Two Variables, One Line” from the new NCERT textbook Ganita Manjari (Part II, 2026-27): linear equations in two variables and their standard form, solutions and graphs, slope and the slope-intercept form y = mx + d, pairs of linear equations solved by substitution, elimination and graphs, and conditions for unique, no or infinitely many solutions – with tables, worked examples, Q&A, 10 MCQs and a free PDF.

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Chapter Overview

An equation like 2x + 3y = 12 links two unknowns. It is a linear equation in two variables, with standard form ax + by + c = 0 (a and b not both zero). Such an equation has infinitely many solutions, and when all of them are plotted they form a straight line – every point on the line is a solution and every solution is on the line.

The steepness of the line is its slope, the ratio of vertical change to horizontal change, and the slope-intercept form y = mx + d shows the slope m and y-intercept d directly. Two such equations together can be solved by substitution, elimination or graphs; their lines may intersect, be parallel or coincide.

Important Topics and Concepts

Linear Equations in Two Variables

- Standard form: $ax + by + c = 0$, with a and b not both zero.
- Examples: $2x + 3y - 12 = 0$; $y = 4x$ (i.e. $4x - y = 0$).
- Real-life: cost of x kg apples and y kg bananas totalling ₹200.
- Rewrite equations to identify a, b and c.

Solutions and Graphs

- A solution is a pair (x, y) that makes the equation true.
- There are infinitely many solutions – choose x, find y.
- Plotting solutions gives a straight line.
- Every point on the line is a solution; every solution lies on the line.

Slope

- Slope = vertical change ÷ horizontal change (rise ÷ run).
- For points (x_1, y_1) and (x_2, y_2): $m = (y_2 - y_1)/(x_2 - x_1)$.
- Positive slope: line rises left to right; negative: falls; zero: horizontal; vertical lines have undefined slope.
- The slope is the same between any two points on a line.

Slope-Intercept Form

- $y = mx + d$: m is the slope, d is the y-intercept (line cuts y-axis at (0, d)).
- Convert $ax + by + c = 0$ to $y = (-a/b)x - c/b$ when $b \neq 0$.
- Lines with the same slope are parallel.
- Useful for quickly sketching graphs.

Pairs of Linear Equations

- Substitution: express one variable from one equation and substitute into the other.
- Elimination: multiply equations to make coefficients equal, then add or subtract to remove one variable.
- Graphical: draw both lines; their intersection is the solution.
- For $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$: $a_1/a_2 \neq b_1/b_2 \rightarrow$ unique solution (intersecting); $a_1/a_2 = b_1/b_2 \neq c_1/c_2 \rightarrow$ no solution (parallel); $a_1/a_2 = b_1/b_2 = c_1/c_2 \rightarrow$ infinitely many (coincident).

Worked Examples

Board-pattern practice.

- Slope of the line through (1, 2) and (4, 11). $(11 - 2)/(4 - 1) = 3$.
- Write $3x - 2y + 6 = 0$ in slope-intercept form. $y = (3/2)x + 3$; slope 3/2, intercept 3.
- Solve $x + y = 10$, $x - y = 4$ by elimination. Add: $2x = 14 \rightarrow x = 7$, $y = 3$.
- Solve $y = 2x - 1$ and $3x + y = 9$ by substitution. $3x + 2x - 1 = 9 \rightarrow x = 2$, $y = 3$.
- Nature of $2x + 3y = 5$ and $4x + 6y = 7$. $2/4 = 3/6 \neq 5/7 \rightarrow$ parallel, no solution.

Consistency of a Pair of Linear Equations

Condition	Graph	Solutions
$a_1/a_2 \neq b_1/b_2$	Lines intersect at one point	Unique solution
$a_1/a_2 = b_1/b_2 \neq c_1/c_2$	Parallel lines	No solution
$a_1/a_2 = b_1/b_2 = c_1/c_2$	Coincident lines	Infinitely many

Important Terms and Formulas

Term	Meaning
Linear equation in two variables	ax + by + c = 0, a and b not both 0
Solution	Pair (x, y) satisfying the equation
Graph	Straight line of all solutions
Slope (m)	$(y_2 – y_1)/(x_2 – x_1)$
y-intercept	Value where line meets y-axis
Slope-intercept form	y = mx + d
Substitution method	Replace one variable using the other equation
Elimination method	Remove a variable by adding/subtracting
Consistent pair	Has at least one solution
Inconsistent pair	Has no solution (parallel lines)

Short Answer Questions

Q1. Write the standard form of a linear equation in two variables.

ax + by + c = 0, where a and b are not both zero.

Q2. How many solutions does 2x + y = 7 have?

Infinitely many.

Q3. Is (2, 3) a solution of 2x + y = 7?

Yes, 4 + 3 = 7.

Q4. Find the slope of the line through (0, 0) and (2, 6).

3.

Q5. What are m and d in y = mx + d?

m is the slope and d is the y-intercept.

Q6. When are two lines parallel?

