1

Quiz 4

S Nithish

Abstract—This document contains the solution of the question from NCERT 11th standard chapter 10 exercise 10.1 problem 6

1 Exercise 10.1

1) Without using the Pythagoras theorem, show that the points (4, 4), (3, 5) and (-1, -1) are the vertices of a right angled triangle.

We need to show that points (4,4), (3,5) and (-1,-1) are vertices of a right triangle.

Let,

$$(A) = \begin{bmatrix} 4 \\ 4 \end{bmatrix}, (B) = \begin{bmatrix} 3 \\ 5 \end{bmatrix}, \text{ and } (C) = \begin{bmatrix} -1 \\ -1 \end{bmatrix} \quad (1.0.1)$$

$$(B) - (A) = \begin{bmatrix} 3 \\ 5 \end{bmatrix} - \begin{bmatrix} 4 \\ 4 \end{bmatrix} = \begin{bmatrix} -1 \\ 1 \\ (1.0.2) \end{cases}$$

$$(C) - (A) = \begin{bmatrix} -1 \\ -1 \end{bmatrix} - \begin{bmatrix} 4 \\ 4 \end{bmatrix} = \begin{bmatrix} -5 \\ -5 \\ (1.0.3) \end{cases}$$

$$((B) - (A))^{\mathsf{T}} ((A) - (C)) = \begin{bmatrix} -1 & 1 \end{bmatrix} * \begin{bmatrix} -5 \\ -5 \end{bmatrix} = 5 - 5 = 0$$

$$(1.0.4)$$

 $((A) - (B))^{\top}((A) - (C)) = 0 \Rightarrow$ angle between (A) - (B) and (B) - (C) is 90 degrees. Hence, $\triangle ABC$ is a right angled triangle with right angle at vertex A(4,4).