

3) A belongs to (d)

then, its coordinates satisfy eqn. of (d)

$$\text{So } (m-2)(-2) + (2n-3)(5) + 15 = 0$$

$$\text{hence } -2m + 10n = 4 \quad \dots (1)$$

Now, (S) is perpendicular to (d) (given).

then, slope (S)  $\times$  slope (d) = -1

$$\text{but slope of (S) } = 2 \quad \text{of (d)} = -\frac{(m-2)}{2n-3}$$

$$\text{then, slope of (d)} = -\frac{1}{2}$$

$$\text{hence, } \left( -\frac{(m-2)}{2n-3} = -\frac{1}{2} \right) \times (-1)$$

$$2m - 2n = 1 \quad \dots (2)$$

$$\begin{cases} -2m + 10n = 4 \\ 2m - 2n = 1 \end{cases} \text{ add}$$

$$\boxed{n = \frac{5}{8}}$$

Sub value of  $n$  in eqn (2).

$$2m - 2\left(\frac{5}{8}\right) = 1$$

$$\boxed{m = \frac{9}{8}}$$

4) Since,  $\vec{EA} + \vec{EB} = \vec{EH}$  (✓)

then EAHB is a parallelogram. (✓)

5) Since EAHB is a parm (proved)

then,  $\vec{EA} = \vec{BH}$