تکلیف سری ۱۷ — ملیکا عربی

۱-

$$\text{شیب} = \frac{-1}{2} \Rightarrow y = \frac{-1}{2}x + b \xrightarrow{(-2,k)} 1 + b = k \Rightarrow b = k-1$$
$$\xrightarrow{(4,m)} -2 + b = m \Rightarrow b = m+2 \quad \Big\} \; k-1 = m+2 \Rightarrow k - m = 3$$

$$AB = \sqrt{\Delta x^2 + \Delta y^2} = \sqrt{(4+2)^2 + (k-m)^2} = \sqrt{45} \Rightarrow S = a^2 = \sqrt{45}^2 = 45$$

۲-

A B C D

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

$$AB \perp BC \longrightarrow m_{AB} = \frac{4-1}{-1-3} = \frac{-3}{4} \Rightarrow m_{BC} = \frac{4}{3}$$

$$m_{BC} = \frac{y-1}{\frac{3}{2} - 3} = \frac{4}{3} \Rightarrow 3y - 3 = 6 - 12 \Rightarrow y = -1 \Rightarrow \begin{array}{l} C = (\frac{3}{2}, -1) \\ D = (\frac{-5}{2}, 2) \end{array}$$

$$AB = \sqrt{\Delta x^2 + \Delta y^2} = \sqrt{16 + 9} = 5$$
$$BC = \sqrt{\Delta x^2 + \Delta y^2} = \sqrt{\frac{9}{4} + 4} = \frac{5}{2}$$
$$AB + BC = 5 + \frac{5}{2} = \frac{15}{2} \longrightarrow \text{محیط} = 2 \times \frac{15}{2} = 15$$

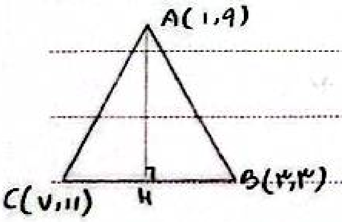
۳-

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

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

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

۴-



$$m_{BC} = \frac{11-3}{7-3} = \frac{8}{4} = 2 \qquad \text{فاصله نقطه } A \text{ تا خط } BC = AH$$

$$\Rightarrow y = 2x + b \xrightarrow{(3,3)} y = 2x - 3 \longrightarrow y - 2x + 3 = 0$$

$$AH = \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} \xrightarrow{(1,9)} \frac{|9 - 2 + 3|}{\sqrt{1+4}} = \frac{10}{\sqrt{5}} = \frac{10\sqrt{5}}{5} = 2\sqrt{5}$$

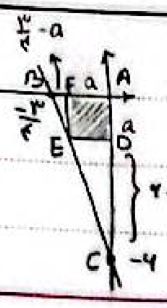
۵-

$$AB: y + 2x = 7 \longrightarrow x = \frac{-19 - 14}{-7 - 4} = -3 \qquad y = \frac{-38 + 49}{-7 - 4} = -1$$

$$BC: 2y - 7x = -19$$

$$\text{فاصله } B \text{ از } AC \quad BH = \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{|-4 + 9 - 17|}{5} = \frac{12}{5}$$

Subject:
Date



ذوزنقه $ADEF \to AB \parallel ED \xrightarrow{\text{تالس}} \frac{CD}{AC} = \frac{ED}{AB} = \frac{EC}{BC}$ —۶

$\Rightarrow \frac{۶-a}{۶} = \frac{a}{\frac{۳}{٤}} \Rightarrow ۲٤a = ۱۸ - ۳a \to ۲۷a = ۱۸ \Rightarrow a = \frac{۲}{۳}$

قطر $= a\sqrt{۲} = \frac{۲}{۳}\sqrt{۲}$

$y - ax = 1 \to y = ax + 1$

$ay - x = a - 1 \to y = \frac{1}{a}x + 1 - \frac{1}{a}$

$\xrightarrow{\text{موازی}} a = \frac{1}{a} \Rightarrow a = \pm 1$ —۷

$1 \neq 1 - \frac{1}{a}$ ✓

if $a = 1 \to y = x$, $y = x + 1 \Rightarrow (۱,۲)$ ✓

if $a = -1 \to y = -x + 1$, $y = -x + ۲ \Rightarrow (۱,۲)$ ✗ $\Rightarrow a = 1$

$y = \frac{|c - c'|}{\sqrt{a^۲ + b^۲}} = \frac{1}{\sqrt{۲}} \to ۵ = \sqrt{x^۲ + y^۲} \to ۲۵ = x^۲ + (\frac{1}{\sqrt{۲}})^۲ \Rightarrow x^۲ = \frac{٤۹}{۲} \to x = \frac{۷\sqrt{۲}}{۲}$

$x - ۳y = 1 \Rightarrow y = \frac{1}{۳}x - \frac{1}{۳}$ $d = \frac{|٤ - 1|}{\sqrt{۹ + 1}} = \frac{۳}{\sqrt{۱۰}} = \frac{۳\sqrt{۱۰}}{۱۰}$ —۸

$m_{AC} = -۳ \to y = -۳(x - ٤) = -۳x + ۱۲$

$C \Rightarrow \frac{1}{۳}x - \frac{1}{۳} = -۳x + ۱۲ \Rightarrow x = ۳{,}۷$ $y = ۰{,}۹$

$S = \begin{vmatrix} ۳{,}۷ & ٤ & ۱ \\ ۰{,}۹ & ۰ & ۰ \\ ۱ & ۱ & ۱ \end{vmatrix} \times \frac{1}{۲} = \frac{1}{۲}(۰{,}۹ - ۳{,}۶) = ۱{,}۳۵$

$m = \frac{b - a}{-\frac{1}{۳} + \frac{1}{۲}} = ۶(b - a) = \sqrt{۳} \Rightarrow b - a = \frac{\sqrt{۳}}{۶}$ —۹

$a = \sqrt{(-\frac{1}{۳} + \frac{1}{۲})^۲ + (b - a)^۲} = \sqrt{\frac{٤}{۳۶}} = \frac{1}{۳} \longrightarrow$ قطر مربع $= a\sqrt{۲} = \frac{1}{۳}\sqrt{۲}$

۱۰- $m_{OA} = \frac{4}{3} \xrightarrow{\text{عمود}} m_L = \frac{-3}{4}$

$r =$ فاصله A از مبدأ مختصات $= \sqrt{3^2+4^2} = 5$

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

$$OA \longrightarrow y = \frac{4}{3}x \quad , \quad L' \Rightarrow y = \frac{4}{3}x + c$$

فاصله L' از $OA = r = 5$ $\Rightarrow \dfrac{c}{\sqrt{1+\left(\frac{4}{3}\right)^2}} = \dfrac{3c}{5} = 5 \longrightarrow c = \dfrac{25}{3}$

$$L' \rightarrow y = \frac{4}{3}x + \frac{25}{3} \quad , \quad L \rightarrow y = -\frac{3}{4}x - \frac{25}{4}$$

$$\Rightarrow \frac{4}{3}x_B + \frac{25}{3} = \frac{-3}{4}x_B - \frac{25}{4} \xrightarrow{\times 12} 16x_B + 100 = -9x_B - 75 \Rightarrow x_B = -7$$

$$y_B = \frac{-28}{3} + \frac{25}{3} = -1$$

$$\Rightarrow x_B \times y_B = -1 \times -7 = \underline{7}$$