CLASS 10 · MATHEMATICS · CHAPTER 3

Pair of Linear Equations - NCERT Examples

Examples 1-10 with independently verified solutions.

CHAPTER	RESOURCE	SOURCE
Pair of Linear Equations in Two Variables	NCERT Examples	NCERT Mathematics, Reprint 2026-27

PART 1

Verified NCERT questions and solutions

Verified NCERT questions and solutions

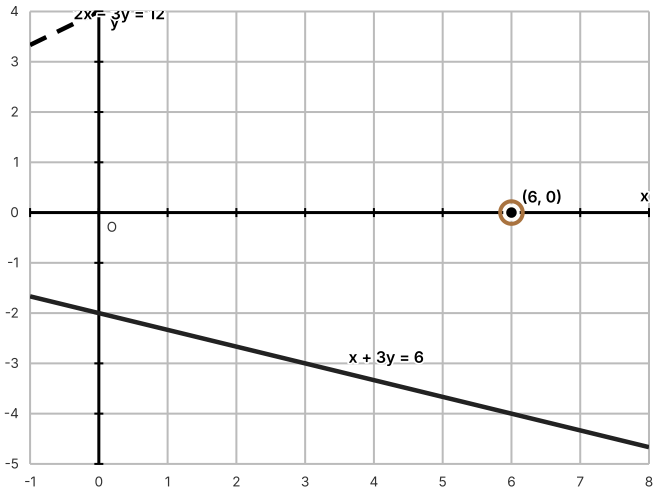
Solutions are checked independently and follow the supplied NCERT chapter edition.

NCERT EXAMPLE

Example 1

graphical method · unique solution

Check graphically whether x + 3y = 6 and 2x − 3y = 12 are consistent. If so, solve them graphically.



The lines intersect at (6, 0).

Solution

Use (0, 2) and (6, 0) for the first line; use (0, −4), (3, −2) and (6, 0) for the second.

The lines intersect once, so the pair is consistent.

$$6 + 3(0) = 6, \qquad 2(6) - 3(0) = 12$$

Final answer

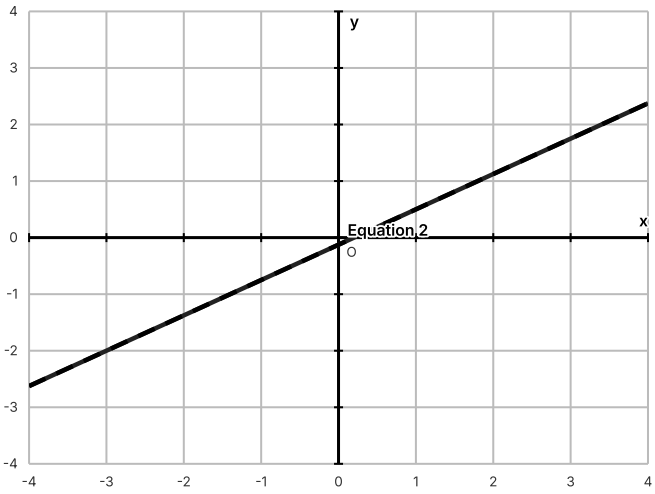
$$x = 6, \qquad y = 0$$

NCERT EXAMPLE

Example 2

graphical method · coincident lines

Graphically decide whether 5x − 8y + 1 = 0 and 3x − (24/5)y + 3/5 = 0 have no, one or infinitely many solutions.



The two equations form coincident lines.

Solution

$$\frac{5}{3}\left(3x - \frac{24}{5}y + \frac{3}{5}\right) = 5x - 8y + 1 = 0$$

The equations represent the same line; every point on it satisfies both.

Final answer

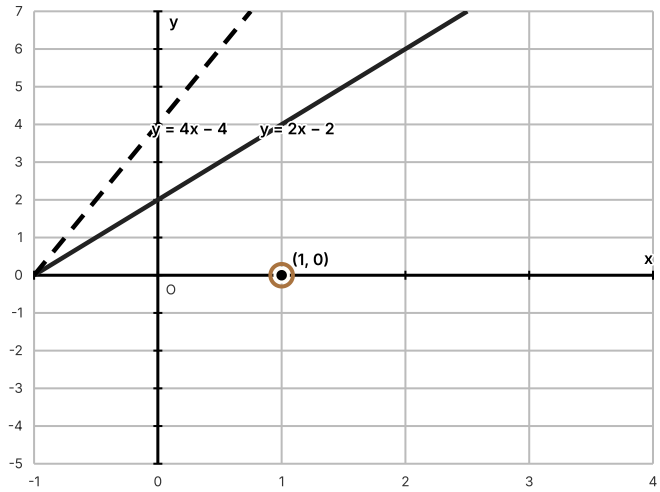
The pair has infinitely many solutions.

NCERT EXAMPLE

Example 3

graphical method · word problem

The number of skirts Champa bought is two less than twice the pants, and four less than four times the pants. Find both numbers.



The lines intersect at (1, 0).

Solution

Let x be pants and y be skirts.

$$y = 2x - 2, \qquad y = 4x - 4$$

Plot (0, −2), (2, 2) and (0, −4), (1, 0).

