سامان سامانی ـ تکلیف شماره ۱۷۰ ـ یازدهم دختر A

۱-

$A(-2,k) \Rightarrow y-k=-\frac{1}{2}(x+2) \Rightarrow y=-\frac{1}{2}x+k-1 \quad \Big\} \; k-1=m+2$

$B(4,m) \Rightarrow y-m=-\frac{1}{2}(x-4) \Rightarrow y=-\frac{1}{2}x+m+2 \quad \Big\} \; k-m=3$ (۳)

$AB=\sqrt{(-2-4)^2+(\underbrace{k-m}_{3})^2}=\sqrt{36+9}=\sqrt{45}=3\sqrt{5} \qquad S=(\sqrt{45})^2=45$

۲-

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

ABCD مستطیل $\Rightarrow BC\perp AB \quad m_{AB}=\frac{4-1}{-1-3}=-\frac{3}{4} \to m_{BC}=\frac{4}{3}=\frac{y-1}{\underbrace{\frac{3}{2}-3}_{-\frac{3}{2}}} \Rightarrow$ (۳)

$y=-1 \qquad A(-1,4),\ B(3,1),\ C(\frac{3}{2},-1),\ D(-\frac{5}{2},2)$

$P=2(AB+BC)=2(5+\frac{5}{2})=15$

۳-

$\tan 60^\circ=m=\sqrt{3} \qquad 2mx+(m^2-1)y=3 \Rightarrow (m^2-1)y=3-2mx$

$\frac{-2m}{m^2-1}=\sqrt{3} \Rightarrow -2m=\sqrt{3}m^2-\sqrt{3} \Rightarrow y=\frac{-2m}{m^2-1}x+\frac{3}{m^2-1}$ (۳)

$\Rightarrow \sqrt{3}m^2+2m-\sqrt{3}=0 \qquad \boxed{\alpha-\beta=\frac{4\sqrt{3}}{3}}$

۴-

$m_{BC}=\frac{11-3}{7-3}=\frac{8}{4}=2 \qquad y-3=2(x-3) \Rightarrow y=2x-3$ (۳)

$BC: x_m - y - 2 = 0$ $\quad d: \frac{|ax_A + by_A + C|}{\sqrt{a^2+b^2}} = \frac{|2-9-2|}{\sqrt{4+1}} = \frac{10}{\sqrt{5}} = 2\sqrt{5}$

$AB: y + x_m = 5$

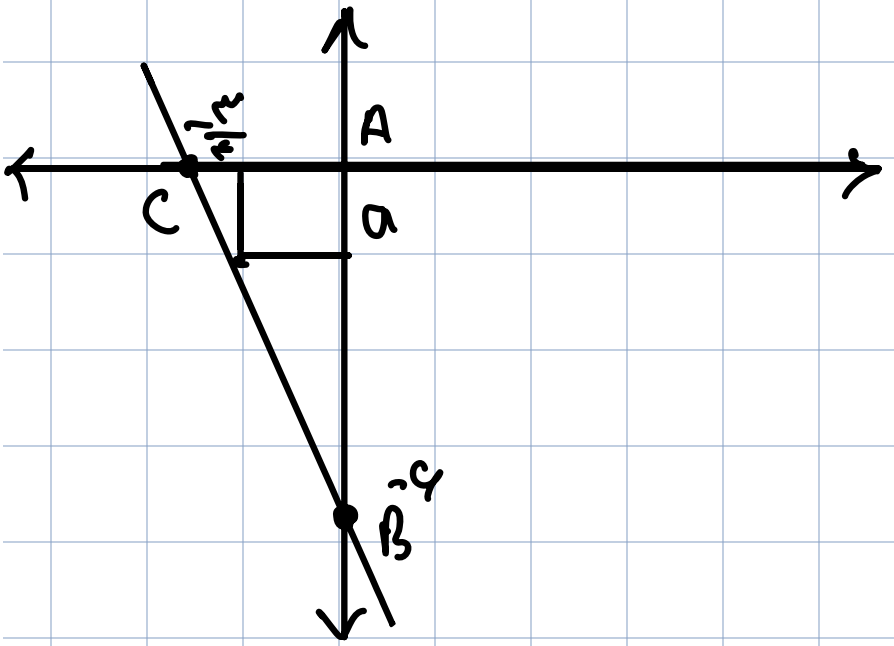
$BC: x_y - 5x_m = -19$ $\quad \rightarrow 11x_m = 22 \rightarrow x_m = 2$

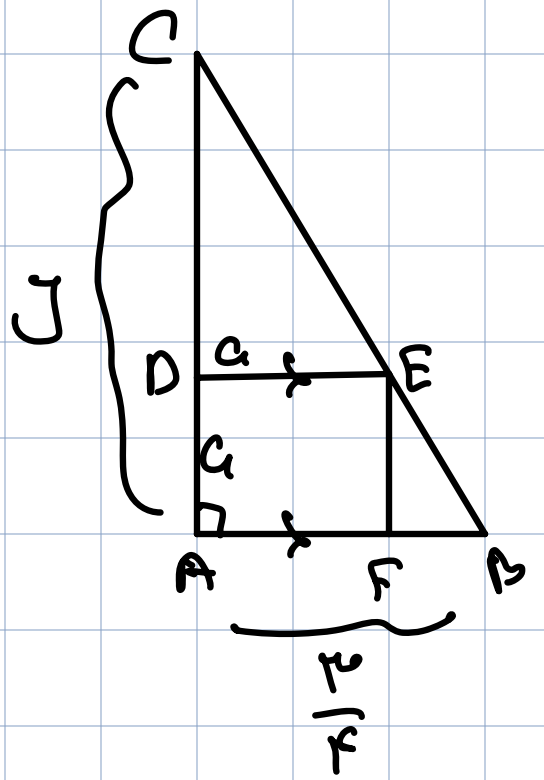
$\Rightarrow x_m = -\frac{-19-14}{-5-4} = +2 \Rightarrow y = +1$ $\quad -3$

