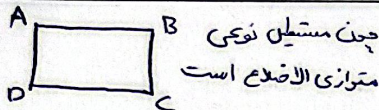


$$\text{شیب } m = \frac{-1}{3} = \frac{y_2 - y_1}{x_2 - x_1} = \frac{m - 1}{4 - (-2)} = \frac{-1}{3} \rightarrow m - 1 = -3$$

$$\text{فاصله نقطه از خط} = \text{فاصله مربع} = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{(4 - (-2))^2 + (m - 1)^2} = \sqrt{49} = 7$$

$$\text{مساحت مربع} = (\text{ضلع})^2 = (7)^2 = 49$$



چون مستطیل نوعی متوازی الاضلاع است

$$\Rightarrow x_A + x_C = x_B + x_D \Rightarrow -1 + x = 3 - 1 - x \Rightarrow x = \frac{3}{2}$$

$$m_{AB} = \frac{y_B - y_A}{x_B - x_A} = \frac{1 - 4}{\frac{3}{2} - (-1)} = \frac{-3}{\frac{5}{2}} = \frac{-6}{5}$$

$$AB \perp BC \Rightarrow m_{BC} = \frac{-1}{m_{AB}} = \frac{5}{6} = \frac{y_C - y_B}{x_C - x_B}$$

$$\Rightarrow \frac{y - 1}{\frac{3}{2} - 3} = \frac{5}{6} \rightarrow 3y - 3 = 4 - 12 \rightarrow y = -1$$

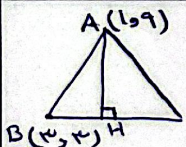
$$AB = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{19 + 9} = 5 \quad BC = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{\frac{9}{4} + 25} = \frac{5}{2}$$

$$\text{شیب} = \tan \alpha = \tan 40^\circ = \sqrt{3}$$

$$2mx + (m^2 - 1)y = 3 \rightarrow m = \frac{-2m}{m^2 - 1} \rightarrow \frac{-2m}{m^2 - 1} = \sqrt{3} \rightarrow \sqrt{3}m^2 - \sqrt{3} = -2m$$

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

$$\text{افزاد} \frac{1}{\sqrt{3}} - (-\sqrt{3}) = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$$

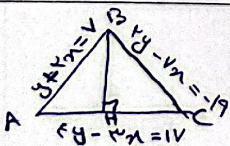


$$m_{CB} = \frac{y_C - y_B}{x_C - x_B} = \frac{11 - 3}{7 - 3} = 2$$

$$y = mx + b \quad \frac{m=2}{(3, 3)} \rightarrow 3 = 2(3) + b \rightarrow b = -3$$

$$\Rightarrow \text{معادله خط BC} \Rightarrow y = 2x - 3 \rightarrow 0y - 2x + 3 = 0$$

$$\text{فاصله نقطه از خط} = \text{فاصله مربع} = \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{|1 - 2(1) + 3|}{\sqrt{4 + 1}} = \frac{2}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$$

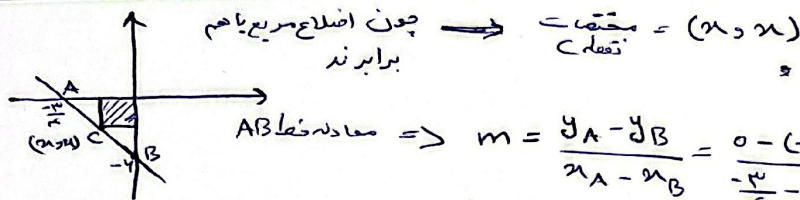


$$\text{خط BC} = 2y - 7x = -19 \rightarrow y = \frac{7x - 19}{2}$$

$$\text{خط AB} : y + 2x = 7 \rightarrow y = -2x + 7$$

$$y = 1$$

$$\text{فاصله نقطه از خط} = \text{فاصله مربع} = \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{|-3(3) + 4(1) - 19|}{\sqrt{9 + 16}} = \frac{22}{5}$$



$$y = mx + b \xrightarrow{(0, -4)} y = -\sqrt{2}x - 4 \xrightarrow{\text{نقطه روی خط } AB} x = -\sqrt{2}x - 4 \rightarrow x = \frac{-4}{2\sqrt{2}} = \frac{-2}{\sqrt{2}}$$

