آزمون ریاضی

1)

$B(4, m)$ ، $A(-3, n)$ $\quad m = -\frac{1}{2}$

طول $AB = \sqrt{(n-m)^2 + (-3-4)^2} \Rightarrow \sqrt{9+36} = \sqrt{45}$

$y = -\frac{1}{2}x + b$ $\quad m = \frac{n-m}{-3-4} = -\frac{1}{2} \rightarrow n - m = 3$

$S_{مربع} = \sqrt{45} \times \sqrt{45} = 45$

2)

$A(-1, 4)$ ، $B(3, 1)$ ، $C(x, y)$ ، $D(-1, x, y+3)$

عرض ها در $2D$ ...

$AB \parallel CD \rightarrow \frac{4-1}{-1-3} = \frac{-3}{2x+1} \rightarrow 2x+1 = 4 \rightarrow x = \frac{3}{2}$

$AB \parallel CD \rightarrow \frac{4-1}{-1-3} = \frac{-3}{2x+1} \rightarrow 2x+1 = 4 \rightarrow x = \frac{3}{2} \rightarrow C(\frac{3}{2}, 1)$

$AB \perp BC \rightarrow -\frac{3}{4} \times \frac{y-1}{-\frac{3}{2}} = -1 \rightarrow \frac{y-1}{2} = -1 \rightarrow y = -1$

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

3)

$2mx + (m^2-1)y = 3$ $\quad \tan\alpha = \sqrt{3}$ $\quad$ m اضافه شود

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

$\Delta = 4 - 4(-\sqrt{3})(\sqrt{3}) = 4 + 4 \times 3 = 16$

$\alpha - \beta = \frac{\sqrt{\Delta}}{|a|}$

$\frac{\sqrt{16}}{\sqrt{3}} = \frac{4}{\sqrt{3}} = \frac{4\sqrt{3}}{3}$

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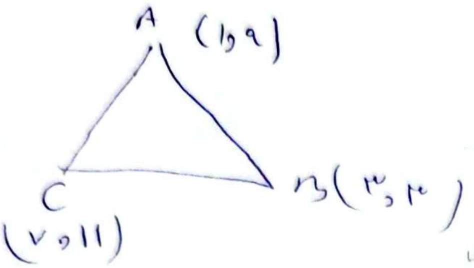
AH $A(1,9)$ $B(3,3)$ $C(7,11)$



$m_{BC} = \frac{3-11}{3-7} = \frac{-8}{-4} = 2$

$y = 2x + b \xrightarrow{(3,3)} 3 = 6 + b \to b = -3$

$y = 2x - 3$

$\to m_{AH} = -\frac{1}{2}$

$-\frac{1}{2}x + \frac{19}{2} = y$ [illegible] $-\frac{1}{2}x + \frac{19}{2} = 2x - 3$

$2x + \frac{1}{2}x = \frac{19}{2} + 3 \longrightarrow \frac{x+4x}{2} = \frac{25}{2} \Rightarrow x = 5 \xrightarrow{y=2x-3} y = 7$

$\frac{5x}{2}$

$(5,7)$

تقاطع $(5,7)$ و $A\ (1,9)$ $\longrightarrow \sqrt{(5-1)^2+(7-9)^2} = \sqrt{16+4} = 2\sqrt{5}$

فاصله این دو را هم

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$AB: y+2x=7$ $AC: 4y-3x=17$ $BC: 2y-7x=-19$

$B\begin{cases} AB: y+2x=7 \\ BC: 2y-7x=-19 \end{cases} \longrightarrow \begin{cases} x=3 \\ y=1 \end{cases} \to B(3,1)$

$BH = AC = \left|\frac{4-9-17}{\sqrt{4^2+3^2}}\right| = \frac{22}{5} = 4/4$

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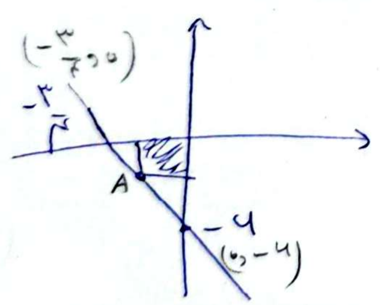

