

Pair of Linear Equations - Exercise 3.1

Exercise 3.1 with independently verified solutions.

CHAPTER

Pair of Linear Equations in Two
Variables

RESOURCE

NCERT Exercises

SOURCE

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.

QUESTION

Question 1

graphical method · word problems

Form equations and solve graphically.

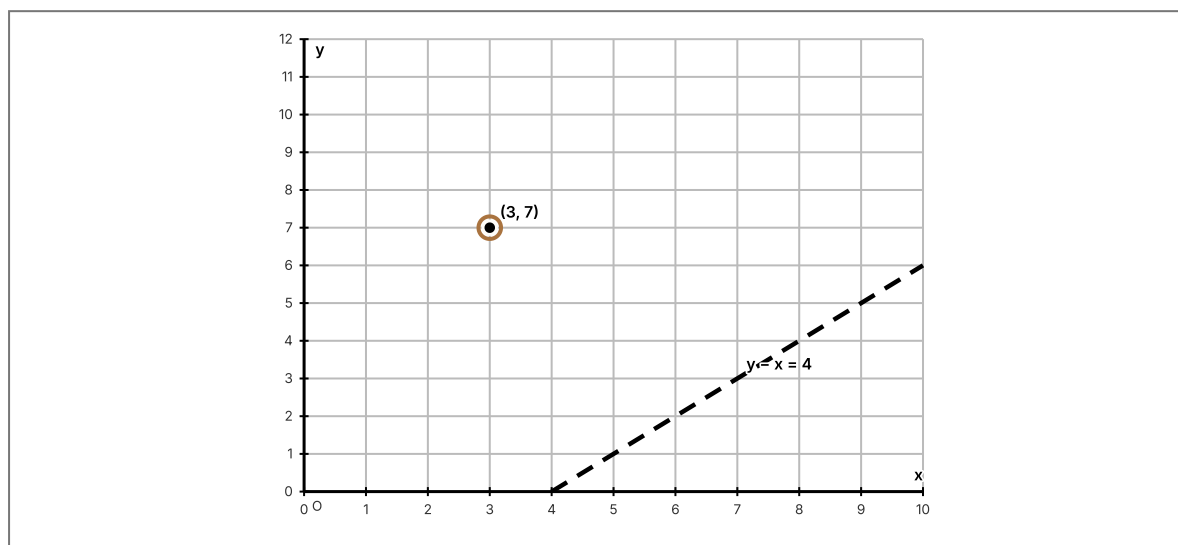
1. Ten students joined a quiz. Girls were 4 more than boys.
2. Five pencils and seven pens cost ₹50; seven pencils and five pens cost ₹46.

Solution

1.

$$x + y = 10, y - x = 4$$

Plot $(0,10), (10,0)$ and $(0,4), (3,7)$.



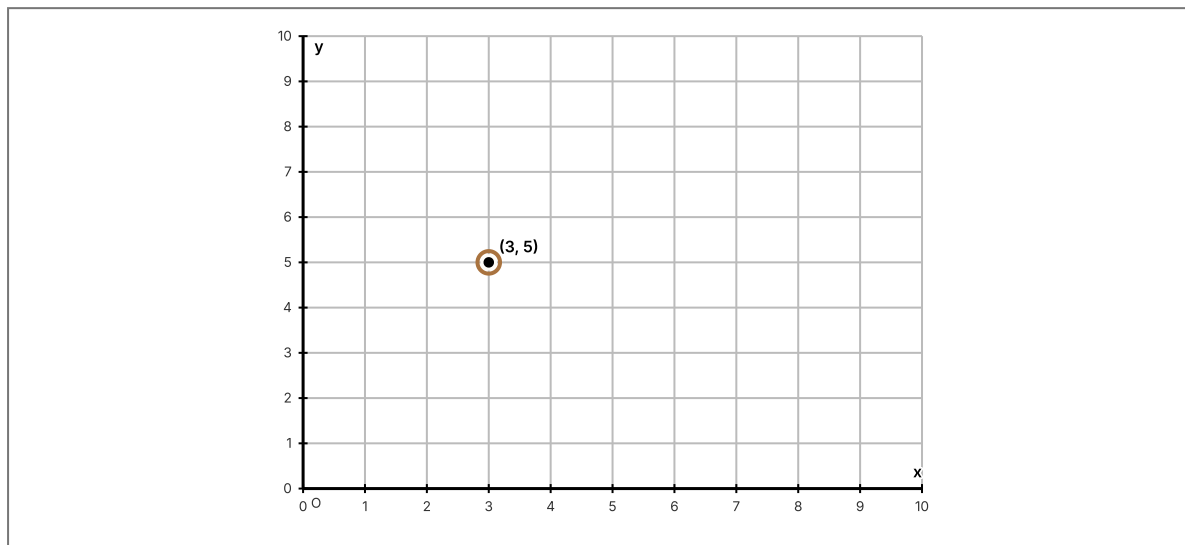
The intersection gives 3 boys and 7 girls.

