Assignment 1

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

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

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

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

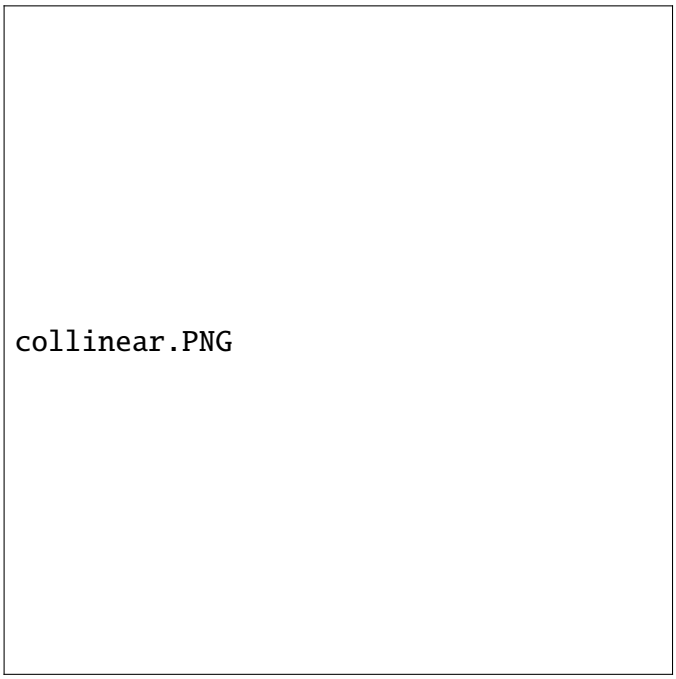

Fig. 2.1: Graphical solution