$m = \frac{0+4}{-\frac{3}{2}-0} = \frac{4}{-\frac{3}{2}} = -\frac{24}{3} = -8$

$y = -8x + b \xrightarrow{b=-4} y = -8x - 4$

نوع $\xrightarrow{A(x=y)}$ $y = -8y - 4 \longrightarrow 9y = -4 \longrightarrow y = -\frac{2}{3}$

$x = -\frac{2}{3}$

فاصله تا مبدا $= $ قطر $\longrightarrow \sqrt{\frac{4}{9}+\frac{4}{9}} = \sqrt{\frac{18}{9}} = \frac{2\sqrt{2}}{3}$

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$y - ax = 1$

$ay + x = a - 1$ متقابل قطر $= 5$ $(1,2)$ $S = ?$

$y = ax + 1 \xrightarrow{(1,2)}$ ✓

$\left.\begin{array}{l} y = ax + 1 \\ y = \frac{x}{a} + a - 1 \end{array}\right\} \xrightarrow{\text{موازی}} a = \frac{1}{a} \to a^2 = 1 \begin{cases} a = 1 \\ a = -1 \end{cases} \to$

ادامه ۱۲ ←

$y = ax+1 \xrightarrow{(1,2)}$ در آن صدق می‌کند

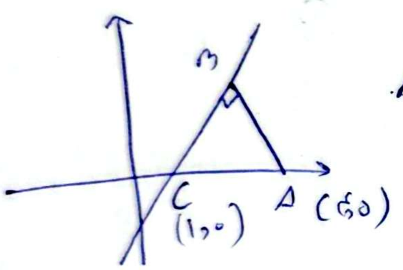
فاصله (۱،۲) تا خط موازی = عرض $\left|\frac{1-2}{\sqrt{2}}\right| = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$y = ax$

$25 - \frac{2}{4} = \frac{98}{4}$ $\quad \sqrt{\frac{98}{4}}$ $\quad S = \frac{7\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{7}{2} = 3/5$

۸) $3y = x - 1 \rightarrow y = \frac{x-1}{3}$ $\quad (4,0)$

فاصله نقطه از خط : $d^{AB} = \left|\frac{4 \cdot -1}{\sqrt{10}}\right| = \frac{3}{\sqrt{10}}$, C = طول از صفر $\longrightarrow C = (1,0)$



$m_{AB} = -3 \xrightarrow{(4,0)} y = -3x + 12 \rightarrow -3x + 12 = \frac{x-1}{3}$

$BC = \sqrt{\left(\frac{27}{10}\right)^2 + \left(\frac{9}{10}\right)^2} = \frac{9\sqrt{10}}{10} \rightarrow S = \frac{9\sqrt{10}}{10} \times \frac{3\sqrt{10}}{10} \times \frac{1}{2}$

$= 1/35$

۹) $y = \sqrt{3}x + c$

$\left(-\frac{1}{3}, b\right)$ و $\left(-\frac{1}{2}, a\right)$ $\quad m = \sqrt{3} \Rightarrow \frac{a-b}{-\frac{1}{2}+\frac{1}{3}} = \sqrt{3}$

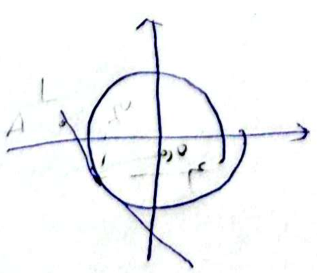
$a - b = -\frac{\sqrt{3}}{6}$ $\quad \left(-\frac{1}{2}+\frac{1}{3}\right)^2$ $\quad \frac{-3+2}{6} = -\frac{1}{6}$

فاصله دو سر آنها = طول وتر : $\sqrt{(a-b)^2 + \left(-\frac{1}{2}+\frac{1}{3}\right)^2} = \sqrt{\frac{3}{36}+\frac{1}{36}} = \frac{2}{6} = \frac{1}{3}$

$a-b = -\frac{\sqrt{3}}{6}$, $\quad -\frac{1}{6}$

۱۰) طول قطر = $\sqrt{2}$ $\quad a = \frac{1}{2}\sqrt{2}$

$(-3, -4)$



$A \begin{cases} x = -3 - 4 = -7 \\ y = -4 + 3 = -1 \end{cases}$ $\quad (-7, -1)$

$\longrightarrow -7x - 1 = 7$