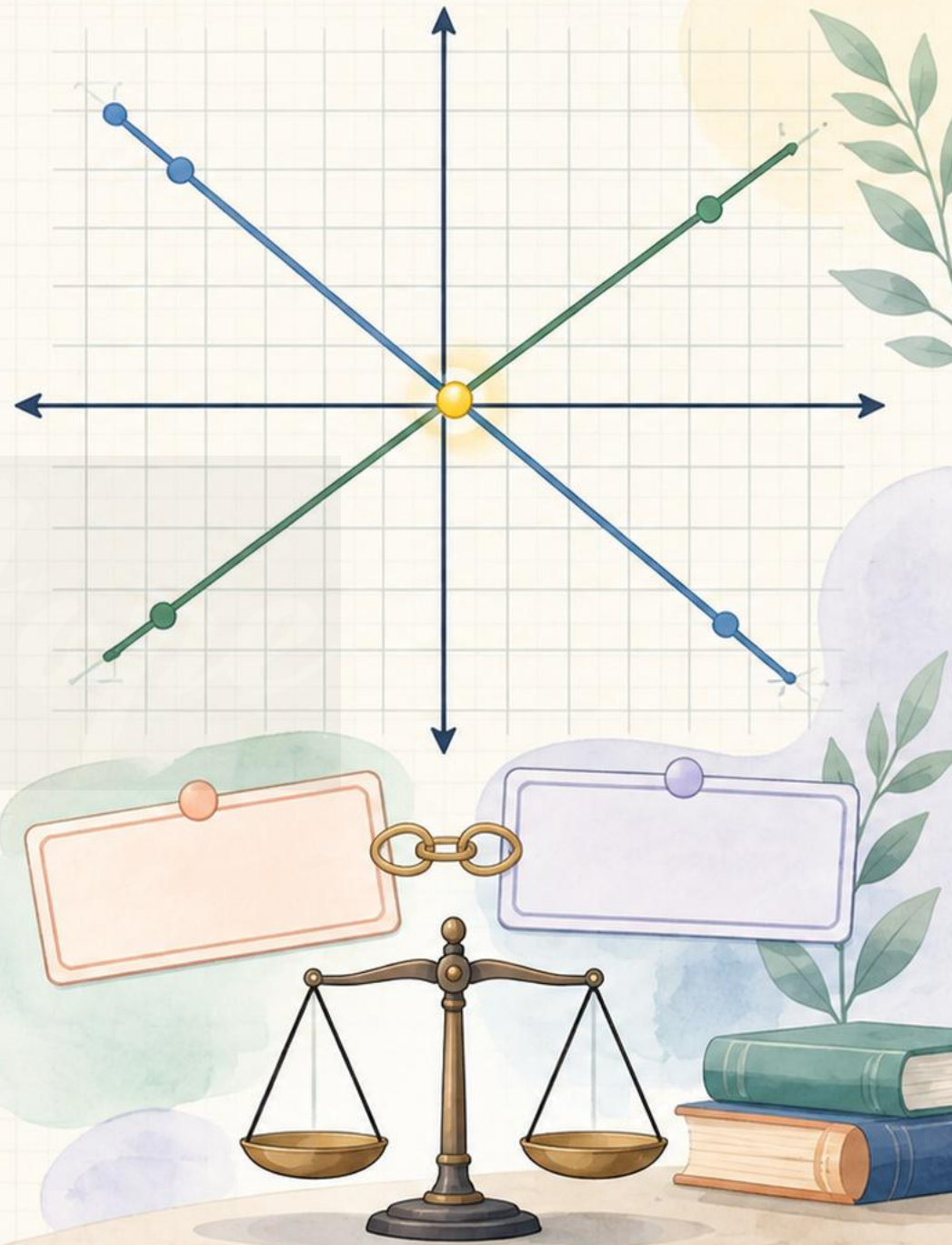


MATHEMATICS • CLASS 10

CHAPTER 3

Pair of Linear Equations in Two Variables

NCERT SOLUTIONS



EXERCISE 3.1 – Q1 (i)

Q1(i). Ten Class X students took part in a Mathematics quiz. There were 4 more girls than boys. Form equations and solve graphically.

