

# 3-3.4-6

EE24BTECH11006 - Arnav Mahishi

Q) Construct a rhombus whose diagonals are 4cm and 6cm in lengths.

input	value
$A$	$(3, 0)$
$B$	$(0, 2)$
$C$	$(-3, 0)$
$D$	$(0, -2)$
$\ \vec{AC}\ $	$6cm$
$\ \vec{BD}\ $	$4cm$

TABLE 0: Input Parameters

Soln: Assuming x and y axis as diagonals of rhombus and center as origin

$$\|\vec{OA}\| = \|\vec{OC}\| \implies \vec{OA} = \begin{pmatrix} 3 \\ 0 \end{pmatrix} \text{ and } \vec{OC} = \begin{pmatrix} -3 \\ 0 \end{pmatrix} \quad (0.1)$$

$$\|\vec{OB}\| = \|\vec{OD}\| \implies \vec{OB} = \begin{pmatrix} 0 \\ 2 \end{pmatrix} \text{ and } \vec{OD} = \begin{pmatrix} 0 \\ -2 \end{pmatrix} \quad (0.2)$$

$$\implies \vec{AB} = \vec{OA} - \vec{OB} = \begin{pmatrix} 3 \\ -2 \end{pmatrix} \quad (0.3)$$

$$\implies \text{Sidelength} = \|\vec{AB}\| = \sqrt{\vec{AB}^T \cdot \vec{AB}} = \sqrt{(3-2) \begin{pmatrix} 3 \\ -2 \end{pmatrix}} = \sqrt{3^2 + 2^2} = \sqrt{13} \quad (0.4)$$

$$\implies \text{Perimeter} = 4 \cdot \overline{AB} = 4 \cdot \sqrt{13} \quad (0.5)$$

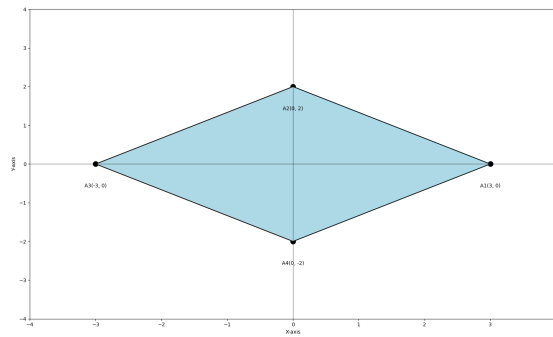


Fig. 0.1: Plot of plane and normal vector