Assignment 2

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1 Question No. 2.45

Can you construct a Rhombus ABCD with AC=6 and BD=7 ?

2 Explanation

1) Assume vertices of given rhombus :-
Let the vertices of rhombus $ABCD$ be **A,B,C** and **D** .

2) List out give data in form vectors :-
According to given data:

$$\|\mathbf{A} − \mathbf{C}\| = 6 \qquad (2.0.1)$$
$$\|\mathbf{B} − \mathbf{D}\| = 7 \qquad (2.0.2)$$

3) Find out two triangles of given rhombus having same base
Rhombus ABCD is made of two triangles $\triangle ABC$ and $\triangle ACD$ placed on base AC .
From $\triangle ACD$,Consider another $\triangle AOB$ and $\triangle BOD$,both are right angled triangle.
By pythagorean theorem:

$\|\mathbf{A} − \mathbf{B}\|^2 = \|\mathbf{A} − \mathbf{O}\|^2 + \|\mathbf{O} − \mathbf{B}\|^2$
$= (3)^2 + (3.5)^2$
$= 21.25$
$\|\mathbf{A} − \mathbf{B}\| = \pm 4.6$
Similarly
$\|\mathbf{B} − \mathbf{C}\| = 4.6$
$\|\mathbf{C} − \mathbf{D}\| = 4.6$
$\|\mathbf{D} − \mathbf{A}\| = 4.6$

By the property of Rhombus,Allsides of rhombus are equal.The opposite sides of rhombus are parallel.

therefore the vertices of rhombus :

$$\mathbf{O} = \begin{pmatrix} 0 \\ 0 \end{pmatrix} \qquad (2.0.3)$$

$$\mathbf{A} = \begin{pmatrix} 0 \\ -4.6 \end{pmatrix} \qquad (2.0.4)$$

$$\mathbf{B} = \begin{pmatrix} 3.5 \\ 0 \end{pmatrix} \qquad (2.0.5)$$

$$\mathbf{C} = \begin{pmatrix} 4.6 \\ 0 \end{pmatrix} \qquad (2.0.6)$$

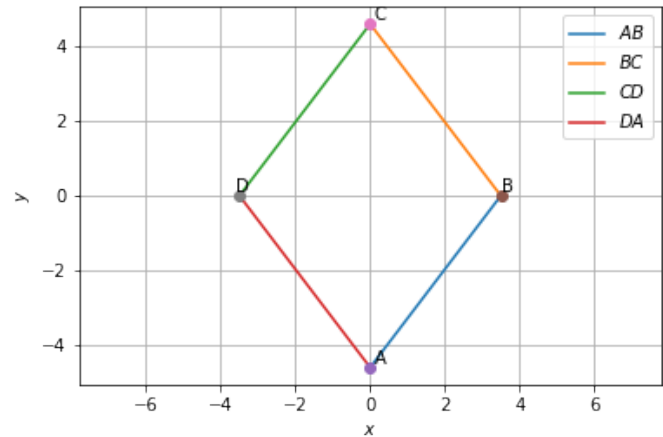$$\mathbf{D} = \begin{pmatrix} 0 \\ -3.5 \end{pmatrix} \qquad (2.0.7)$$

Plot the Rhombus $ABCD$ is as follows:

Fig. 2.1: $\triangle ABC$