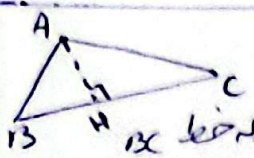


$$m = \frac{1+4}{4-1} = \frac{5}{3} = -V \Rightarrow m' = \frac{1}{V} \quad \text{①}$$

$$x = \frac{2+1}{2} = 3 \quad y = \frac{1-2}{2} = -\frac{1}{2} \Rightarrow Z(3, -\frac{1}{2}) \rightarrow \text{نقطه تقاطع}$$

$$\textcircled{2} \Rightarrow y - y_1 = m(x - x_1) \Rightarrow y - 1 = \frac{1}{V}(x - 3) \Rightarrow y = \frac{x}{V} - \frac{3}{V} + 1 \quad \textcircled{2}$$

$$y = \frac{x}{V} + \frac{4}{V}$$



$$BC = \sqrt{(-1+4)^2 + (3-1)^2} = \sqrt{10} = \omega$$

$$\text{محاسبه } m: \frac{V-3}{-1+1} = \frac{-1}{V} \Rightarrow y - V = \frac{-1}{V}(x + 1) \Rightarrow y = \frac{-x}{V} - \frac{1}{V} + V$$

$$y = \frac{-x}{V} + \frac{4}{V} \Rightarrow 3y = -x + 4 \Rightarrow 3y + x - 4 = 0$$

$$AM \Rightarrow \frac{4+1-3-1}{\sqrt{9+16}} = \frac{1}{\omega} \Rightarrow 2 \quad d_{BC} - d_{AM} = 3$$

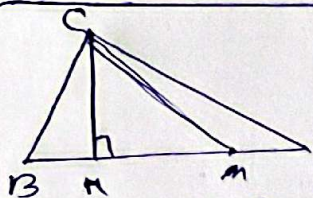
$$\text{نقطه } Z \Rightarrow \begin{cases} y - \frac{1}{V}x = 3 \\ y - \frac{1}{V}x = \frac{1}{V} \end{cases} \Rightarrow \frac{|c-c'|}{\sqrt{a^2+b^2}} = \frac{|3-\frac{1}{V}|}{\sqrt{1+\frac{1}{V^2}}} = \frac{3}{\frac{V}{\sqrt{V^2+1}}} = \frac{3\sqrt{V^2+1}}{V}$$



$$\text{موازی: } 3y - x = V \Rightarrow 3y = x + V \Rightarrow y = \frac{x}{3} + \frac{V}{3} \Rightarrow m = \frac{1}{3}$$

$$3y = x + 2 \Rightarrow y = \frac{x}{3} + \frac{2}{3} \Rightarrow y = \frac{1}{3}x + \frac{2}{3}$$

$$\text{مساحت: } \frac{3}{\sqrt{10}} \Rightarrow \text{مساحت دایره } \pi r^2 \Rightarrow \pi \left(\frac{3}{\sqrt{10}}\right)^2 = \pi \frac{9}{10} = \frac{9}{10}\pi$$



$$C(-1, -3), B(4, 1), A(2, 3)$$

$$m_{BC} = \frac{1+3}{4-1} = \frac{4}{3} \Rightarrow y_M = \frac{4}{3}x + 1 \Rightarrow M(3, 5) \quad \textcircled{2}$$

$$AC = \sqrt{(-1-2)^2 + (-3-3)^2} = \sqrt{36} = 6$$

$$AH = \frac{|-1-3-3|}{\sqrt{1+1}} = \frac{7}{\sqrt{2}} \quad CH^2 + HM^2 = CM^2 \Rightarrow 49 = \frac{49}{2} + HM^2 \Rightarrow HM = \frac{7}{\sqrt{2}}$$

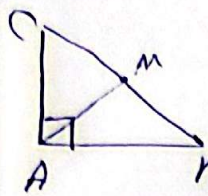
$$\textcircled{3} \Rightarrow \frac{3-1}{2-1} = \frac{1}{-1} \Rightarrow y - 3 = -1(x - 2) \Rightarrow y = -x + 5 \Rightarrow y + x - 5 = 0$$

$$\begin{cases} (m+1)x - (2m-5)y + 1 = 0 \\ (2m-2)x - (5-m)y - 1 = 0 \end{cases} \Rightarrow m = \frac{m+1}{-2m+5} \Rightarrow \frac{2m-2}{5-m} = \frac{-1}{-2m+5}$$

