Line Assignment

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I. Question

Class 11, Exercise 10.1, Q(1): **Draw a quadrilateral in the Cartesian plane, whose vertices are (-4,5), (0,7), (5,-5), (-4,-2). Also, find its area.**

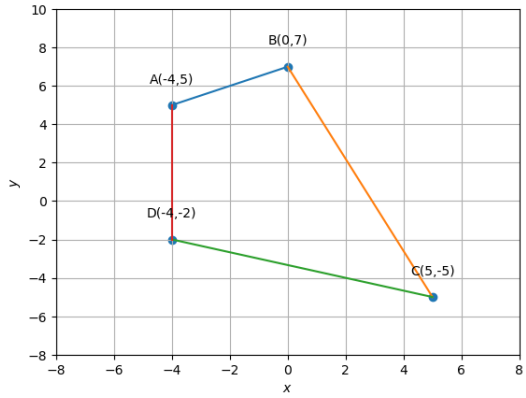

Figure 1: Quadrilateral ABCD

II. Solution

We can divide the quadrilateral into two triangles, one with sides **AB**, **BC**, and **AC**, and the other with sides **AC**, **CD**, and **AD**.

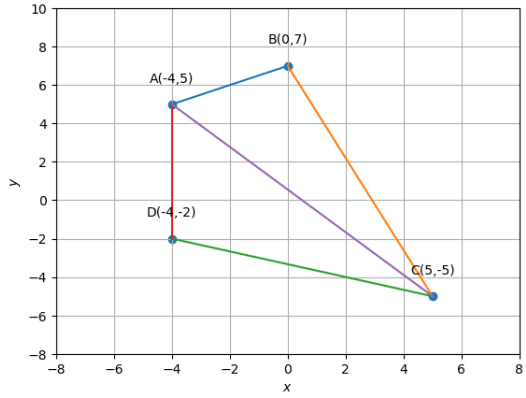

Figure 2: Quadrilateral ABCD with diagonal AC

Consider $\triangle ABC$,

$$\boldsymbol{Ar(\triangle ABC) = \frac{1}{2}|(B-A)\times(B-C)|}$$

$$= \frac{1}{2}\begin{vmatrix} \hat{i} & \hat{j} \\ 4 & 2 \\ -5 & 12 \end{vmatrix}$$

$$= \frac{48\hat{k}+10\hat{k}}{2}$$

$$= 29\hat{k}$$

Area of $\triangle ABC$ is given by

$$\boldsymbol{d1 = ||(B-A)(B-C)||} \quad (1)$$

$$= 29$$

$Ar(\triangle ABC) = 29$ sq.units

Now consider $\triangle ACD$,

$$\boldsymbol{Ar(\triangle ACD) = \frac{1}{2}|(D-A)\times(D-C)|}$$

$$= \frac{1}{2}\begin{vmatrix} \hat{i} & \hat{j} \\ 0 & -7 \\ -9 & 3 \end{vmatrix}$$

$$= \frac{63\hat{k}}{2}$$

$$= 31.5\hat{k}$$

Area of $\triangle ACD$ is given by

$$\boldsymbol{d1 = ||(D-A)(D-C)||} \quad (2)$$

$$= 31.5$$

$Ar(\triangle ACD) = 31.5$ sq.units **Area of Quadrilateral ABCD**

$$\boldsymbol{= Ar(\triangle ABC) + Ar(\triangle ACD)}$$

$$= 29 + 31.5$$

$$= 60.5 \text{ sq.units}$$

CONSTRUCTION

Symbol	Value	Description
A	(-4,5)	Vertex A
B	(0,7)	Vertex B
C	(5,-5)	Vertex C
D	(-4,-2)	Vertex D

Get the python code of the figures from

https://github.com/SinkonaChinthamalla/fwc/blob/main/matrix/line/codes