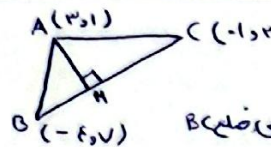


$$A(-4, 1) \quad B(2, 1) \rightarrow \text{شیب } m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - (-4)}{2 - (-4)} = -\frac{1}{2} \rightarrow \text{شیب عمود } m' = \frac{1}{2}$$

$$M\left(\frac{x_A + x_B}{2}, \frac{y_A + y_B}{2}\right) \Rightarrow M\left(\frac{-4 + 2}{2}, \frac{1 + 1}{2}\right) \Rightarrow M(-1, 1)$$

معادله عمود منصف: $y = m'x + b$ $\frac{m' = \frac{1}{2}}{M(-1, 1)} \rightarrow 1 = \frac{1}{2}x + b \rightarrow b = \frac{3}{2} \rightarrow y = \frac{1}{2}x + \frac{3}{2}$



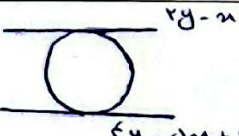
$$A(3, 1) \quad C(-1, 3) \quad \text{طول BC: } \sqrt{\Delta x^2 + \Delta y^2} = \sqrt{(-1 - (-4))^2 + (3 - 1)^2} = \Delta$$

$$B(-4, 1) \quad \text{میدانی ضلع BC} \Rightarrow m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{1 - 3}{-4 - (-1)} = \frac{-2}{-3} = \frac{2}{3}$$

$$y = mx + b \rightarrow 1 = \frac{2}{3}(-4) + b \rightarrow b = \frac{11}{3}$$

$$\text{طول ارتفاع AH} = \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{|\frac{2}{3}x - \frac{2}{3}y + \frac{11}{3}|}{\sqrt{(\frac{2}{3})^2 + (-\frac{2}{3})^2}} = \frac{|\frac{2}{3}(3) - \frac{2}{3}(1) + \frac{11}{3}|}{\sqrt{\frac{4}{9} + \frac{4}{9}}} = \frac{|\frac{2}{3}(2) + \frac{11}{3}|}{\sqrt{\frac{8}{9}}} = \frac{|\frac{15}{3}|}{\sqrt{\frac{8}{9}}} = \frac{5}{\sqrt{\frac{8}{9}}} = \frac{15}{2\sqrt{2}}$$

$$\text{طول ارتفاع BC} = \Delta - 2 = 3$$

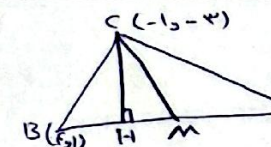


$$\begin{cases} y - x = 2 \rightarrow y = x + 2 \\ y - x = 4 \rightarrow y = x + 4 \end{cases}$$

$$\frac{a}{a'} = \frac{b}{b'} \neq \frac{c}{c'} \Rightarrow \frac{1}{1} = \frac{-1}{-1} \Rightarrow a = 2$$

$$\text{فاصله مرکز تا خط} = \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|2 - 4|}{\sqrt{1^2 + (-1)^2}} = \frac{2}{\sqrt{2}} = \sqrt{2}$$

$$\text{مساحت دایره} = \pi r^2 = (\frac{\sqrt{2}}{2})^2 \pi = \frac{\pi}{2}$$



$$C(-1, 3) \quad A(2, 3) \quad \text{میدانی ضلع AB} \Rightarrow m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 3}{2 - (-1)} = 0$$

$$y = mx + b \rightarrow 3 = 0(-1) + b \rightarrow b = 3$$

$$\text{میدانی ارتفاع CH} \Rightarrow m' = -\frac{1}{m} \rightarrow m' = -\frac{1}{0} \rightarrow m' = 1$$

$$y = m'x + b \rightarrow 3 = 1(-1) + b \rightarrow b = 4$$

$$y = x + 4$$

$$\text{فاصله مرکز تا خط} = \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|3 - 4|}{\sqrt{1^2 + 1^2}} = \frac{1}{\sqrt{2}}$$

$$\text{معادله خط} \rightarrow m' = -\frac{1}{m}$$

$$\begin{cases} (m-2)x + (2-m)y - 1 = 0 \rightarrow m = \frac{-2m+2}{2-m} \\ (m+1)x - (2m-4)y + 1 = 0 \rightarrow m' = \frac{m+1}{2m-4} \end{cases} \rightarrow \frac{m+1}{2m-4} = \frac{2-m}{2m-2} \rightarrow 2m^2 + m - 2 = -2m^2 + 4m - 2$$

$$\rightarrow 4m^2 - 3m + 4 = 0 \rightarrow m^2 - 3m + 9 = 0 \rightarrow \Delta = 149 - 340 < 0$$