$$\text{فاصله نقطه تا خط} = \sqrt{(5x)^2 + (4y)^2} = \sqrt{\frac{4}{9} + \frac{4}{9}} = \frac{2\sqrt{2}}{3}$$

$$a \cdot y - x = a - 1 \rightarrow m = \frac{1}{a} \quad \left. \begin{array}{l} \text{مماسی} \\ \text{چون} \\ \text{مماسی} \end{array} \right\} m = m' \rightarrow \frac{1}{a} = a \rightarrow a^2 = 1 \rightarrow a = \pm 1$$

$$y = ax = 1 \rightarrow m' = a$$

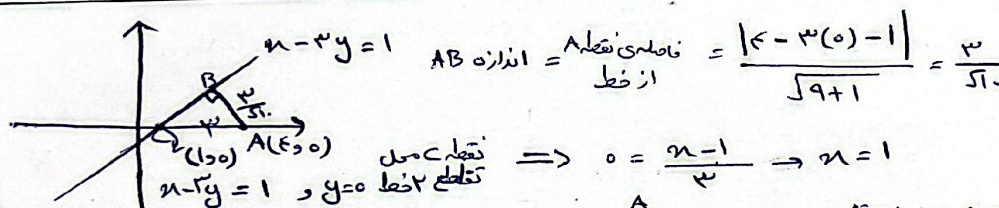
$a = 1 \rightarrow y - x = 0$ (خطی) $y - x = 1$ (خطی) $y - 1 \neq 0$ $y - 1 = 1 \checkmark$ $\rightarrow$ بی نقطه
 $a = -1 \rightarrow -y - x = -2$ (خطی) $y + x = 1$ (خطی) $-2 - 1 \neq -2 \times$ $-2 + (-1) \neq 1 \times$
 بی نقطه (دایره) $\rightarrow$ بی مماسی نیست پس $a \neq -1$

مساحت مستطیل $= (AB) \times (AD) = \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{1}{2}$

$AB = \frac{|1 - 1|}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$AD = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$(\frac{\sqrt{2}}{2})^2 + (\frac{\sqrt{2}}{2})^2 = 1 \rightarrow AD = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$



AC اندازه $= x_A - x_C = 1 - 1 = 0$

$AB = \frac{1}{\sqrt{5}}$

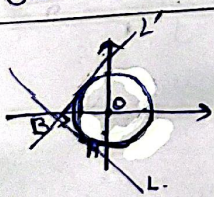
$BC = \frac{1}{\sqrt{5}}$

$AB \times BC = \frac{1}{5}$

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{a - b}{\frac{1}{2} + \frac{1}{2}} = \sqrt{3} \rightarrow a - b = \frac{-\sqrt{3}}{4}$$

$$\text{فاصله نقطه تا خط} = \sqrt{(5x)^2 + (4y)^2} = \sqrt{\frac{1}{4} + \frac{9}{4}} = \frac{5}{2}$$

اندازه خط $= 5 \times \frac{5}{2} = \frac{25}{2}$



$m_{OH} = \frac{y_O - y_H}{x_O - x_H} = \frac{0 - (-4)}{0 - (-3)} = \frac{4}{3} \rightarrow m_L = -\frac{3}{4}$

$\Rightarrow y_L = -\frac{3}{4}x - \frac{25}{4}$

L معادله خط عمود بر خط $L' \rightarrow m_{L'} = \frac{1}{m_L} = \frac{4}{3} \rightarrow y = \frac{4}{3}x + b$

$OH = \sqrt{(-3)^2 + (-4)^2} = 5$ $\Rightarrow |b| = \frac{25}{4}$

L' معادله خط عمود بر خط $L \rightarrow y_{L'} = \frac{4}{3}x + \frac{25}{4}$

$\frac{4}{3}x + \frac{25}{4} = -\frac{3}{4}x - \frac{25}{4} \xrightarrow{\times 12} 14x + 100 = -9x - 75$

$23x = -175 \rightarrow x = -\frac{175}{23}$ $y = -1$ $x_B \times y_B = (-175) \times (-1) = 175$