Straight Lines

1 11^{th} Maths - Exercise 10.3.8

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

2 Solution

Given equation expressed as

$$\mathbf{n}^\top \mathbf{x} = c \tag{1}$$

$$\text{where } \mathbf{n} = \begin{pmatrix} 1 \\ -7 \end{pmatrix}, c = -5 \tag{2}$$

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

$$\mathbf{m}^\top (\mathbf{x} - \mathbf{A}) = 0 \tag{3}$$

where $\mathbf{A}$ and $\mathbf{m}^\top$ is

$$\mathbf{m}^\top = \begin{pmatrix} 7 & 1 \end{pmatrix} \tag{4}$$

$$\mathbf{A} = \begin{pmatrix} 3 \\ 0 \end{pmatrix} \tag{5}$$

Substituting the value of $\mathbf{m}^\top$ and $\mathbf{A}$ in (**??**)

$$\begin{pmatrix} 7 & 1 \end{pmatrix} \left(\mathbf{x} - \begin{pmatrix} 3 \\ 0 \end{pmatrix} \right) = 0 \tag{6}$$

$$\begin{pmatrix} 7 & 1 \end{pmatrix} \mathbf{x} = 21 \tag{7}$$

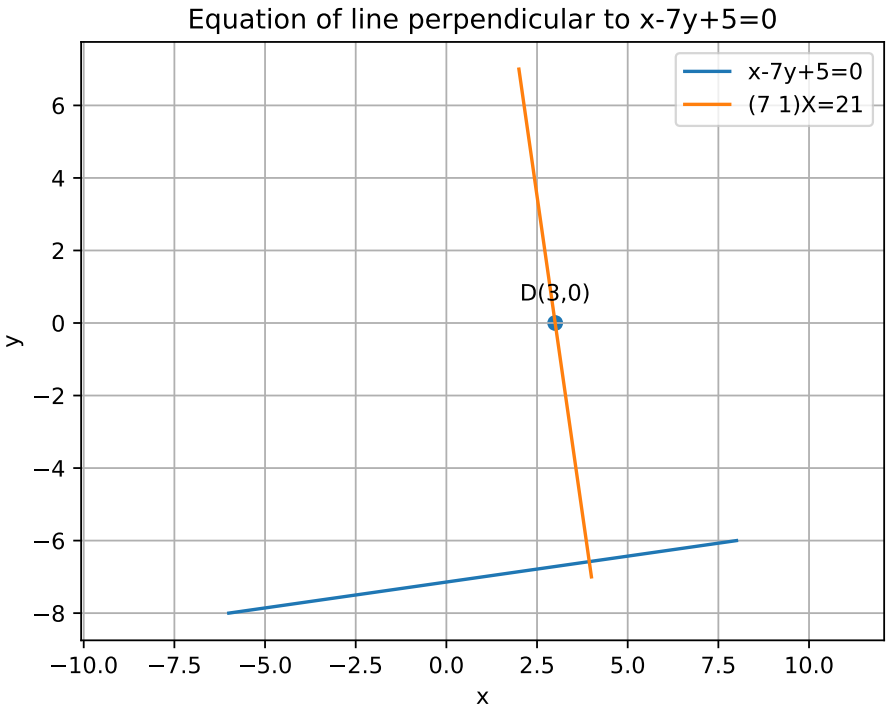
Equation of line perpendicular to x-7y+5=0
x-7y+5=0
(7 1)X=21
D(3,0)
6
4
2
0
−2
−4
−6
−8
y
−10.0
−7.5
−5.0
−2.5
0.0
2.5
5.0
7.5
10.0
x

Figure 1