

$$x - y = 3$$

NCERT - GRADE 10 CHEAT SHEET

PAIR OF LINEAR EQUATIONS IN TWO VARIABLES



1 CHAPTER SNAPSHOT

- ★ **Standard Form:** A pair of linear equations in two variables is of the form $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$, where a_1, b_1, c_1 and a_2, b_2, c_2 are real numbers and $a_1b_2 - a_2b_1 \neq 0$.
- ★ **Graph:** The solution of a pair of linear equations is the point of intersection of the two lines.
- ★ **Methods of Solving:**
 1. Graphical Method
 2. Substitution Method
 3. Elimination Method

Key Terms

- Linear Equation
- Solution
- Consistent
- Inconsistent
- Unique Solution
- Infinite Solutions

3 FORMULA BANK

ALGEBRAIC METHODS FORMULA BANK

SUBSTITUTION Method

- **Key Idea:** Find one variable in terms of the other from one equation and substitute.

- Core Flow:

1. Solve one eq. for x.
2. Sub into other eq.
3. Solve for y.
4. Sub y value back into first eq. to find x.

ELIMINATION Method

- **Key Idea:** Make coefficients of one variable equal, then add or subtract to eliminate.

- Core Flow:

1. Multiply eqs to match coefficients
2. Add/subtract to eliminate variable.
3. Solve for remaining variable.
4. Sub value back to find first variable.

5 SMART REVISION TIPS

- ★ Always verify that the solution satisfies both equations.
- ★ Look for pairs of factors where the product is $a_1b_1 - a_2b_1$ (not zero).
- ★ For word problems, clearly identify the given and required variables.
- ★ While solving, write the steps neatly and check the answer in the original equations.

6 COMMON MISTAKES

- ✗ Taking $a_1 = 0$ (which makes it a non-linear equation).
- ✗ Incorrect sign while using substitution or elimination.
- ✗ Forgetting to check the solution in both equations.
- ✗ Writing $a = b$ instead of $a_1b_2 - a_2b_1$.
- ✗ Arithmetic errors while solving.

8 30-SECOND RAPID REVISION



- **Form:** $a_1x + b_1y + c_1 = 0$, $a_2x + b_2y + c_2 = 0$.
- **Graph:** Intersection point (x, y)
- **Determinant (D):** $D = a_1b_2 - a_2b_1$

2 HIGH-YIELD CONCEPTS

- ★ A pair of linear equations in two variables:
 $a_1x + b_1y + c_1 = 0$ and $a_2x + b_2y + c_2 = 0$
where $a_1, b_1, c_1, a_2, b_2, c_2 \in \mathbb{R}$ and $a_1b_2 - a_2b_1 \neq 0$.
- ★ **Algebraic Method:**
 - Represent the equations as lines on a graph.
 - The point of intersection gives the solution (x, y) .
- ★ **Algebraic Methods:**
 - **Substitution Method:** Express one variable in terms of the other.
 - **Elimination Method:** Add or subtract the equations to eliminate a variable.

$$a_1x + b_1y + c_1 = 0 \quad \text{and} \quad a_2x + b_2y + c_2 = 0$$

4 BOARD EXAM FOCUS & COMMON MISTAKES

Frequently Asked Questions

- ✓ Find the nature of solutions (consistent or inconsistent).
- ✓ Find the value of a variable using substitution/elimination.
- ✓ Find the coordinates of the point of intersection.
- ✓ Form a pair of linear equations from a given situation (e.g., age, cost, distance).

Key Pro Tips

- ★ Check the signs of a, b, c carefully.
- ★ Use the substitution method when one variable has coefficient 1 or -1.
- Value-based word problems (Speed, Age, Fractions).
- Solving complex systems (e.g., u, v method).
- ★ Verify the solution in both equations.

7 EXAMPLES (ALGEBRAIC METHODS)

Detailed Substitution

$$\begin{aligned} 2x + y &= 8 \\ x + 2y &= 10 \\ \hline 2x + y &= 8 \\ \Rightarrow 2x + 2y &= 10 \\ \Rightarrow y &= 4 \\ \Rightarrow y &= 4 \\ \Rightarrow x &= 2 \\ \Rightarrow y &= 4 \end{aligned}$$

Detailed Elimination

$$\begin{aligned} 2x + y &= 8 \\ x + 2y &= 10 \\ \hline x + 2y &= 10 \quad (\text{by } 2) \\ x + 2y &= 10 \\ - \quad x &= -2 \\ \hline x &= 2 \\ x &= 2 \\ y &= 4 \end{aligned}$$

- **Core Question:** Which method is faster?
- **Quick Recall Check:**
 - Unique Sol.: $\frac{a_1}{a_2} \neq \frac{b_1}{b_2}$
 - No Sol.: $0 = 1$
 - No Sol.: $0 = 1$
 - Inf. Sol.: $0 = 0$
- **Verify:** (x, y) in equations.

★ KEY TAKEAWAY:



NCERT

Master the logic, ace the exam! - Pumpa