

# 2.7.13

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## Question:

Given vertices  $\mathbf{A}(-4, -5)$ ,  $\mathbf{B}(-1, -6)$ ,  $\mathbf{C}(-5, 7)$  and  $\mathbf{D}(4, 5)$  of a quadrilateral. Find the area of quadrilateral  $ABCD$ .

## Solution:

Given vertices  $\mathbf{A} = \begin{pmatrix} -4 \\ -5 \end{pmatrix}$ ,  $\mathbf{B} = \begin{pmatrix} -1 \\ -6 \end{pmatrix}$ ,  $\mathbf{C} = \begin{pmatrix} -5 \\ 7 \end{pmatrix}$ ,  $\mathbf{D} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$ . We split the quadrilateral into triangles  $\triangle ABC$  and  $\triangle ACD$  and add them to get the answer.

**Area of  $\triangle ABC$ :**

$$\text{Area}_{ABC} = \frac{1}{2} \|\mathbf{(B - A) \times (C - A)}\| = 17.5 \quad (1)$$

**Area of  $\triangle ACD$ :**

$$\text{Area}_{ACD} = \frac{1}{2} \|\mathbf{(C - A) \times (D - A)}\| = 53 \quad (2)$$

**Total area of quadrilateral (sum of triangle areas):**

$$\text{Area}_{ABCD} = \text{Area}_{ABC} + \text{Area}_{ACD} = 70.5 \quad (3)$$

See Fig. 0 ,

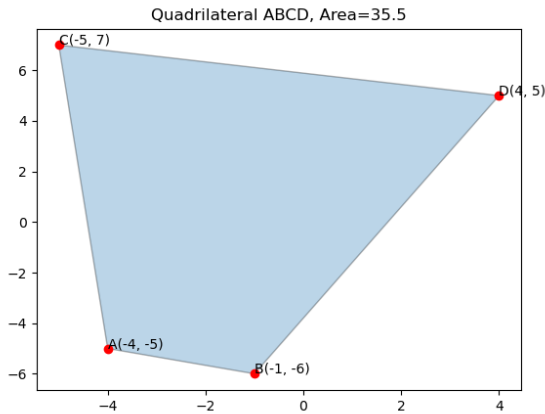


Fig. 0