Find the ratio in which the line segment joining the points $(1, -3)$ and $(4, 5)$ is divided by X axis.

Solution: Let $\mathbf{A} = \begin{pmatrix} 1 \\ -3 \end{pmatrix}$ and $\mathbf{C} = \begin{pmatrix} 4 \\ 5 \end{pmatrix}$

Consider a point $\mathbf{B} = \begin{pmatrix} x \\ 0 \end{pmatrix}$ on the X-axis. As the points $\mathbf{A}, \mathbf{B}, \mathbf{C}$ are collinear The matrix $(\mathbf{B} - \mathbf{AC} - \mathbf{A})^\top$ has rank 1.

The matrix is in Row Reduced Echelon Form(RREF). To satisfy collinearity condition, the rank of matrix should be 1. Hence,

Assume the ratio **B** divides **A** and **C** be k:1