Let x = number of boys, y = number of girls.

$$x + y = 10$$

$$y - x = 4$$

Points for $x + y = 10$: $(0,10)$, $(10,0)$.

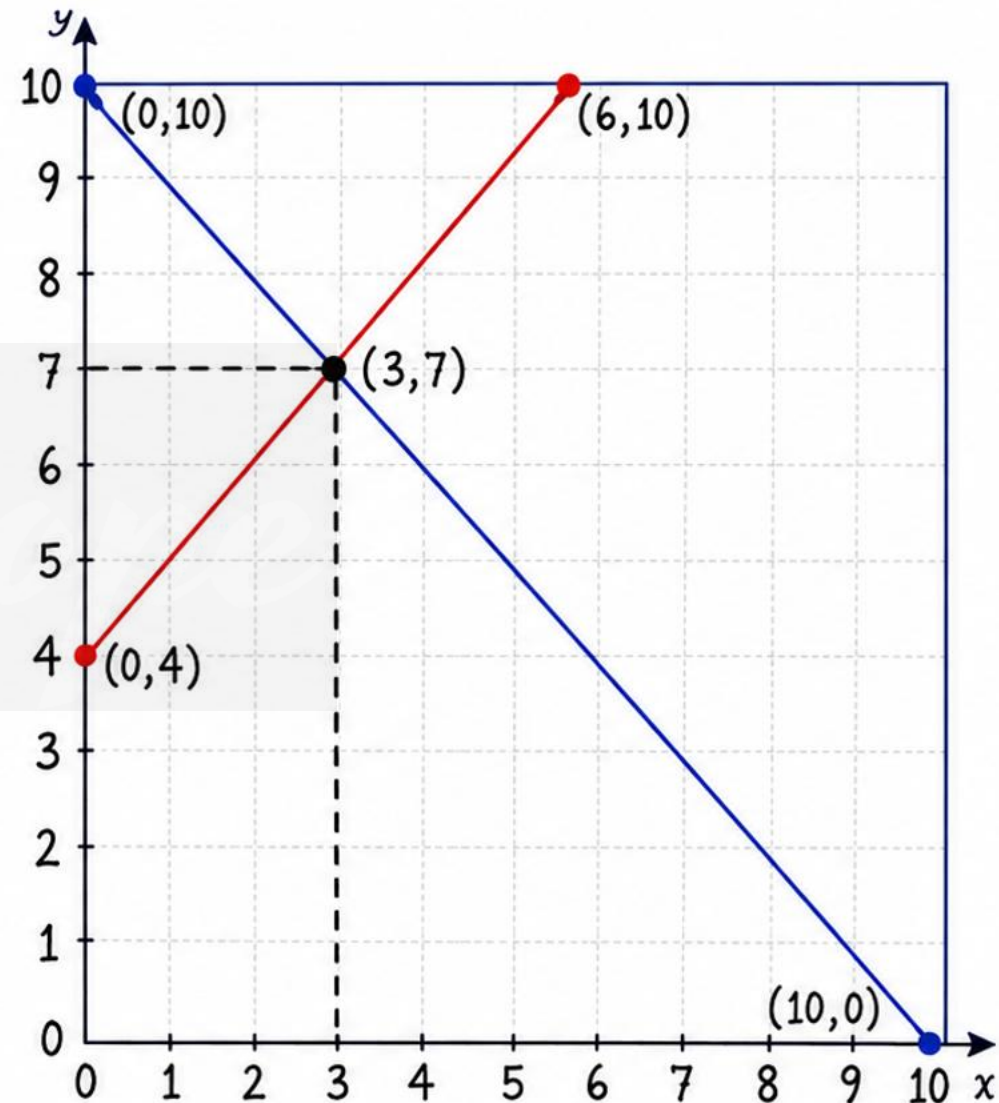
Points for $y = x + 4$: $(0,4)$, $(6,10)$.

Draw both straight lines through their points.

The lines meet at $(3,7)$.

Answer: 3 boys and 7 girls.

Check: $3 + 7 = 10$ and $7 - 3 = 4$.



