

$$a \leq \frac{-14}{4} \leq -\frac{7}{2} \Rightarrow \text{شرط } a = \frac{1}{4} \Rightarrow y = \frac{1}{4}x + b$$

$$\text{نقطه وسط } M \left(\frac{2+4}{2}, \frac{3+1}{2} \right) = (3, 2) \Rightarrow y = \frac{1}{4}x + b$$

$$2 = \frac{1}{4}(3) + b \Rightarrow b = \frac{5}{4} \quad y = \frac{1}{4}x + \frac{5}{4}$$

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

$$\text{فاصله خط } BC \Rightarrow a \leq \frac{f}{\sqrt{a^2+b^2}} \rightarrow y = \frac{1}{4}x + b \xrightarrow{(-1, 3)} 3 = \frac{1}{4} + b \Rightarrow b = \frac{11}{4} \quad \frac{1}{4}x + y - \frac{11}{4} = 0$$

$$\text{فاصله نقطه } A \text{ از خط } BC = d = \frac{|1+1-\frac{11}{4}|}{\sqrt{1+\frac{1}{16}}} = \frac{\frac{10}{4}}{\frac{5}{4}} = \frac{10}{5} = 2$$

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$$BC - AH = 2 - 2 = 0$$

$$\text{فاصله خط از هم} = \text{قطر دایره} \quad 4y - 2x - 2 = 0 \rightarrow a = \frac{4}{5} \quad / \quad 2y - x - 1 = 0 \rightarrow a = \frac{1}{2}$$

$$d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} \quad \text{در خط موازی} \Rightarrow \frac{a}{c} \leq \frac{1}{2}, a \leq 2 \quad \hookrightarrow x^2 = 4y - 2x - 1 = 0$$

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$$4y - 2x - 2 = 0, 4y - 2x - 1 = 0$$

$$d = \frac{|-2+14|}{\sqrt{14+4}} = \frac{12}{\sqrt{18}} = \frac{4}{\sqrt{2}} \Rightarrow \text{شعاع دایره} = \frac{2}{\sqrt{2}} \quad \text{مساحت دایره} = \pi r^2 = \frac{2}{\sqrt{2}} \pi$$

$$M \left(\frac{2+4}{2}, \frac{3+1}{2} \right) = M(3, 2) \quad \text{AB معلوم } y = -x + 5$$

$$\text{شیب } AB = \frac{2}{-1} = -2 \Rightarrow \text{شیب } AH = 1, y = x + b \xrightarrow{(-1, 3)} b = 2$$

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$$\begin{cases} y = x - 2 \\ y = -x + 5 \end{cases} \quad 2y = 3, y = \frac{3}{2}, x = \frac{7}{2} \quad H \left(\frac{7}{2}, \frac{3}{2} \right)$$

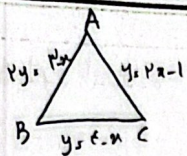
$$MH = \sqrt{\left(3 - \frac{7}{2}\right)^2 + \left(2 - \frac{3}{2}\right)^2} = \sqrt{\frac{1}{4} + \frac{1}{4}} = \frac{\sqrt{2}}{2}$$

$$\begin{cases} (m+1)x - (2m-4)y + 1 = 0 \rightarrow a = \frac{-(m+1)}{-(2m-4)} = \frac{m+1}{2m-4} \\ (3m-2)x + (5-m)y - 5 = 0 \rightarrow a = \frac{2-3m}{5-m} \end{cases} \quad \text{بر هم عمود} = \frac{m+1}{2m-4} = \frac{5-m}{3m-2}$$

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$$(m+1)(3m-2) = (5-m)(2m-4) \rightarrow 3m^2 - 13m + 2 = 0, \Delta = 149 - 36 = 113$$

$$\Delta < 0, \text{ هجرت برای } m \Rightarrow \text{هیچ جوابی ندارد}$$



$$A \begin{cases} 2y = 3-x \\ y = 2x-1 \end{cases} \rightarrow y=1, x=1 \quad / \quad B \begin{cases} y = 2-x \\ 2y = 3-x \end{cases} \rightarrow y=1, x=1$$

$$C \begin{cases} y = 2x-1 \\ y = 2-x \end{cases} \rightarrow y = \frac{1}{3}, x = \frac{2}{3}$$

