

Que → Suppose that the points (h, k) , $(1, 2)$ and $(-3, 4)$ lie on the line L_1 . If a line L_2 passing through the points (h, k) and $(4, 3)$ is perpendicular to L_1 , then k/h equals

(2019 mains) 8

(a) $-\frac{1}{7}$

(b) $\frac{1}{3}$

(c) 3

(d) 0

Solution → points on line L_1 → condition of collinearity — (h, k) , $(1, 2)$ & $(-3, 4)$

$$\frac{2-k}{1-h} = \frac{4-2}{-3-1} = \frac{2}{-4} = -\frac{1}{2} \rightarrow \text{slope of } L_1$$

$$\rightarrow 2(2-k) = -(1-h)$$

$$\rightarrow 4-2k = -1+h$$

$$\rightarrow h = 5-2k \quad \text{--- (1)}$$

L_2 → passing through (h, k) & $(4, 3)$ is perpendicular to L_1 →

$$m(L_1) \times m(L_2) = -1$$

$$-\frac{1}{2} \times m(L_2) = -1$$

$$m(L_2) = 2.$$

$$m(L_2) = \frac{3-k}{4-h} = 2$$

$$\rightarrow 3-k = 2(4-h) \quad - \textcircled{2}$$

$$\rightarrow 3-k = 8 - 2(5-2k) \quad \text{from eq ① into eq ②}$$

$$\rightarrow 3-k = 8 - 10 + 4k$$

$$\rightarrow 5k = 5$$

$$\rightarrow k = 1 \quad \& \quad h = 3$$

So,

$$\boxed{\frac{h}{k} = \frac{3}{1} = 3}$$