Assignment3

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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
  $$y - intercept = \begin{pmatrix}0\\\frac{c}{b}\end{pmatrix} \tag{2.0.2}$$

1) Normal vector
$$\mathbf{n} = \begin{pmatrix}1\\7\end{pmatrix} \tag{2.0.3}$$
Direction vector
$$\mathbf{m} = \begin{pmatrix}7\\-1\end{pmatrix} \tag{2.0.4}$$
y-intercept = $\begin{pmatrix}0\\0\end{pmatrix}$

2) Normal vector
$$\mathbf{n} = \begin{pmatrix}6\\3\end{pmatrix} \tag{2.0.5}$$
Direction vector
$$\mathbf{m} = \begin{pmatrix}3\\-6\end{pmatrix} \tag{2.0.6}$$
y-intercept = $\begin{pmatrix}0\\\frac{5}{3}\end{pmatrix}$

3) Normal vector
$$\mathbf{n} = \begin{pmatrix}0\\1\end{pmatrix} \tag{2.0.7}$$
Direction vector
$$\mathbf{m} = \begin{pmatrix}1\\0\end{pmatrix} \tag{2.0.8}$$
y-intercept = $\begin{pmatrix}0\\0\end{pmatrix}$