(1)

$BH = \frac{|4y - 3x_m - 17|}{\sqrt{25}} = \frac{|-4+9-17|}{5} = 10$ $\quad \frac{|4-9-17|}{5} = \frac{22}{5}$

-4





(2)

مربع ADEF $\Rightarrow$ AB // DE $\xrightarrow{\text{تعميم تالس}}$ $\frac{CD}{AC} = \frac{DE}{AB} \Rightarrow$

$\frac{4-a}{4} = \frac{a}{\frac{3}{4}} = \frac{4a}{3} \Rightarrow 12 - 3a = 16a \Rightarrow a = \frac{12}{19}$

قطر المربع $= a\sqrt{2} = \frac{12\sqrt{2}}{19}$

۷- ②

$$\left.\begin{array}{l} ay-x=a-1 \\ y-ax=1 \end{array}\right\} \Rightarrow y=\frac{x}{a}+\frac{a-1}{a},\quad \Rightarrow y=ax+1 \xrightarrow{\text{موازی}} \frac{1}{a}=a \Rightarrow a^2=1 \Rightarrow a=\pm 1$$

$$\xrightarrow{a=1} y=x\ ,\ y=x+1$$

← نقطه $(1,2)$ در این معادله صدق می‌کند

$$\xrightarrow{a=-1} y=-x+2\ ,\ y=-x+1$$

نقطه $(1,2)$ در هیچ یک از این دو خط صدق نمی‌کند

$$y=\frac{|c-c'|}{\sqrt{a^2+b^2}}=\frac{1}{\sqrt{2}}=\frac{\sqrt{2}}{2} \qquad 5=\sqrt{x^2+y^2} \Rightarrow \left(\frac{\sqrt{2}}{2}\right)^2+x^2=25$$

$$\Rightarrow x^2=\frac{49}{2} \Rightarrow x=\frac{7}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}=\frac{7\sqrt{2}}{2} \qquad S=\frac{7}{\sqrt{2}}\times\frac{\sqrt{2}}{\sqrt{2}}=\frac{7\sqrt{2}}{2}=3.5$$

۸- ③

$$x-3y=1 \Rightarrow 3y=x-1 \Rightarrow y=\frac{1}{3}x-\frac{1}{3}$$

$$d=\frac{|4-1|}{\sqrt{1+9}}=\frac{3\sqrt{10}}{10} \qquad m_{AC}=-3 \rightarrow y=-3(x-4)=-3x+12$$

$$\text{تقاطع} \rightarrow \frac{1}{3}x-\frac{1}{3}=-3x+12 \rightarrow \frac{10}{3}x=\frac{37}{3} \rightarrow x=3.7,\ y=0.9$$

$$\begin{vmatrix} 3.7 & 4 & 1 \\ 0.9 & 0 & 0 \\ 1 & 1 & 1 \end{vmatrix}=0.9-3.6=-2.7 \qquad S=\frac{1}{2}\times 2.7=1.35$$

۹- (۲)

$$m = \frac{b-a}{-\frac{1}{۳}-(-\frac{1}{۲})} = \frac{b-a}{\frac{1}{۶}} = \sqrt{۲} \longrightarrow b-a = \frac{\sqrt{۲}}{۶}$$

$$a = \sqrt{\underbrace{(-\tfrac{1}{۳}-(-\tfrac{1}{۲}))^{۲}}_{\frac{1}{۶}} + \underbrace{(b-a)^{۲}}_{\frac{\sqrt{۲}}{۶}}} \longrightarrow \text{تطریح} = a\sqrt{۲} = \frac{\sqrt{۲}}{۳}$$

۱۰- (۲)

فاصله از نیمساز ناحیه‌ها $= r \longrightarrow \sqrt{۳r^{۲}+۴r^{۲}} = d$

$$m_{OA} = \frac{۴}{۳} \xrightarrow{OA \perp l} m_l = -\frac{۳}{۴} \qquad \left.\begin{matrix} OA \perp L \\ l' \perp L \end{matrix}\right\} OA \parallel l' \Rightarrow m_{l'} = \frac{۴}{۳}$$

$$OA \longrightarrow y = \frac{۴}{۳}x \qquad l' \longrightarrow y = \frac{۴}{۳}x + c$$

$$O l' = r = d \Rightarrow \frac{c}{\sqrt{۱+(\frac{۴}{۳})^{۲}}} = \frac{۳c}{۵} = d \longrightarrow c = \frac{۲d}{۳}$$

$$l' \longrightarrow y = \frac{۴}{۳}x + \frac{۲d}{۳} \;,\; l \longrightarrow y + ۴ = -\frac{۳}{۴}(x+۳) \Rightarrow y = -\frac{۳}{۴}x - \frac{۲d}{۴}$$

$$\Rightarrow \left(\frac{۴}{۳}x_B + \frac{۲d}{۳} = -\frac{۳}{۴}x_B - \frac{۲d}{۴}\right) \times ۱۲ \Rightarrow$$

$۱۶x_B + ۱۰۰ = -۹x_B - ۷۵ \Rightarrow ۲۵x_B = -۱۷۵ \Rightarrow x_B = -۷$

$y_B = -\frac{۲۸}{۳} + \frac{۲۵}{۳} = -۱ \qquad x_B \times y_B = ۷$