When they have the same slope but different intercepts.

Q7. Solve x = 2y and x + y = 9.

3y = 9 → y = 3, x = 6.

The unique solution of the pair of equations.

Long Answer Questions

Q1. Two pens and three notebooks cost ₹110; one pen and two notebooks cost ₹65. Find the cost of each.

2p + 3n = 110 and p + 2n = 65.

From the second: p = 65 – 2n.

Substitute: 2(65 – 2n) + 3n = 110 → 130 – n = 110 → n = 20.

p = 65 – 40 = 25.

Pen ₹25, notebook ₹20.

Q2. Solve 3x + 2y = 16 and 2x – y = 6 by elimination and verify graphically.

Multiply the second by 2: 4x – 2y = 12.

Add to the first: 7x = 28 → x = 4.

Then 2(4) – y = 6 → y = 2.

Plot both lines; they meet at (4, 2).

Check: 12 + 4 = 16 ✓, 8 – 2 = 6 ✓.

Q3. Explain slope using two points and show it is the same for any two points on y = 2x + 1.

Slope = rise ÷ run between two points.

Points (0, 1) and (1, 3): slope = 2/1 = 2.

Points (2, 5) and (5, 11): slope = 6/3 = 2.

Same ratio everywhere – a line has constant slope.

This equals m = 2 in y = mx + d.

MCQs with Answers

1. Number of solutions of x + y = 5(a) one (b) two (c) infinitely many (d) noneAnswer: (c) infinitely many

2. Slope of y = –4x + 7(a) 7 (b) –4 (c) 4 (d) –7Answer: (b) –4

3. y-intercept of y = 3x – 2(a) 3 (b) –2 (c) 2 (d) 0Answer: (b) –2

4. Slope through (2, 3) and (6, 11)(a) 2 (b) 4 (c) 8 (d) 1/2Answer: (a) 2

5. Lines with equal slopes and different intercepts are(a) intersecting (b) parallel (c) coincident (d) perpendicularAnswer: (b) parallel

6. x + 2y = 4 and 2x + 4y = 8 have(a) no solution (b) one solution (c) infinitely many (d) two solutionsAnswer: (c) infinitely many

7. x + y = 3 and x + y = 5 have(a) no solution (b) one solution (c) infinite (d) twoAnswer: (a) no solution

8. Solution of x + y = 7, x – y = 1(a) (4, 3) (b) (3, 4) (c) (5, 2) (d) (6, 1)Answer: (a) (4, 3)

10. Slope of a horizontal line is(a) 1 (b) 0 (c) undefined (d) –1Answer: (b) 0

Quick Revision Points

- ax + by + c = 0 (a, b not both 0).
- Infinitely many solutions; graph is a line.
- Slope = $(y_2 – y_1)/(x_2 – x_1)$.
- y = mx + d: slope m, intercept d.
- Substitution, elimination, graphical methods.
- Ratio test: unique / none / infinite.

Chapter Summary

A linear equation in two variables, ax + by + c = 0, has infinitely many solutions that form a straight line on the graph. The slope of the line – rise over run – is constant, and the slope-intercept form y = mx + d shows the slope and y-intercept directly.

A pair of linear equations can be solved by substitution, elimination or graphing. Comparing the ratios a_1/a_2, b_1/b_2 and c_1/c_2 tells whether the lines intersect (unique solution), are parallel (no solution) or coincide (infinitely many solutions).

Exam Tips and PYQ Pattern

- Always verify solutions in both equations.
- Learn the ratio table for consistency.
- Convert to y = mx + d before sketching.
- Choose the method that avoids fractions.
- Label lines and the intersection point on graphs.

Frequently Asked Questions

Is this chapter in the 2026-27 CBSE syllabus?

Yes. It is part of the new NCERT Class 9 Maths textbook “Ganita Manjari” (Part II), prescribed for the 2026-27 session.

Can I download these notes as a PDF?

Yes. Use the free PDF link at the top of this page – no signup needed.

How many solutions does a linear equation in two variables have?

Infinitely many; all of them lie on a straight line.

How do you know if a pair of linear equations has no solution?

If $a_1/a_2 = b_1/b_2 \neq c_1/c_2$, the lines are parallel and there is no solution.

Conclusion

Two Variables, One Line connects algebra with straight-line graphs. Learn the consistency table, practise the worked examples here and save the free PDF for revision.

More Notes: Class 9 Maths Chapter 12: Quadrilaterals notes | Class 9 Maths Chapter 14: Math of Space: Surface Area and Volume notes | All Class 9 Maths notes

Author Bio: Written and reviewed by the Nextoper Editorial Team, a group of CBSE mathematics educators who build chapter notes directly from the NCERT textbook and past board paper patterns.

Freshness Note: These notes follow the NCERT Class 9 Maths textbook, Ganita Manjari (Parts I and II, first edition 2026, NCF-SE 2023), and the CBSE syllabus for the 2026-27 session. Last checked on 24 November 2026.