Quiz 4

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***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,

$$\brak{A} = \myvec{4\\4}, \brak{B} = \myvec{3\\5}, \text{and } \brak{C} = \myvec{-1\\-1} \tag{1.0.1}$$

$$\brak{B} - \brak{A} = \myvec{3\\5} - \myvec{4\\4} = \myvec{-1\\1} \tag{1.0.2}$$

$$\brak{C} - \brak{A} = \myvec{-1\\-1} - \myvec{4\\4} = \myvec{-5\\-5} \tag{1.0.3}$$

$$\brak{\brak{B} - \brak{A}}^{\top} \brak{\brak{A} - \brak{C}} = \myvec{-1 & 1} * \myvec{-5\\-5} = 5 - 5 = 0 \tag{1.0.4}$$

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