

①

$\overset{2}{\bullet} \text{P}(x,y) \overset{3}{\bullet}$
 $\text{A}(-1,7) \qquad \text{B}(4,-3)$

$$x = \frac{2 \times 4 + 3 \times (-1)}{2+3}, \quad y = \frac{2 \times (-3) + 3 \times 7}{2+3}$$

$$= \frac{8-3}{5}, \quad = \frac{-6+21}{5}$$

$$= \frac{5}{5}, \quad = \frac{15}{5}$$

$$= 1, \quad = 3$$

$P(1,3)$ is required point.

②

$\overset{1}{\bullet} \text{P}(x_1, y_1) \overset{2}{\bullet} \text{Q}(x_2, y_2)$
 $\text{A}(4,-1) \qquad \text{B}(-2,-3)$

P and Q are points of trisection

$AP:PB = 1:2$

$$x_1 = \frac{1 \times (-2) + 2 \times 4}{1+2}, \quad y_1 = \frac{1 \times (-3) + 2 \times (-1)}{1+2}$$

$$= \frac{-2+8}{3}, \quad = \frac{-3-2}{3}$$

$$= \frac{6}{3}, \quad = -\frac{5}{3}$$

$$= 2$$

$\therefore P(2, -\frac{5}{3})$

Q is midpt. of PB

$$x_2 = \frac{2 + (-2)}{2}, \quad y_2 = \frac{-\frac{5}{3} + (-3)}{2}$$

$$= \frac{0}{2}, \quad = \frac{-5 + (-9)}{6}$$

$$= 0, \quad = -\frac{14}{6}$$

$$= -\frac{7}{3}$$

$\therefore Q(0, -\frac{7}{3})$

③

$\text{A}(x,y)$
 $\text{N}(2,25) \qquad \text{P}(8,20)$

A is midpoint of NP

$$\therefore x = \frac{2+8}{2}, \quad y = \frac{25+20}{2}$$

$$= \frac{10}{2}, \quad = \frac{45}{2}$$

$$= 5, \quad = 22.5$$

Rashmi posts her flag on the 5th line at a distance of 22.5 m

distance between flags of Niharika and Preet

$$= \sqrt{(8-2)^2 + (20-25)^2}$$

$$= \sqrt{36+25}$$

$$= \sqrt{61}$$