مائده میرمقتدایی

۱←

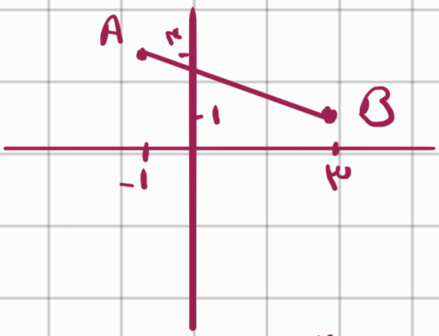
$$y-k=-\tfrac{1}{2}(x+2) \Rightarrow y=-\tfrac{1}{2}x-1+k$$
$$y-m=-\tfrac{1}{2}(x-4) \Rightarrow y=-\tfrac{1}{2}x+2+m$$

$$k-1=2+m \rightarrow k-m=3$$

$$AB=\sqrt{(\underbrace{-2-4}_{-6})^2+(\underbrace{k-m}_{3})^2}=\sqrt{36+9}=\sqrt{45}$$

$$S=AB^2=(\sqrt{45})^2=45$$

۲←



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

مستطیل است $ABCD \rightarrow BC \perp AB \rightarrow m_{AB}=-\tfrac{3}{4} \rightarrow m_{BC}=\tfrac{4}{3}$

$$\tfrac{4}{3}=\frac{y-1}{\frac{3}{2}-3} \rightarrow y-1=\tfrac{4}{3}\times-\tfrac{3}{2} \rightarrow y=-1$$

$$A(-1,4),\ B(3,1),\ C(\tfrac{3}{2},-1),\ D(-\tfrac{5}{2},2)$$

$$AB=\sqrt{4^2+3^2}=5,\quad BC=\sqrt{2^2+(\tfrac{3}{2})^2}=\frac{5}{2}$$

محیط $=2(AB+BC)=2(5+\tfrac{5}{2})=15$

$\tan 60^\circ = \sqrt{3}$ شیب

$2mx + (m^2-1)y = 3 \rightarrow$ ۳

$(m^2-1)y = 3 - 2mx$

$\hookrightarrow y = \frac{-2m}{m^2-1}x + \frac{3}{m^2-1}$

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

$\alpha - \beta = \frac{\sqrt{4 + 4\sqrt{3} + 3}}{\sqrt{3}} = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$

$AH \rightarrow BC$ خط از A عمود

۴

$m_{BC} = \frac{11-3}{7-3} = 2$ $\quad y - 3 = 2(x-3) \rightarrow y = 2x - 3$

$\Rightarrow Bc \rightarrow 2x - y - 3 = 0$

$d = \frac{|ax_A + by_A + c|}{\sqrt{a^2+b^2}} = \frac{|2-9-3|}{\sqrt{4+1}} = 2\sqrt{5}$

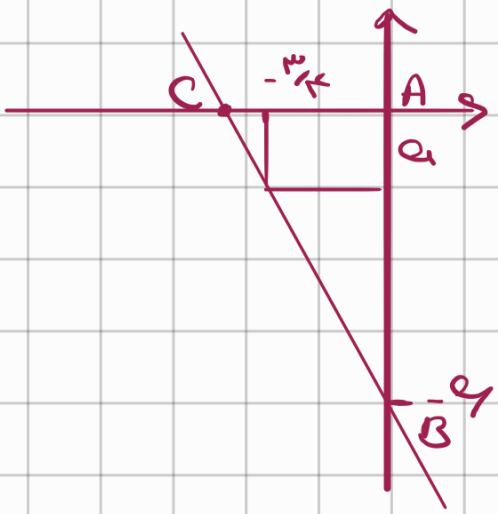
برای پیدا کردن نقطه B:

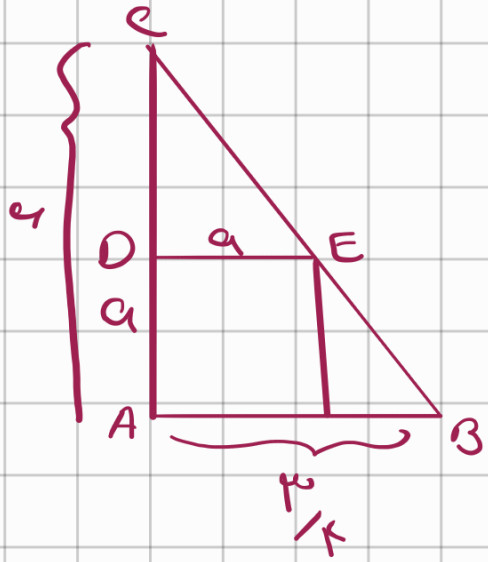
$\begin{cases} AB: y + 2x = 7 \\ BC: 2y - 7x = -19 \end{cases}$