The intersection is $(3,7)$.

2.

$$5x + 7y = 50, 7x + 5y = 46$$

Plot $(3,5), (10,0)$ and $(3,5), (-2,12)$.



The intersection gives ₹3 per pencil and ₹5 per pen.

The intersection is $(3,5)$; both costs verify.

Final answer

There were 3 boys and 7 girls. A pencil costs ₹3 and a pen ₹5.

QUESTION

Question 2

coefficient ratios · line relationships

Use coefficient ratios to classify each pair.

1.

$$5x - 4y + 8 = 0; 7x + 6y - 9 = 0$$

2.

$$9x + 3y + 12 = 0; 18x + 6y + 24 = 0$$

3.

$$6x - 3y + 10 = 0; 2x - y + 9 = 0$$

Solution

1. $\frac{5}{7} \neq \frac{-4}{6}$

Intersecting.

2. $\frac{9}{18} = \frac{3}{6} = \frac{12}{24}$

Coincident.

3. $\frac{6}{2} = \frac{-3}{-1} \neq \frac{10}{9}$

Parallel.

QUESTION

Question 3

consistent equations · coefficient ratios

Use coefficient ratios to decide consistency.

1. $3x + 2y = 5; 2x - 3y = 7$

2. $2x - 3y = 8; 4x - 6y = 9$

3. $\frac{3}{2}x + \frac{5}{3}y = 7; 9x - 10y = 14$

4. $5x - 3y = 11; -10x + 6y = -22$

5. $\frac{4}{3}x + 2y = 8; 2x + 3y = 12$

Solution

1. Coefficient ratios differ: consistent, unique solution.

-
2. x and y ratios agree but constant ratio differs: inconsistent.
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3. Coefficient ratios differ: consistent, unique solution.
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4. All ratios agree: dependent and consistent, infinitely many solutions.
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5. All ratios are 2/3: dependent and consistent, infinitely many solutions.
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QUESTION

Question 4

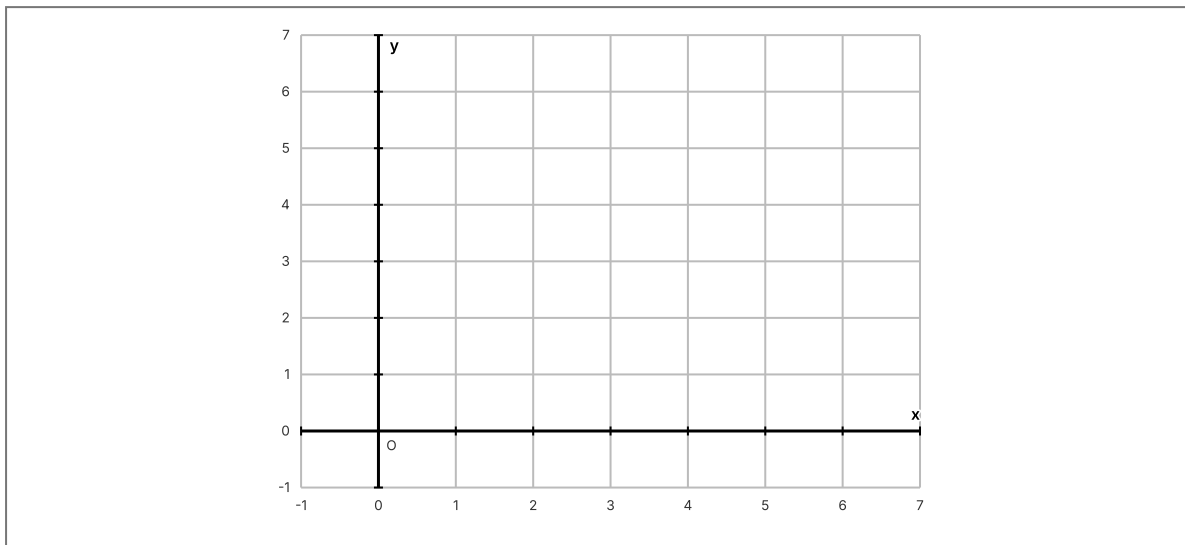
graphical method · consistency

Classify each pair; obtain graphical solutions for consistent pairs.

1. $x + y = 5; 2x + 2y = 10$
2. $x - y = 8; 3x - 3y = 16$
3. $2x + y - 6 = 0; 4x - 2y - 4 = 0$
4. $2x - 2y - 2 = 0; 4x - 4y - 5 = 0$

Solution

1.