EXERCISE 3.1 – Q1 (ii)

Q1(ii). Five pencils and seven pens cost ₹50.
Seven pencils and five pens cost ₹46.
Find each price graphically.

Let x = price of one pencil; y = price of one pen,
in rupees.

$$5x + 7y = 50 \quad \text{--- ①}$$

$$7x + 5y = 46 \quad \text{--- ②}$$

① Plot $5x + 7y = 50$ using $(3, 5)$, $(10, 0)$.

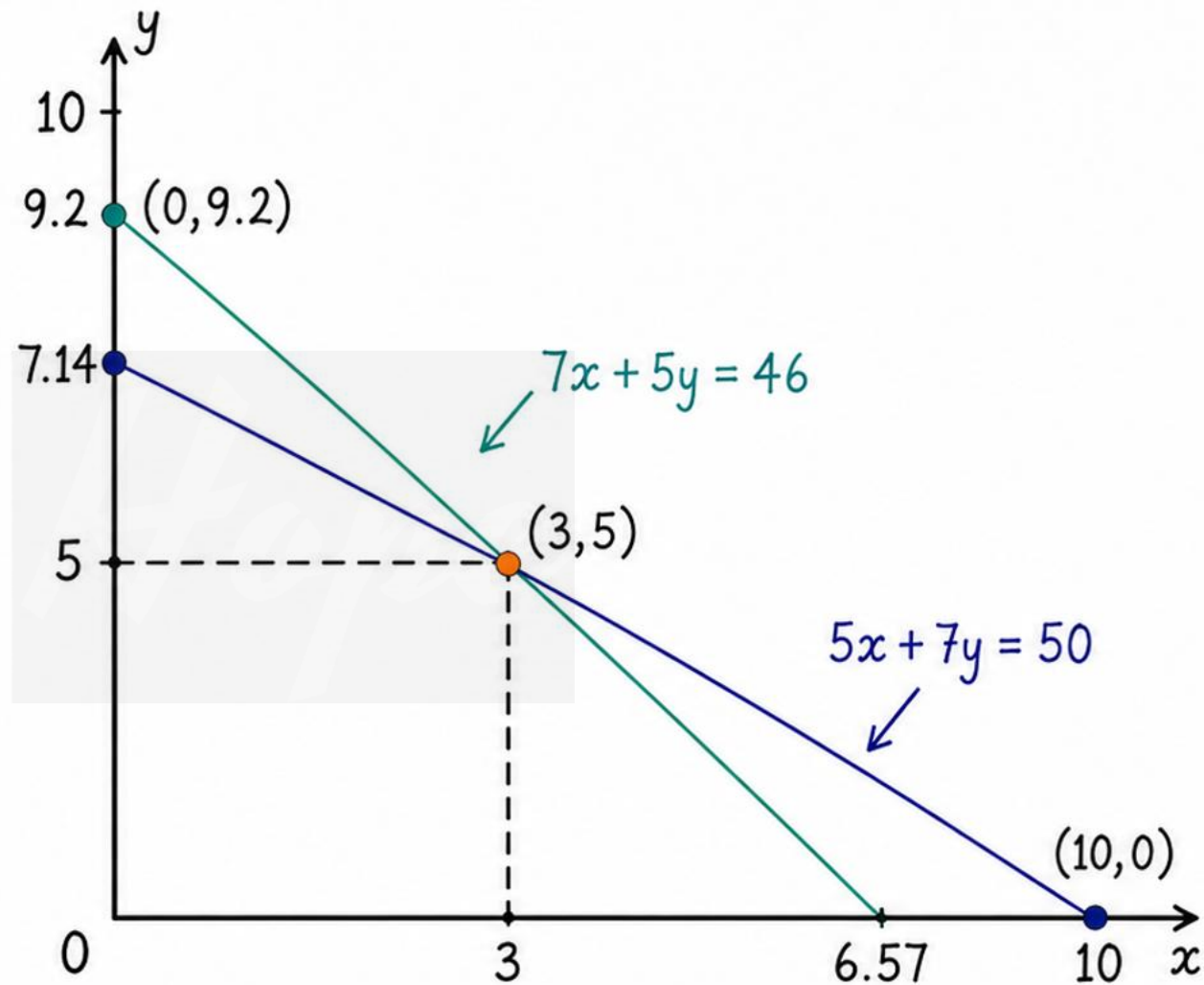
② Plot $7x + 5y = 46$ using $(0, 9.2)$, $(3, 5)$.