$x = \frac{-19-12}{-7-3} = 3$

$y = \frac{-3 \times 7 + 29}{-7-3} = -1$

$BH = AC$ بر B عمود $= \frac{|4y - 3x - 17|}{\sqrt{4^2+3^2}} = \frac{|-4+3+9-17|}{5} =$ ۳





a

مربع است ADEF → AB ∥ DE ⟶ تعمیم تالس $= \frac{AD}{AC} = \frac{DE}{AB}$

$$\Rightarrow \frac{a-a}{a} = \frac{a}{\frac{3}{4}} = \frac{4a}{3} \Rightarrow 18 - 3a = 24a$$

$$\Rightarrow 27a = 18 \rightarrow a = 2/3$$

قطر مربع $= a\sqrt{2} = \boxed{\frac{2\sqrt{2}}{3}}$

$$\begin{cases} ay - x = a - 1 \\ y - ax = 1 \end{cases} \rightarrow \begin{cases} y = x/a + \frac{a-1}{a} \\ y = ax + 1 \end{cases}$$

موازی ⟶ $\frac{1}{a} = a \rightarrow a^2 = 1$ ← ۷

$a = \pm 1$

$a=1$ ⟶ $y = x \Rightarrow y = x+1$ ✓ $(1,2)$

$\Rightarrow a = 1$

$a=-1$ ⟶ $y = -x+2, y = -x+1$ ✗ $(1,2)$

$$y = \frac{|c-c'|}{\sqrt{a^2+b^2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2} \rightarrow \omega = \sqrt{x^2+y^2} \rightarrow 2\omega = x^2 + \left(\frac{\sqrt{2}}{2}\right)^2$$

$$\rightarrow x^2 = \frac{49}{2} \rightarrow x = \frac{7\sqrt{2}}{2} \rightarrow S = xy \rightarrow \frac{\sqrt{2}}{2} \times \frac{7\sqrt{2}}{2} = \boxed{3,\omega}$$

$x - 3y = 1 \Rightarrow 3y = x - 1 \Rightarrow y = \frac{1}{3}x - \frac{1}{3}$ $A(3,0)$ $B(\frac{7}{2}, \frac{1}{2})$ ←۱

$d = \frac{|3-1|}{\sqrt{1+9}} = \frac{3\sqrt{10}}{10}$

$m_{AC} = -3 \rightarrow y = -3(x-3) = -3x+12$

$\frac{1}{3}x - \frac{1}{3} = -3x + 12 \rightarrow \frac{10}{3}x = \frac{37}{3} \rightarrow x = 3.7$

$y = 0.9$

$\begin{bmatrix} 3.7 & 3 & 1 \\ 0.9 & 0 & 0 \\ 1 & 1 & 1 \end{bmatrix} = 0.9 - 3.6 = -2.7$

$S = \frac{1}{2} \times 2.7 = \boxed{1.35}$

$m = \frac{b-a}{-\frac{1}{3} - (-\frac{1}{2})} = \frac{b-a}{\frac{1}{6}} = \sqrt{3} \rightarrow b - a = \frac{\sqrt{3}}{6}$ ←۹

$a = \sqrt{\underbrace{(-\frac{1}{3} - (-\frac{1}{2}))^2}_{\frac{1}{6}} + \underbrace{(b-a)^2}_{\frac{\sqrt{3}}{6}}} \rightarrow$ محیط $= 2\sqrt{2} = \boxed{\frac{\sqrt{2}}{3}}$

شعاع دایره = فاصله نقطه $A(-3,-4)$ از مبدا مختصات $= \sqrt{3^2 + 4^2} = 5$ ←۱۰

$m_{OA} = \frac{4}{3} \xrightarrow{OA \perp l} m_l = -\frac{3}{4}$

$$\left.\begin{matrix} OA \perp l \\ l' \perp l \end{matrix}\right\} \longrightarrow OA \parallel l' \Rightarrow m_{l'} = \frac{4}{3}$$

$$OA \rightarrow y = \frac{4}{3}x \qquad l' \Rightarrow y = \frac{4}{3}x + c$$

$$l' \,;\, OA \text{ مماس } = r = 3 \Rightarrow \frac{c}{\sqrt{1+\left(\frac{4}{3}\right)^2}} = \frac{3c}{5} = 3$$

$$\longrightarrow c = \frac{15}{3}$$

$$l' \rightarrow y = \frac{4}{3}x + \frac{15}{3} \quad , \quad l \rightarrow y + 4 = -\frac{3}{4}(x+3)$$

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

$$\Rightarrow \left(\frac{4}{3}x_B + \frac{15}{3} = -\frac{3}{4}x_B - \frac{25}{4}\right) \times 12$$

$$\longrightarrow 16x_B + 100 = -9x_B - 75 \Rightarrow 25x_B = -175 \rightarrow x_B = -7$$

$$y_B = -\frac{28}{3} + \frac{15}{3} = -1$$

$$x_B \times y_B = -1 \times -7 = 7$$