MATRICES

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Contents

1 Problem

Q.Find the equation of the line parallel to the line 3x-4y+2=0 and passing through the point (-2,3).

2 Solution

Given equation is 3x-4y+2=0
the line parallel to given equation is
3x-4y+k=0
the parallel line passing through point(-2,3)
we can write the above equation as
(x-0)/4=(y-1/2)/3

$$\mathbf{m} = \begin{pmatrix} 4 \\ 3 \end{pmatrix} \tag{1}$$

$$\mathbf{n}^{\top}\mathbf{x} = C \tag{2}$$

$$\mathbf{n} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \mathbf{m} \tag{3}$$

$$\mathbf{n} = \begin{pmatrix} 0 & 1 \\ -1 & 0 \end{pmatrix} \begin{pmatrix} 4 \\ 3 \end{pmatrix} \tag{4}$$

$$\mathbf{n} = \begin{pmatrix} 3 \\ -4 \end{pmatrix} \tag{5}$$

$$\mathbf{n}^{\top} = \begin{pmatrix} 3 & -4 \end{pmatrix} \tag{6}$$

substituting

$$x = \begin{pmatrix} -2 \\ 3 \end{pmatrix} \tag{7}$$

$$\begin{pmatrix} 3 & -4 \end{pmatrix} \begin{pmatrix} -2 \\ 3 \end{pmatrix} = c \tag{8}$$

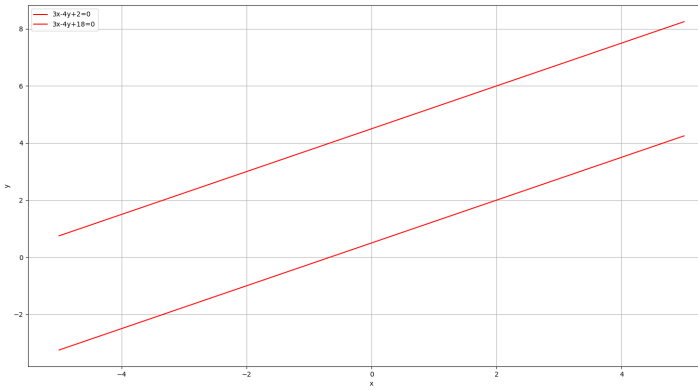
$$c = -18 \tag{9}$$

so the parallel equation of given equation is

$$\begin{pmatrix} 3 & -4 \end{pmatrix} \mathbf{x} = -18 \tag{10}$$

therefore,the equation parallel to the given equation and passing through the point(-2,3) is 3x-4y+18=0

3 Plot



4 Software

We can get the parallel equation of given equation and the plot of two eqution by executing the following code:

https://github.com/Gowt-hami/fwc-1-module1/blob/main/par.py