

Straight Lines

11th Maths - Chapter 10

This is Problem-8 from Exercise 10.3

1. Find the equation of line perpendicular to the line $x - 7y + 5 = 0$ and having x intercept 3.

Solution: Given line is

$$x - 7y + 5 = 0 \quad (1)$$

this equation can be expressed as

$$\mathbf{n}^\top \mathbf{x} = c \quad (2)$$

$$\text{where } \mathbf{n} = \begin{pmatrix} 1 \\ -7 \end{pmatrix}, c = -5 \quad (3)$$

the equation of line perpendicular having x intercept 3 is given by

$$\mathbf{m}^\top (\mathbf{x} - \mathbf{A}) = 0 \quad (4)$$

where \mathbf{A} and \mathbf{m} is

$$\mathbf{m} = \begin{pmatrix} 7 \\ 1 \end{pmatrix} \quad (5)$$

$$\mathbf{m}^\top = (7 \ 1) \quad (6)$$

$$\mathbf{A} = \begin{pmatrix} 3 \\ 0 \end{pmatrix} \quad (7)$$

Substituting the value of \mathbf{m} and \mathbf{A} in (4)

$$(7 \ 1) \left(\mathbf{x} - \begin{pmatrix} 3 \\ 0 \end{pmatrix} \right) = 0 \quad (8)$$

$$(7 \ 1) \mathbf{x} - 21 = 0 \quad (9)$$

$$(7 \ 1) \mathbf{x} = 21 \quad (10)$$

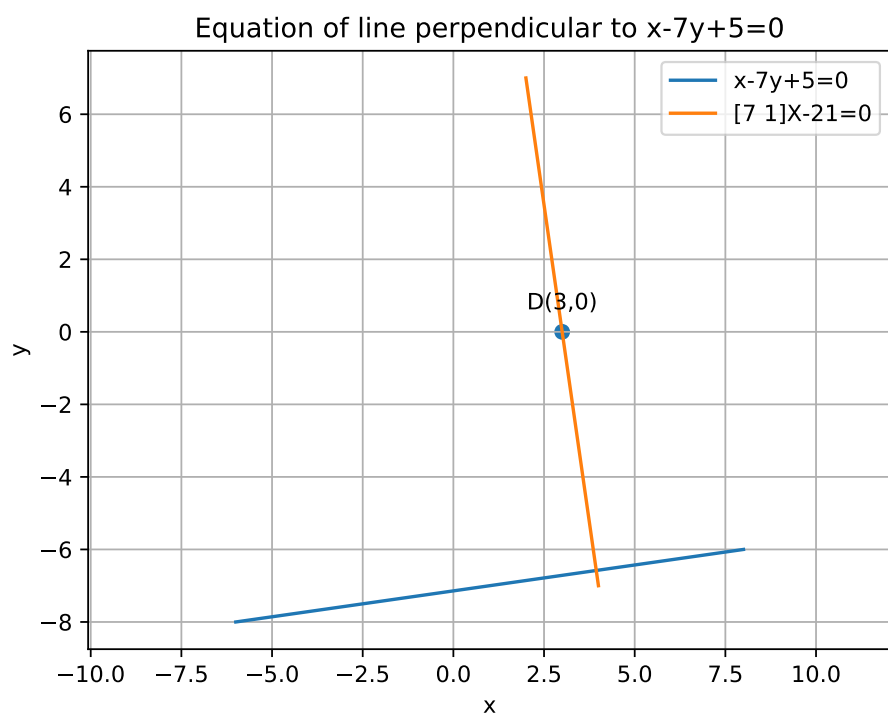


Figure 1