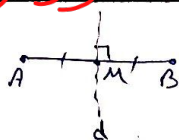


۲۰ عالم فوستر

$A(1, -1) \quad B(2, 1)$



$$\rightarrow m_{AB} = \frac{1 - (-1)}{2 - 1} = 2 \rightarrow m_d \times m_{AB} = -1 \rightarrow m_d = -\frac{1}{2}$$

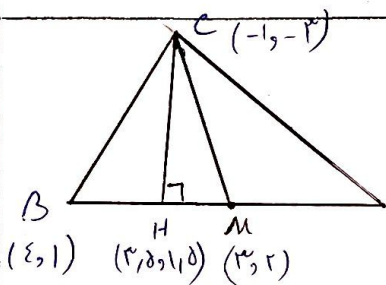
$$\left. \begin{aligned} &\rightarrow d: y = -\frac{1}{2}x + \frac{3}{2} \\ &M = (1.5, 0) \end{aligned} \right\} \rightarrow y = x + 3$$

$A(1, 1) \quad B(-2, 1) \quad C(-1, 3) \rightarrow BC: y = -\frac{2}{3}x + \frac{5}{3} \rightarrow 3y + 2x - 5 = 0$

$BC = \sqrt{(1 - (-1))^2 + (1 - 3)^2} = \sqrt{4 + 4} = 2\sqrt{2}$

$AH = BC/2 \rightarrow AH = \frac{|3 \times 1 + 2 \times 1 - 5|}{\sqrt{3^2 + 2^2}} = \frac{0}{\sqrt{13}} = 0$

$BC - AH = 2\sqrt{2}$



$\rightarrow M = (\frac{1 + (-2)}{2}, \frac{1 + 1}{2}) = (-0.5, 1)$

$m_{AB} = \frac{1 - 1}{-2 - 1} = 0 \rightarrow AB: y = 1$

$A(1, 1) \rightarrow AB \perp CH \rightarrow m_{CH} = \text{undefined} \rightarrow CH: x = -1$

$\rightarrow -x + 1 = x - 1 \rightarrow x = 1 \rightarrow H(1, 1) \rightarrow MH = \sqrt{(-1 - 1)^2 + (1 - 1)^2} = 2$

$L_1: 4y - 2x = 12 \rightarrow L_1 \parallel L_2 \rightarrow \frac{a}{a'} = \frac{b}{b'} \rightarrow \frac{2}{-2} = \frac{-4}{-2} \rightarrow a = 2$

$L_2: 4y - ax = 2$

$\text{فاصله} = \frac{|C - C'|}{\sqrt{a^2 + b^2}} = \frac{|12 - 2|}{\sqrt{4 + 4}} = \frac{10}{\sqrt{8}} = \frac{5\sqrt{2}}{2} \rightarrow r = \frac{5\sqrt{2}}{2}$

$\rightarrow S = \pi r^2 = \pi \times \frac{25}{2} = \frac{25\pi}{2}$

$(2m - 2)x + (8 - m)y - 1 = 0 \rightarrow m = \frac{2 - 2m}{8 - m}$

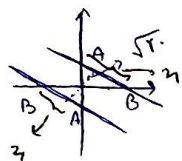
$(m + 1)x - (2m - 2)y + 1 = 0 \rightarrow m' = \frac{m + 1}{2m - 2} \rightarrow \frac{2 - 2m}{8 - m} \times \frac{m + 1}{2m - 2} = -1$

$\rightarrow \frac{-2m^2 - m + 1}{-2m^2 + 12m - 2} = -1 \rightarrow -2m^2 - m + 1 = -2m^2 + 12m - 2 \rightarrow -13m + 3 = 0 \rightarrow m = \frac{3}{13}$

