Assignment 1

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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).

$$x_1 = -5, y_1 = 1 \tag{2.0.1}$$
$$x_2 = 1, y_2 = p \tag{2.0.2}$$
$$x_3 = 4, y_3 = -2 \tag{2.0.3}$$

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

$$x_1(y_2 - y_3) + x_2(y_3 - y_1) + x_3(y_1 - y_2) = 0 \tag{2.0.4}$$
$$(-5)(p + 2) + 1(-2 - 1) + 4(1 - p) = 0 \tag{2.0.5}$$
$$(-5p - 10 - 3 + 4 - 4p) = 0 \tag{2.0.6}$$
$$-9p = 9 \tag{2.0.7}$$
$$\implies p = -1 \tag{2.0.8}$$

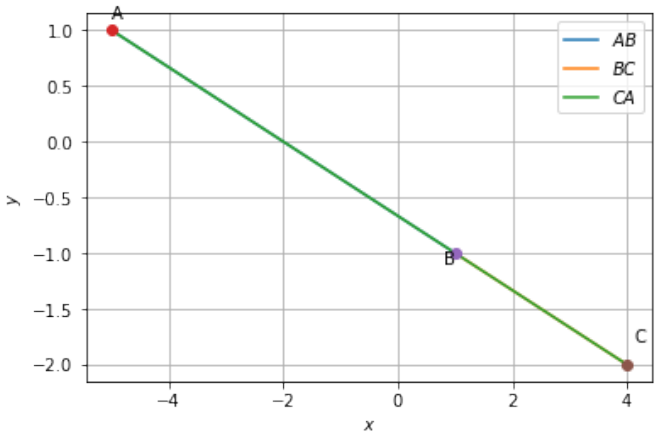

Fig. 2.1: Graphical solution

3 Question 2

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 $4AB^2 = AC^2 + BD^2$.

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 $\triangle AOB, \angle O = 90°$
Acc. to pythagorous theorem,we have

$$AB^2 = OA^2 + OB^2 \tag{4.0.1}$$
$$= \frac{AC^2}{2} + \frac{BC^2}{2} \tag{4.0.2}$$
$$AB^2 = \frac{AC^2 + BD^2}{4} \tag{4.0.3}$$
$$4AB^2 = AC^2 + BD^2 \tag{4.0.4}$$

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

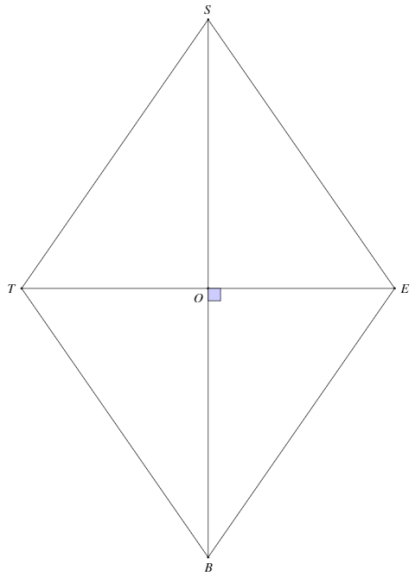

Fig. 4.1: Rhombus