Question-1-1.6-8

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Question:
If the three points $\mathbf{A}\,(X,-1)$,$\mathbf{B}\,(2,1)$,$\mathbf{C}\,(4,5)$ are collinear,find the value of X
Solution:

point	Coordinates
A	$(X,-1)$
B	$(2,1)$
C	$(4,5)$

TABLE 0: variables used

Construct a Matrix for the above points

$$M = \begin{pmatrix} X & -1 & 1 \\ 2 & 1 & 1 \\ 4 & 5 & 1 \end{pmatrix} \tag{0.1}$$

The Determinant of the matrix is 0

$$Det = X(-4) + 1(-2) + 1(6) = 0 \tag{0.2}$$
$$\implies -4X + 4 = 0 \tag{0.3}$$
$$\implies X = 1 \tag{0.4}$$

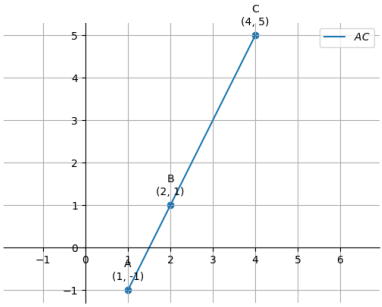

Fig. 0.1: Line **AC**