$$M\left(\frac{2+\frac{1}{3}}{2}, \frac{-1+\frac{2}{3}}{2}\right) \rightarrow M\left(\frac{1}{2}, \frac{1}{6}\right), \quad \text{طول } AM = \sqrt{\left(\frac{1}{2}\right)^2 + \left(\frac{1}{6}\right)^2} = \sqrt{\frac{10}{9}} = \frac{\sqrt{10}}{3}$$

$$\text{طول } BC = 2 \rightarrow \text{طول } AH = \frac{1+1-1}{\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \quad \Rightarrow \quad \frac{AM}{AH} = \frac{\frac{\sqrt{10}}{3}}{\frac{\sqrt{2}}{2}} = \frac{2\sqrt{5}}{3}$$

$$y = mx + b, (0, A), (B, 0) \quad / \quad y = -\frac{1}{2}x + C, A(0, C), B(2C, 0)$$

$$d = \frac{|0+0+C|}{\sqrt{1+m^2}} = \frac{|C|}{\sqrt{1+m^2}} \Rightarrow |C| \leq \sqrt{2} \times \frac{\sqrt{2}}{2} = 1 \Rightarrow C \leq \sqrt{2} - \omega$$

$$AB = \sqrt{(2C-0)^2 + (0-C)^2} = \sqrt{5C^2} = |C| \sqrt{5} \Rightarrow AB \leq \sqrt{5}$$

$$(1) \text{ خط } y = \frac{2}{m}x + 2 \quad \text{و} \quad (2) \text{ خط } y = (1-m)x + 2 \quad \text{و} \quad y=0$$

$$\text{نقطه تقاطع } (-\frac{m}{2}, 0) \quad \text{و} \quad \text{نقطه تقاطع } (\frac{2}{m-1}, 0) \quad / \quad \text{ارتفاع مثلث برابر با } y$$

$$\text{مساحت} = \frac{\text{ارتفاع} \times \text{قاعده}}{2} = \frac{|\frac{2}{m-1} - (-\frac{m}{2})| \times 2}{2} = \frac{2}{m-1} + \frac{m}{2} \leq \frac{\omega}{2} \Rightarrow \left| \frac{2}{m-1} + \frac{m}{2} \right| \leq \frac{\omega}{2}$$

$$\frac{2}{m-1} + \frac{m}{2} \leq \frac{\omega}{2} \Rightarrow m=3 \quad \Rightarrow \quad \frac{2}{m-1} + \frac{m}{2} = \frac{\omega}{2} \Rightarrow m=3 \pm \sqrt{5} \Rightarrow (-2+\sqrt{5})(-2-\sqrt{5})(3) = -3$$

$$\text{نقطه تقاطع } (0, -3) \quad \text{و} \quad (\frac{2}{3}, 0) \quad \frac{\frac{2}{3} + 0}{\frac{2}{3}} \leq 2 \Rightarrow x \leq \frac{\omega}{2}, \quad \frac{y+0}{\frac{2}{3}} \leq 2 \Rightarrow y \leq -4 \quad (\frac{\omega}{2}, -4)$$

$$\frac{0+x}{\frac{2}{3}} \leq 2 \Rightarrow x \leq 4, \quad \frac{-3+y}{\frac{2}{3}} \leq -2 \Rightarrow y \leq -1 \quad (4, -1)$$

$$\text{خط } a: \frac{-3}{-\frac{2}{3}} \leq 2, \quad y = 2x + b \rightarrow -1 = 2(4) + b \Rightarrow b = -9 \rightarrow y = 2x - 9$$

خطی که نقطه A و نقطه قریب آن یعنی A' را بهم وصل کند بر خط $y = x + 5$ عمود است در سبب آن برابر با (-1) است

$$y = -x + b \quad (1, 2) \rightarrow 2 = -1 + b \Rightarrow b = 3, \quad y = -x + 3$$

$$\begin{cases} y = -x + 3 \\ y = x + 5 \end{cases} \quad 2y = 8, \quad y = 4 \Rightarrow x = -1 \quad (-1, 4) \rightarrow \text{نقطه تقاطع در خط}$$

$$(a, b) / (1, 2) \rightarrow \frac{a+1}{2} \leq -1 \Rightarrow a \leq -3, \quad \frac{b+2}{2} \leq 4, \quad b \leq 6$$

$$2b - a = 2 \times 4 + 3 = 11$$