

Assignment No.2

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Download all python codes from

<https://github.com/Vallidevibolla/Assignment-2-1/blob/main/code.py>

and latex-tikz codes from

<https://github.com/Vallidevibolla/Assignment-2-1/blob/main/main.tex>

Question taken from

https://github.com/gadepall/ncert/blob/main/linalg/vectors/gvv_ncert_vectors.pdf– Q.no.2.25

$$\begin{aligned} \Rightarrow (20 \ 4) \times \begin{pmatrix} 0 \\ y \end{pmatrix} &= 36 \\ \Rightarrow 4y &= 36 \\ \Rightarrow y &= 9 \end{aligned}$$

Finally the desired point on y-axis equidistance from A and B is $\begin{pmatrix} 0 \\ 9 \end{pmatrix}$.

See the figure generated by using python

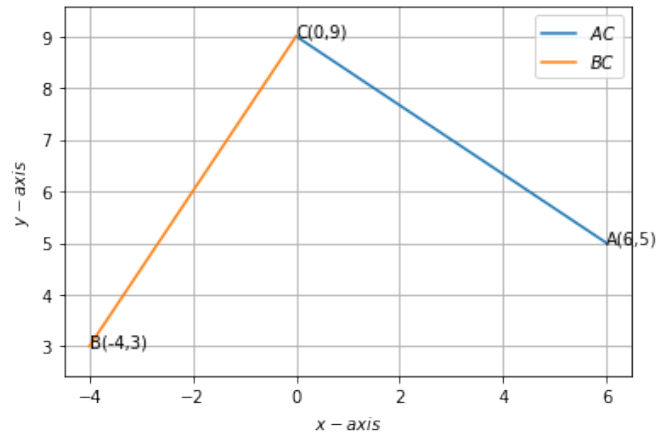


Fig. 2.1: Fig. 2.25

1 QUESTION No.2.25

Find a point on the y-axis which is equidistant from the points $A = \begin{pmatrix} 6 \\ 5 \end{pmatrix}$ and $B = \begin{pmatrix} -4 \\ 3 \end{pmatrix}$

2 SOLUTION

Given,

$$\mathbf{A} = \begin{pmatrix} 6 \\ 5 \end{pmatrix} \quad (2.0.1)$$

$$\mathbf{B} = \begin{pmatrix} -4 \\ 3 \end{pmatrix} \quad (2.0.2)$$

Let x be the point on y-axis. Then

$$\|\mathbf{x} - \mathbf{A}\|^2 = \|\mathbf{x} - \mathbf{B}\|^2$$

From given information

$$\|\mathbf{x} - \mathbf{A}\|^2 = \|\mathbf{x}\|^2 + \left\| \begin{pmatrix} 6 \\ 5 \end{pmatrix} \right\|^2 - 2(6 \ 5)x$$

$$\|\mathbf{x} - \mathbf{B}\|^2 = \|\mathbf{x}\|^2 + \left\| \begin{pmatrix} -4 \\ 3 \end{pmatrix} \right\|^2 - 2(-4 \ 3)x$$

$$\Rightarrow \|\mathbf{x}\|^2 + \left\| \begin{pmatrix} 6 \\ 5 \end{pmatrix} \right\|^2 - 2(6 \ 5)x = \|\mathbf{x}\|^2 + \left\| \begin{pmatrix} -4 \\ 3 \end{pmatrix} \right\|^2 - 2(-4 \ 3)x$$

$$\Rightarrow 2(6 \ 5)x - 2(-4 \ 3)x = \left\| \begin{pmatrix} 6 \\ 5 \end{pmatrix} \right\|^2 + \left\| \begin{pmatrix} -4 \\ 3 \end{pmatrix} \right\|^2$$

$$\Rightarrow (20 \ 4)x = 61 - 25$$