The lines intersect at $(3, 5)$.

Answer: Pencil = ₹3; pen = ₹5.

Check: $5(3) + 7(5) = 50$

$$7(3) + 5(5) = 46.$$



EXERCISE 3.1 – Q2

Q2. Compare coefficient ratios to decide whether the lines intersect, are parallel, or coincide.

(i) $5x - 4y + 8 = 0$
 $7x + 6y - 9 = 0$

$$\frac{a_1}{a_2} = \frac{5}{7}$$

$$\frac{b_1}{b_2} = \frac{-4}{6} = \frac{-2}{3}$$

$$\frac{c_1}{c_2} = \frac{-8}{9}$$

$$\frac{5}{7} \neq \frac{-2}{3}$$

The lines intersect at one point.

(ii) $9x + 3y + 12 = 0$
 $18x + 6y + 24 = 0$

$$\frac{a_1}{a_2} = \frac{9}{18} = \frac{1}{2}$$

$$\frac{b_1}{b_2} = \frac{3}{6} = \frac{1}{2}$$

$$\frac{c_1}{c_2} = \frac{12}{24} = \frac{1}{2}$$

All three ratios are equal.

The lines are coincident.

(iii) $6x - 3y + 10 = 0$
 $2x - y + 9 = 0$

$$\frac{a_1}{a_2} = \frac{6}{2} = 3$$

$$\frac{b_1}{b_2} = \frac{(-3)}{(-1)} = 3$$

$$\frac{c_1}{c_2} = \frac{10}{9}$$

$$3 = 3 \neq \frac{10}{9}$$

The lines are parallel.

EXERCISE 3.1 – Q3 (i)-(iii)

Q3. Compare the ratios and state whether each pair is consistent or inconsistent.

Move constants to the left before identifying c_1 and c_2 .

$$\begin{aligned} \text{(i)} \quad 3x + 2y &= 5 \\ 2x - 3y &= 7 \end{aligned}$$

$$\frac{a_1}{a_2} = \frac{3}{2}$$

$$\frac{b_1}{b_2} = \frac{-2}{3}$$

$$\frac{c_1}{c_2} = \frac{(-5)}{(-7)} = \frac{5}{7}$$

$$\frac{3}{2} \neq \frac{-2}{3}$$

Consistent: one solution.

$$\begin{aligned} \text{(ii)} \quad 2x - 3y &= 8 \\ 4x - 6y &= 9 \end{aligned}$$

$$\frac{a_1}{a_2} = \frac{1}{2}$$

$$\frac{b_1}{b_2} = \frac{1}{2}$$

$$\frac{c_1}{c_2} = \frac{8}{9}$$

$$\frac{1}{2} = \frac{1}{2} \neq \frac{8}{9}$$

Inconsistent: no solution.

$$\begin{aligned} \text{(iii)} \quad \left(\frac{3}{2}\right)x + \left(\frac{5}{3}\right)y &= 7 \\ 9x - 10y &= 14 \end{aligned}$$

$$\frac{a_1}{a_2} = \frac{(3/2)}{9} = \frac{1}{6}$$

$$\frac{b_1}{b_2} = \frac{(5/3)}{(-10)} = -\frac{1}{6}$$

$$\frac{c_1}{c_2} = \frac{7}{14} = \frac{1}{2}$$

$$\frac{1}{6} \neq -\frac{1}{6}$$

Consistent: one solution.

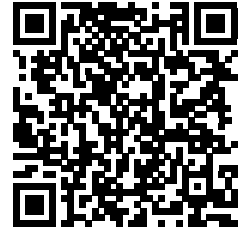


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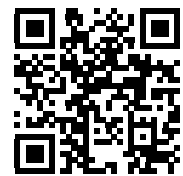


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