

Assignment 1

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Download all python codes from

<https://github.com/AnilMondedla/Python>

and latex-tikz codes from

<https://github.com/AnilMondedla/Python>

1 PROBLEM

(1.56) Find area of the triangle with vertices at the point given in each of the following :

(i) (1 0) , (6 0) , (4 3)

2 SOLUTION

vertices in vector form

$$\mathbf{A} = \begin{pmatrix} 1 \\ 0 \end{pmatrix}, \mathbf{B} = \begin{pmatrix} 6 \\ 0 \end{pmatrix}, \mathbf{C} = \begin{pmatrix} 4 \\ 3 \end{pmatrix} \quad (2.0.1)$$

Here,

Draw a perpendicular line from C to AB.

$$\mathbf{P} = \begin{pmatrix} 4 \\ 0 \end{pmatrix} \quad (2.0.2)$$

Then Line CP becomes the height of the triangle

The direction vectors of AB and PC are

$$\mathbf{B} - \mathbf{A} = \begin{pmatrix} 5 \\ 0 \end{pmatrix} \quad (2.0.3)$$

$$\mathbf{C} - \mathbf{P} = \begin{pmatrix} 0 \\ 3 \end{pmatrix} \quad (2.0.4)$$

$$\mathbf{M} = (\mathbf{B} - \mathbf{A} \quad \mathbf{C} - \mathbf{P})^T \quad (2.0.5)$$

$$\mathbf{M} = \begin{bmatrix} 5 & 0 \\ 0 & 3 \end{bmatrix}$$

The area of $\triangle ABC$ is obtained in terms of the magnitude of the determinant of the matrix \mathbf{M} in

$$\Delta = \frac{1}{2} |\mathbf{M}| \quad (2.0.6)$$

$$\Delta = \frac{1}{2} \times \begin{vmatrix} 5 & 0 \\ 0 & 3 \end{vmatrix} \quad (2.0.7)$$

$$\Delta = 7.5$$

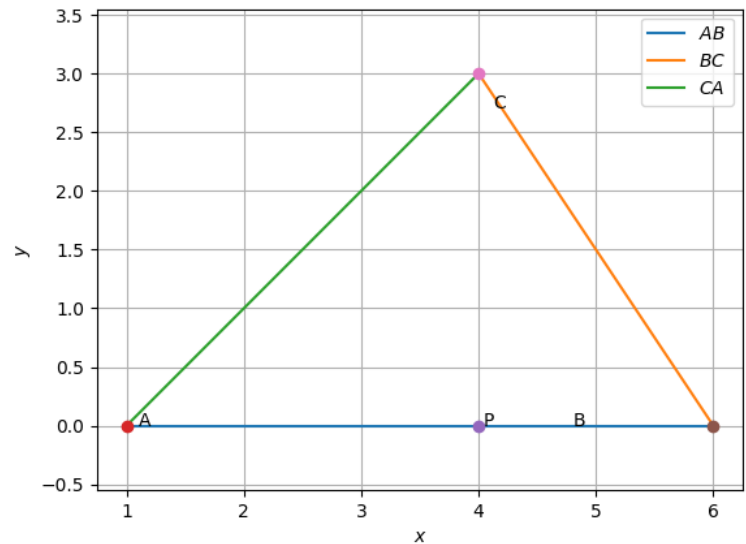


Fig. 0: triangle.