Assignment3

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Download all python codes from

https://github.com/CRAMYATULASI/ASSIGNMENT4/tree/main/ASSIGNMENT4/CODES

and download all latex-tikz codes from

https://github.com/Sowmyabandi99/Assignment3/blob/main/main.tex

1 Question No. 2.16

Find the direction vectors and y-intercepts of the following lines.

1)
$$\begin{pmatrix}1 & 7\end{pmatrix}\mathbf{x} = 0 \tag{1.0.1}$$

2)
$$\begin{pmatrix}6 & 3\end{pmatrix}\mathbf{x} = 5 \tag{1.0.2}$$

3)
$$\begin{pmatrix}0 & 1\end{pmatrix}\mathbf{x} = 0 \tag{1.0.3}$$

2 Solution

- Direction vector and y-intercept of the line $\mathbf{n}^T\mathbf{x} = c$, where n= $\begin{pmatrix}a\\b\end{pmatrix}$ are:

Direction vector
$$\mathbf{m} = \begin{pmatrix}b\\-a\end{pmatrix} \tag{2.0.1}$$

and y-intercept = $\frac{c}{b}e_2$, where $e_2 = \begin{pmatrix}0\\1\end{pmatrix}$

1) Normal vector
$$\mathbf{n} = \begin{pmatrix}1\\7\end{pmatrix} \tag{2.0.2}$$

Direction vector
$$\mathbf{m} = \begin{pmatrix}7\\-1\end{pmatrix} \tag{2.0.3}$$

y-intercept = $\begin{pmatrix}0\\0\end{pmatrix}$

2) Normal vector
$$\mathbf{n} = \begin{pmatrix}6\\3\end{pmatrix} \tag{2.0.4}$$

Direction vector
$$\mathbf{m} = \begin{pmatrix}3\\-6\end{pmatrix} \tag{2.0.5}$$

y-intercept = $\frac{5}{3}e_2$

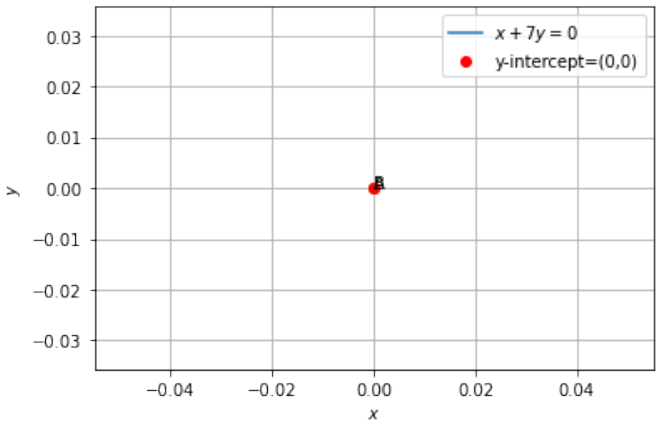
3) Normal vector
$$\mathbf{n} = \begin{pmatrix}0\\1\end{pmatrix} \tag{2.0.6}$$

Direction vector
$$\mathbf{m} = \begin{pmatrix}1\\0\end{pmatrix} \tag{2.0.7}$$

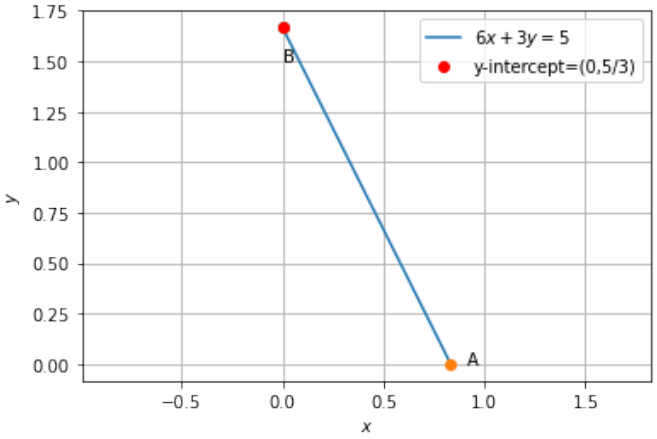
y-intercept = $\begin{pmatrix}0\\0\end{pmatrix}$

PLOT OF GIVEN LINES -

Plot of (1.0.1) -



Plot of (1.0.2) -



Plot of (1.0.3)