Linear Forms

11^{th} Maths - Chapter 10

The following problem is question 13 from exercise 10.3:

1. Find the equation of the right bisector of the line segment joining the points (3, 4) and (–1, 2).

Solution:
Let

$$\overrightarrow{OP} = 3\hat{i} + 4\hat{j} \tag{1}$$

$$\overrightarrow{OQ} = -\hat{i} + 2\hat{j} \tag{2}$$

$$\overrightarrow{OR} = \frac{(3-1)\hat{i} + (4+2)\hat{j}}{2} \tag{3}$$

$$\overrightarrow{OR} = \hat{i} + 3\hat{j} \tag{4}$$

Slope of the line passing through (1) and (2) is
given by

$$m_1 = \frac{2-4}{-1-3} \tag{5}$$

$$= \frac{-2}{-4} \tag{6}$$

$$= \frac{1}{2} \tag{7}$$

Slope of the perpendicular line is given by m_2 = -2 The equation of right bisector passing though (3) is given by

$$(y - y_1) = m_2(x - x_1) \tag{8}$$
$$(y - 3) = -2(x - 1) \tag{9}$$
$$y - 3 = -2x + 2 \tag{10}$$
$$2x + y = 5 \tag{11}$$

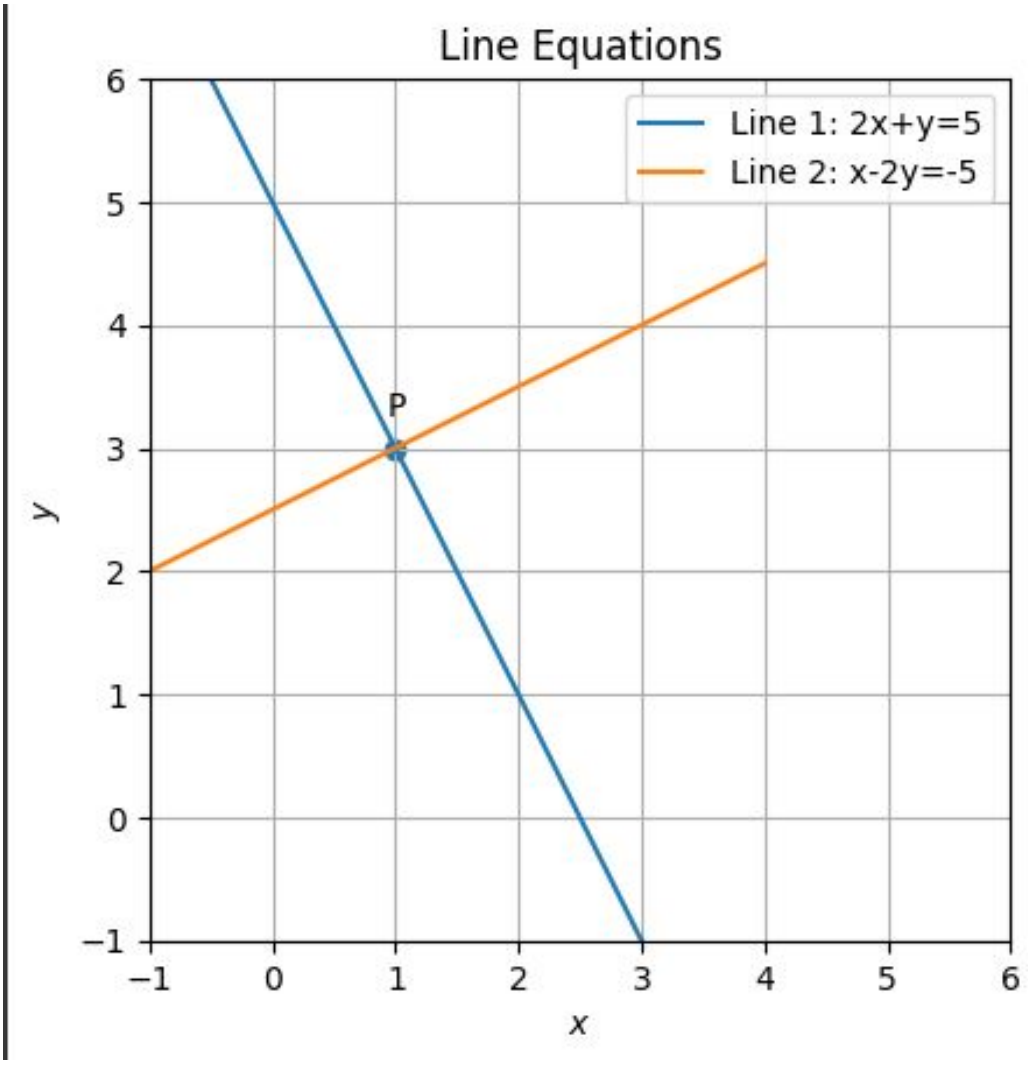

Figure 1: graph