

SOLUTION OF TRIANGLE

1. If a $\triangle ABC$ has vertices $A(-1, 7)$, $B(-7, 1)$ and $C(5, -5)$, then its orthocentre has coordinates:

(1) $(3, -3)$

(2) $\left(-\frac{3}{5}, \frac{3}{5}\right)$

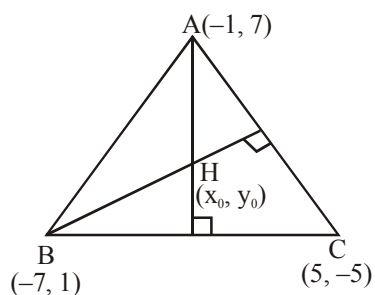
(3) $(-3, 3)$

(4) $\left(\frac{3}{5}, -\frac{3}{5}\right)$

SOLUTION

1. Official Ans. by NTA (3)

Sol. Let orthocentre is $H(x_0, y_0)$



$$m_{AH} \cdot m_{BC} = -1$$

$$\Rightarrow \left(\frac{y_0 - 7}{x_0 + 1} \right) \left(\frac{1 + 5}{-7 - 5} \right) = -1$$

$$\Rightarrow 2x_0 - y_0 + 9 = 0$$

..... (1)

$$\text{and } m_{BH} \cdot m_{AC} = -1$$

$$\Rightarrow \left(\frac{y_0 - 1}{x_0 + 7} \right) \left(\frac{7 - (-5)}{-1 - 5} \right) = -1$$

$$\Rightarrow x_0 - 2y_0 + 9 = 0 \quad \text{..... (2)}$$

Solving equation (1) and (2) we get

$$(x_0, y_0) \equiv (-3, 3)$$