Solution : Let us denote the number of pants by x and the number of skirts by y. Then the equations formed are:

$$y = 2x - 2 \qquad (1)$$
$$y = 4x - 4 \qquad (2)$$

Let us draw the graphs of Equations (1) and (2) by finding two solutions for each of the equations. They are given in **Table 3.3**.

Table 3.3

x	2	0
y = 2x - 2	2	-2

x	0	1
y = 4x - 4	-4	0

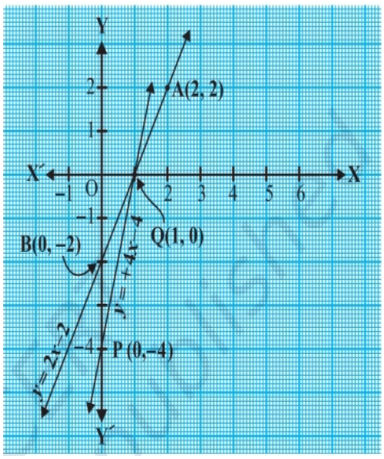

Fig. 3.2

Plot the points and draw the lines passing through them to represent the equations, as shown in Fig. 3.2.

The two lines intersect at the point (1, 0). So, $x = 1$, $y = 0$ is the required solution of the pair of linear equations, i.e., the number of pants she purchased is 1 and she did not buy any skirt.

Verify the answer by checking whether it satisfies the conditions of the given problem.

EXERCISE 3.1

1. Form the pair of linear equations in the following problems, and find their solutions graphically.

   (a) 10 students of Class X took part in a Mathematics quiz. If the number of girls is 4 more than the number of boys, find the number of boys and girls who took part in the quiz.

(b) 5 pencils and 7 pens together cost ₹ 50, whereas 7 pencils and 5 pens together cost ₹ 46. Find the cost of one pencil and that of one pen.

2. On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the lines representing the following pairs of linear equations intersect at a point, are parallel or coincident:

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

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

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

3. On comparing the ratios $\frac{a_1}{a_2}, \frac{b_1}{b_2}$ and $\frac{c_1}{c_2}$, find out whether the following pair of linear equations are consistent, or inconsistent.

(i) $3x + 2y = 5, \quad 2x - 3y = 7$

(ii) $2x - 3y = 8, \quad 4x - 6y = 9$

(iii) $\frac{3}{2}x + \frac{5}{3}y = 7, \quad 9x - 10y = 14$

(iv) $5x - 3y = 11, \quad 10x + 6y = -22$

(v) $\frac{4}{3}x + 2y = 8, \quad 2x + 3y = 12$

4. Which of the following pairs of linear equations are consistent/inconsistent? If consistent, obtain the solution graphically:

(i) $x + y = 5, \quad 2x + 2y = 10$

(ii) $x - y = 8, \quad 3x - 3y = 16$

(iii) $2x + y - 6 = 0, \quad 4x - 2y - 4 = 0$

(iv) $2x - 2y - 2 = 0, \quad 4x - 4y - 5 = 0$

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

6. Given the linear equation $2x + 3y - 8 = 0$, write another linear equation in two variables such that the geometrical representation of the pair so formed is:

(i) intersecting lines

(ii) parallel lines

(iii) coincident lines

7. Draw the graphs of the equations $x - y + 1 = 0$ and $3x + 2y - 12 = 0$. Determine the coordinates of the vertices of the triangle formed by these lines and the x-axis, and shade the triangular region.

i.e., $8 - 12 = 0$
i.e., $-4 = 0$
which is a false statement.
Therefore, the equations do not have a common solution. So, the two rails will not cross each other.

EXERCISE 3.2

1. Solve the following pair of linear equations by the substitution method:

   (a) $x + y = 14, \quad x - y = 4$

   (b) $s - t = 3, \quad \frac{s}{3} + \frac{t}{2} = 6$

   (c) $3x - y = 3, \quad 9x - 3y = 9$

   (d) $0.2x + 0.3y = 1.3, \quad 0.4x + 0.5y = 2.3$

   (e) $\sqrt{2}x + \sqrt{3}y = 0, \quad \sqrt{3}x - \sqrt{8}y = 0$

   (f) $\frac{3x}{2} - \frac{5y}{3} = 2, \quad \frac{x}{3} + \frac{y}{2} = \frac{13}{6}$

2. Solve $2x + 3y = 11$ and $2x - 4y = -24$ and hence find the value of 'm' for which $y = mx + 3$.

3. Form the pair of linear equations for the following problems and find their solution by substitution method:

   (a) The difference between two numbers is 26 and one number is three times the other. Find them.

   (b) The larger of two supplementary angles exceeds the smaller by 18 degrees. Find them.

   (c) The coach of a cricket team buys 7 bats and 6 balls for ₹ 3800. Later, she buys 3 bats and 5 balls for ₹ 1750. Find the cost of each bat and each ball.

   (d) The taxi charges in a city consist of a fixed charge together with the charge for the distance covered. For a distance of 10 km, the charge paid is ₹ 105 and for a journey of 15 km, the charge paid is ₹ 155. What are the fixed charges and the charge per km? How much does a person have to pay for travelling a distance of 25 km?

   (e) A fraction becomes $\frac{9}{11}$, if 2 is added to both the numerator and the denominator. If 3 is added to both the numerator and the denominator it becomes $\frac{5}{6}$. Find the fraction.