$\rightarrow m = -1 \quad m = \frac{1}{8} \rightarrow m = \frac{1}{8}$

$$\begin{cases} AB: x+2y=2 \\ AC: y=2x-1 \\ BC: x+y=2 \end{cases} \rightarrow \begin{cases} -\frac{x}{2} + \frac{y}{2} = 2x-1 \rightarrow 2,8x = \frac{8}{5} \rightarrow x=1 \rightarrow A(1,1) \\ 2x-1 = -x+2 \rightarrow 3x=3 \rightarrow x=1 \rightarrow C(\frac{8}{5}, \frac{4}{5}) \\ -\frac{x}{2} + \frac{y}{2} = -x+2 \rightarrow \frac{x}{2} = \frac{8}{5} \rightarrow x=\frac{8}{5} \rightarrow B(\frac{8}{5}, -1) \end{cases} M(\frac{1}{5}, \frac{2}{5})$$

$$\frac{AM}{AH} = \frac{\sqrt{(\frac{4}{5})^2 + (-\frac{1}{5})^2}}{\frac{|1+1-2|}{\sqrt{1+1}}} = \frac{\sqrt{\frac{17}{25}}}{\frac{0}{\sqrt{2}}} = \frac{\sqrt{\frac{17}{25}}}{\frac{2}{\sqrt{2}}} = \frac{\frac{\sqrt{17}}{5}}{\frac{2}{\sqrt{2}}} = \frac{\sqrt{17}}{5} \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{34}}{10} = \frac{1}{2} = \frac{8}{16} \checkmark$$



$$\rightarrow |B| \times |A| = \sqrt{2} \times |AB| \rightarrow |B| \times |A| = \sqrt{2} \times x$$

$$\rightarrow |B| = 2|A| \rightarrow 2 \times |A|^2 = \sqrt{2} \times \sqrt{2^2 + 1^2} \rightarrow 2|A|^2 = \sqrt{2} \times \sqrt{5} \rightarrow |A|^2 = \frac{\sqrt{10}}{2}$$

$$\rightarrow 2|A|^2 = 1 \times |A|^2 \rightarrow |A| = 1 \rightarrow |B| = 2 \rightarrow |AB| = \sqrt{1^2 + 1^2} = \sqrt{2} \checkmark$$

عرض از مبدا هر دو (2) است. سیم هر دو از نقطه (2,0) می گذرند. از این جا مشخص است. دایره ها آن 8/5 است

$$\begin{cases} y = \frac{4}{5}x + 2 \\ y = (1-m)x + 2 \end{cases}$$

$$\rightarrow (1-m)x_1 + 2 = 0 \rightarrow x_1 = \frac{-2}{1-m}, \quad \frac{4}{5}x_2 + 2 = 0 \rightarrow x_2 = -\frac{5}{2} \rightarrow |x_1 - x_2| = \frac{5}{2}$$

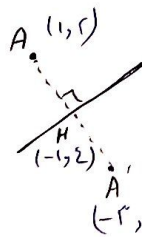
$$\rightarrow \left| \frac{-2}{1-m} + \frac{5}{2} \right| = \frac{5}{2} \rightarrow \begin{cases} \frac{m^2 - m + 2}{2m - 1} = \frac{5}{2} \rightarrow 2m^2 - 12m + 18 = 0 \rightarrow m = 3 \\ \frac{m^2 - m + 2}{2m - 1} = -\frac{5}{2} \rightarrow 2m^2 + 18m - 2 = 0 \rightarrow m = -1 \end{cases}$$

$$y = 2x - 2 \quad M(2, -2)$$

$$m' = 2 \xrightarrow{x=1} A(1, -1) \rightarrow A'(2, -2)$$

$$\rightarrow y' = 2x + b \xrightarrow{(2, -2)} y' = 2x - 4 \checkmark$$

$$A(1, 2)$$



$$AH: y = -x + b \xrightarrow{(1, 2)} y = -x + 3$$

$$y = x + 8$$

$$\rightarrow -x + 3 = x + 8 \rightarrow x = -1 \rightarrow H(-1, 4)$$

$$\rightarrow A'(-2, 4) \rightarrow \begin{cases} a = -2 \\ b = 4 \end{cases} \rightarrow 2b - a = 12 + 2 = 14 \checkmark$$