

# Assignment 1

Panisha Gundelli

## 1 QUESTION 1

Find the value of  $p$  for which the points  $(-5, 1)$ ,  $(1, p)$  and  $(4, -2)$  are collinear

## 2 SOLUTION

Given:-  $A(-5,1)$ ,  $B(1,p)$ ,  $C(4,-2)$ .

$$(x_1 = -5, y_1 = 1),$$

$$(x_2 = 1, y_2 = p).$$

$$(x_3 = 4, y_3 = -2)$$

The given points of A,B and C are collinear. Therefore,

$$x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) = 0 \quad (2.0.1)$$

$$(-5)(p + 2) + 1(-2 - 1) + 4(1 - p) = 0 \quad (2.0.2)$$

$$(-5p - 10 - 3 + 4 - 4p) = 0 \quad (2.0.3)$$

$$-9p = 9 \quad (2.0.4)$$

$$p = -1 \quad (2.0.5)$$

## 4 SOLUTION

As it is a Rhombus, the 4 equal sides will be equal to each other and the diagonals intersect at equal angles.

In  $\triangle AOB = \angle O = 90^\circ$

Acc. to pythagoruous theorem,

$$AB^2 = OA^2 + OB^2 \quad (4.0.1)$$

$$= \frac{AC^2}{2} + \frac{BC^2}{2} \quad (4.0.2)$$

$$AB^2 = \frac{AC^2 + BD^2}{4} \quad (4.0.3)$$

$$4AB^2 = AC^2 + BD^2 \quad (4.0.4)$$

Hence, it is proved that  $4AB^2 = AC^2 + BD^2$

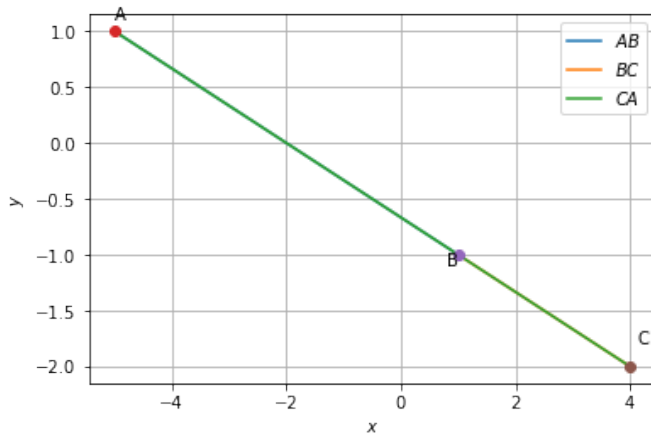


Fig. 2.1: Graphical solution

## 3 QUESTION2

Prove that in a right triangle, the square of the hypotenuse is equal to the sum of the squares of the other two sides. From Fig. ABCD which is rhombus. Prove that  $4AB^2 = AC^2 + BD^2$ .

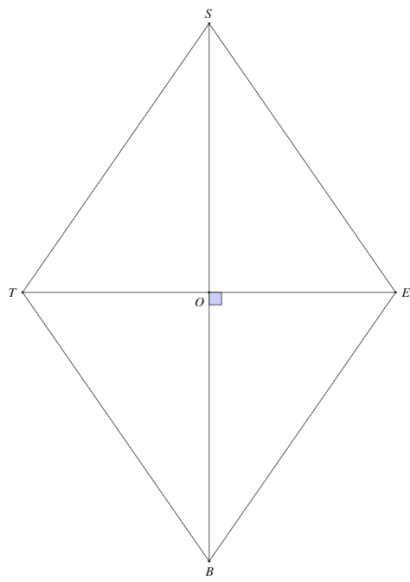


Fig. 4.1: Rhombus