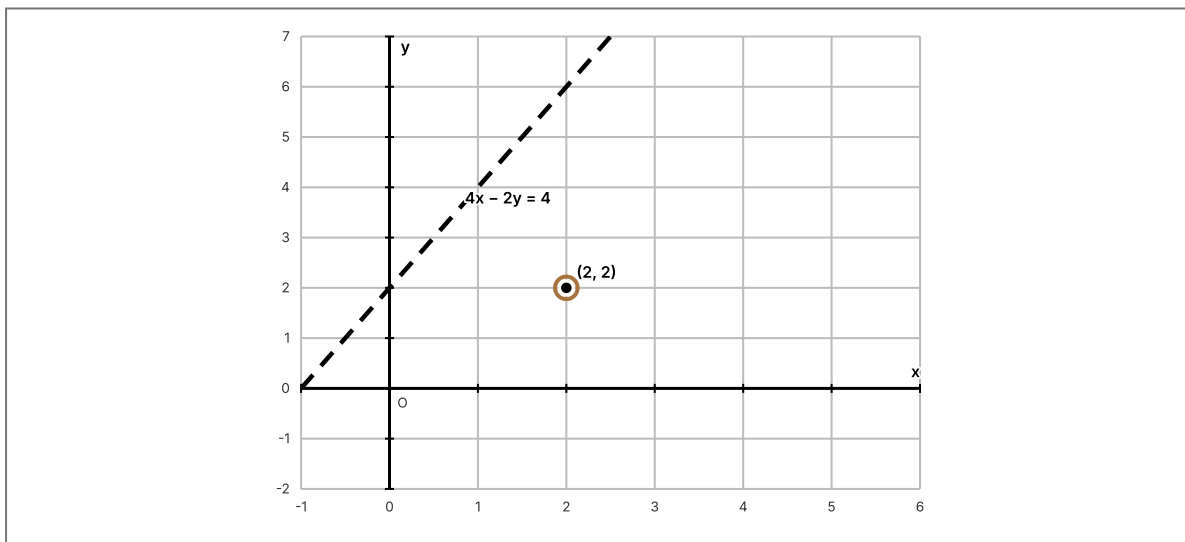


The coincident pair has infinitely many solutions.

Coincident: consistent with infinitely many solutions.

2. Parallel: inconsistent, no solution.

3.



The lines intersect at $(2, 2)$.

Intersecting: consistent with unique solution $(2, 2)$, which verifies both equations.

4. Parallel: inconsistent, no solution.

QUESTION

Question 5

word problem

Half the perimeter of a rectangular garden is 36 m and its length is 4 m more than its width. Find its dimensions.

Solution

Let length be l and width w .

$$l + w = 36, \quad l - w = 4$$

$$2l = 40 \Rightarrow l = 20, \quad w = 16$$

The sum is 36 and difference is 4.

Final answer

Length 20 m; width 16 m.

QUESTION

Question 6

forming equations · line relationships

With $2x + 3y - 8 = 0$, give another equation producing each line relationship.

1. Intersecting
2. Parallel
3. Coincident

Solution

One valid set is:

1. $x + y - 1 = 0$

Coefficient ratios differ.

2. $4x + 6y - 9 = 0$

x and y ratios agree; constant ratio differs.

3. $4x + 6y - 16 = 0$

All coefficients are doubled.

QUESTION

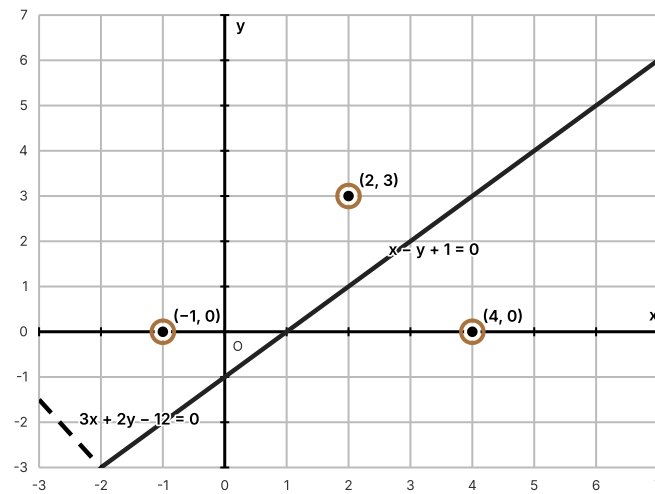
Question 7

graphical method · coordinate geometry

Draw $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Find the triangle vertices formed with the x-axis and shade the region.

Solution

Use $(-1,0), (0,1), (2,3)$ for the first line and $(4,0), (0,6), (2,3)$ for the second.



The triangle vertices are $(-1, 0)$, $(4, 0)$, and $(2, 3)$.

The x-intercepts and common point give the three vertices.

Final answer

Vertices: $(-1, 0)$, $(4, 0)$, $(2, 3)$.