The intersection (1, 0) satisfies both statements.

Final answer

Champa bought 1 pant and no skirt.

NCERT EXAMPLE

Example 4

substitution method

Solve 7x − 15y = 2 and x + 2y = 3 by substitution.

Solution

$$x = 3 - 2y$$

$$7(3 - 2y) - 15y = 2 \Rightarrow -29y = -19$$

$$y = \frac{19}{29}, \qquad x = 3 - \frac{38}{29} = \frac{49}{29}$$

$$7\left(\frac{49}{29}\right) - 15\left(\frac{19}{29}\right) = 2, \quad \frac{49}{29} + 2\left(\frac{19}{29}\right) = 3$$

Final answer

$$x = \frac{49}{29}, \qquad y = \frac{19}{29}$$

NCERT EXAMPLE

Example 5

substitution method · graphical method · age problem

Seven years ago Aftab was seven times his daughter's age; three years from now he will be three times her age. Represent and solve the situation.

Solution

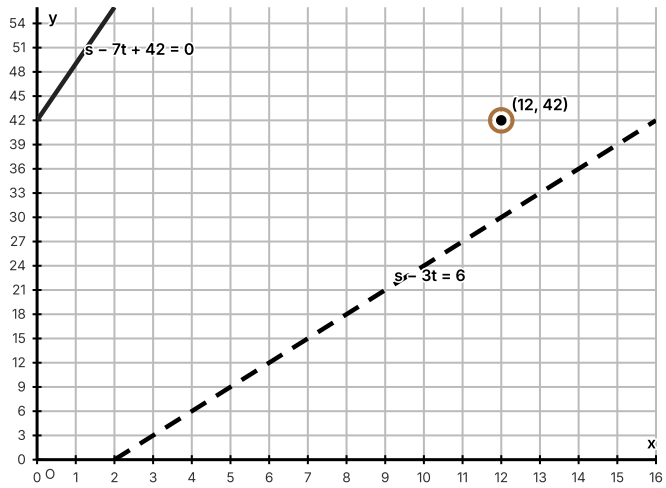
Let s and t be their present ages.

$$s - 7 = 7(t - 7) \Rightarrow s - 7t + 42 = 0$$

$$s + 3 = 3(t + 3) \Rightarrow s - 3t = 6$$

$$s = 3t + 6 \Rightarrow 3t + 6 - 7t + 42 = 0$$

$$t = 12, \qquad s = 42$$



Horizontal axis t; vertical axis s. The lines intersect at (12, 42).

The ages become 35 and 5 seven years ago, and 45 and 15 three years later.

Final answer

Aftab is 42 and his daughter is 12.

NCERT EXAMPLE

Example 6

substitution method · dependent equations

Two pencils and three erasers cost ₹9; four pencils and six erasers cost ₹18. Find each price.

Solution

Let the prices be x and y rupees.

$$2x + 3y = 9, \qquad 4x + 6y = 18$$

$$x = \frac{9 - 3y}{2}$$

Substitution in the second equation gives 18 = 18. The second equation is twice the first, so no unique pair of prices is determined.

Final answer

There are infinitely many solutions; the individual prices cannot be found uniquely.

NCERT EXAMPLE

Example 7

substitution method · parallel lines

Rails are represented by x + 2y − 4 = 0 and 2x + 4y − 12 = 0. Will they cross?

Solution

$$x = 4 - 2y$$

$$2(4 - 2y) + 4y - 12 = 0 \Rightarrow -4 = 0$$

The contradiction proves that the parallel lines have no common point.

Final answer

The rails will not cross.

NCERT EXAMPLE

Example 8

elimination method · word problem

Income ratio is 9 : 7, expenditure ratio is 4 : 3, and each person saves ₹2000 monthly. Find their incomes.

Solution

Let incomes be ₹9x and ₹7x and expenditures be ₹4y and ₹3y.

$$9x - 4y = 2000, \qquad 7x - 3y = 2000$$

$$27x - 12y = 6000, \qquad 28x - 12y = 8000$$

$$x = 2000, \qquad y = 4000$$

$$9x = 18000, \qquad 7x = 14000$$

The expenditures are ₹16000 and ₹12000, ratio 4 : 3; each saving is ₹2000.

Final answer

The monthly incomes are ₹18,000 and ₹14,000.

NCERT EXAMPLE

Example 9

elimination method · inconsistent equations

Use elimination to find all solutions of 2x + 3y = 8 and 4x + 6y = 7.

Solution

$$2(2x + 3y = 8) \Rightarrow 4x + 6y = 16$$

Subtracting the second original equation gives 0 = 9, which is impossible.

Final answer

The pair has no solution.

NCERT EXAMPLE

Example 10

elimination method · digits problem

A two-digit number plus its reversal is 66. Its digits differ by 2. Find all such numbers.

Solution

Let x and y be the tens and units digits.

$$(10x + y) + (10y + x) = 66 \Rightarrow x + y = 6$$

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

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

Both numbers sum with their reversals to 66.

Final answer

The numbers are 42 and 24.