Assignment 1

Panisha Gundelli

1 Question 1

Find the value of p for which the points $\mathbf{A} = \begin{pmatrix}-5\\1\end{pmatrix}, \mathbf{B} = \begin{pmatrix}1\\p\end{pmatrix}, \mathbf{C} = \begin{pmatrix}4\\-2\end{pmatrix}$are collinear

2 Solution

Given:- $\mathbf{A} = \begin{pmatrix}-5\\1\end{pmatrix}, \mathbf{B} = \begin{pmatrix}1\\p\end{pmatrix}, \mathbf{C} = \begin{pmatrix}4\\-2\end{pmatrix}$

It is given that the points are collinear, then the points should satisfy the condition.

$$B - A = k(C - A) \tag{2.0.1}$$

$$(B - A) = \begin{pmatrix}6\\p-1\end{pmatrix}, \tag{2.0.2}$$

$$(C - A) = \begin{pmatrix}9\\-3\end{pmatrix}, \tag{2.0.3}$$

Substituting the values in equation 2.0.1 we have

$$\begin{pmatrix}6\\p-1\end{pmatrix} = k\begin{pmatrix}9\\-3\end{pmatrix} \tag{2.0.4}$$

$$\implies 6 = 9k \tag{2.0.5}$$

$$\implies k = \frac{2}{3} \tag{2.0.6}$$

We also have

$$p - 1 = k(-3) \tag{2.0.7}$$

$$p - 1 = -3\frac{2}{3} \tag{2.0.8}$$

$$p - 1 = -2 \tag{2.0.9}$$

$$\implies p = -1 \tag{2.0.10}$$

collinear.PNG

Fig. 2.1: Graphical solution