$$\frac{2m-2}{5-m} = \frac{2m-5}{m+1} \Rightarrow (2m-2)(m+1) = (2m-5)(5-m) \Rightarrow 2m^2 - 4m - 2 = 10m - 2m^2 - 25 + 5m \Rightarrow 4m^2 - 19m + 23 = 0$$

$$\Delta = 19^2 - 4 \cdot 23 = 121 \Rightarrow \sqrt{121} = 11$$

$$\begin{cases} AB: x+y=2 \\ AC: y=2m-1 \\ BC: x+y=5 \end{cases}$$



$$\begin{cases} AB: y = -\frac{1}{x}x + 2 \\ AC: y = 2m - 1 \end{cases} \Rightarrow \begin{cases} \text{Midpoint of } AC \text{ is } (\frac{1}{2}, \frac{2m-1}{2}) \\ \text{Line } AM \text{ is perpendicular to } BC \end{cases}$$

$$-m + 2 = -\frac{1}{2} + \frac{2m-1}{2} \Rightarrow \frac{1}{2}m = \frac{1}{2} \Rightarrow m = 1 \Rightarrow y = -x + 2 \Rightarrow B(1, 1)$$

$$AM = \frac{BC}{2} = \frac{\sqrt{(1-1)^2 + (1-1)^2}}{2} = \frac{\sqrt{0}}{2} = 0 \Rightarrow C(1, 1)$$

$$d_{AH} = \sqrt{1+1} = \sqrt{2} \Rightarrow \frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}} \Rightarrow \frac{1}{\sqrt{2}} = \frac{1}{\sqrt{2}}$$

$$m = \frac{1}{x} \Rightarrow y = -\frac{1}{x}x + b \Rightarrow -\frac{1}{x}x - y + b = 0 \Rightarrow \sqrt{2} = \frac{|b|}{\sqrt{\frac{1}{x^2} + 1}} \Rightarrow |b| = \omega \Rightarrow \frac{1}{x}x + b = 0 \Rightarrow A(1, 0)$$

$$\text{if } x=0 \Rightarrow b = y \Rightarrow AB = \sqrt{(0-1)^2 + (b-0)^2} = |b|\sqrt{2} \Rightarrow \omega\sqrt{2}$$

$$y = (1-m)x + 2 \quad y = \frac{r}{m}x + 2 \quad y_1 = y_2 \Rightarrow (1-m)x + 2 = \frac{r}{m}x + 2 \Rightarrow x = 0, y = 2 \Rightarrow A(0, 2)$$

$$\begin{cases} (1-m)x + 2 = 0 \Rightarrow x_1 = \frac{r}{m-1} \\ \frac{r}{m}x + 2 = 0 \Rightarrow x_2 = -\frac{2m}{r} \end{cases} \Rightarrow (x_1, 0) \cdot (x_2, 0) \cdot (0, 2) \Rightarrow h_{\Delta} = 2$$

$$S_{\Delta} = \frac{1}{2} \cdot 2 \cdot |x_1 - x_2| = |x_1 - x_2| \Rightarrow \left| \frac{r}{m-1} + \frac{2m}{r} \right| = \frac{\omega}{r} \Rightarrow$$

$$\begin{cases} \frac{r}{m-1} + \frac{2m}{r} = \frac{\omega}{r} \Rightarrow m = 2 \\ \frac{r}{m-1} + \frac{2m}{r} = -\frac{\omega}{r} \Rightarrow m = 2 + \sqrt{2} \end{cases} \Rightarrow P(-1, \sqrt{2}) \cdot (-1, \sqrt{2}) = -2$$

$$\begin{cases} m_M = \frac{m_B + m_B'}{2} \Rightarrow 2 = \frac{6 + m_B'}{2} \Rightarrow m_B' = 2 \\ y_M = \frac{y_B + y_B'}{2} \Rightarrow -4 = \frac{-2 + y_B'}{2} \Rightarrow y_B' = -6 \end{cases} \Rightarrow d' = \frac{m}{r} - 2 \quad md = 2 \rightarrow md' = 2 \quad y = 2m - 4$$

$$A(1, 2) \quad m_{AA'} = -1 \Rightarrow y - 2 = -1(x - 1) \Rightarrow y = -x + 3 \Rightarrow AA': y = -x + 3$$

$$\begin{cases} y - 2 = 0 \\ x + 2 = 0 \end{cases} \Rightarrow y = 2, x = -2 \Rightarrow B(-2, 2)$$

$$a' = \omega, y' = 1 \Rightarrow A'(\omega, 1) \quad 2b - a = 2 \times 1 - \omega = 2 - \omega$$

$$rba = 1$$