Subject:
Date

تکلیف ترم [illegible] — شماره ۵ : ۱۴ — (۲۰)

① M نقطه وسط B,A: $M = (3,1)$, $m = \frac{8+6}{-2} = -7 \rightarrow m' = \frac{1}{7}$ (شیب عمود بر AB خط)

$\rightarrow y = ax+b \xrightarrow[a=\frac{1}{7}]{(3,1)} 1 = \frac{3}{7} + b \rightarrow \frac{4}{7} = b \rightarrow y = \frac{x}{7} + \frac{4}{7}$ (۵)

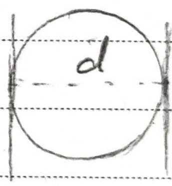
② $BC = \sqrt{(y_B - y_C)^2 + (x_B - x_C)^2} \rightarrow BC = \sqrt{9+16} = 5$

$m_{BC} = \frac{7-3}{-4+1} = \frac{-4}{3} \xrightarrow{(-1,3)} y = ax+b \rightarrow 3 = \frac{4}{3} + b \rightarrow \frac{5}{3} = b$ (۵)

$\rightarrow y = \frac{-4x}{3} + \frac{5}{3} \rightarrow 3y + 4x - 5 = 0 \rightarrow AH = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2+b^2}} \rightarrow$ (فاصله نقطه A از BC)

$\rightarrow AH = \frac{|12+3-5|}{\sqrt{9+16}} = \frac{10}{5} = 2 \longrightarrow BC - AH = 3$

③ موازی $\rightarrow m = m' \rightarrow \begin{cases} 4y - ax - 2 = 0 \\ 4y - 2x - 14 = 0 \end{cases} \rightarrow a = 2$



فاصله دو خط موازی $= \frac{|c - c'|}{\sqrt{a^2+b^2}} \longrightarrow d = \frac{|-2+14|}{\sqrt{16+4}} = \frac{12}{\sqrt{20}} = 2r \rightarrow$ (۵)

$r = \frac{6}{2\sqrt{5}} = \frac{3\sqrt{5}}{5} \rightarrow S = \pi r^2 \Rightarrow S = \frac{9\pi}{5}$

④ M وسط B,A $\rightarrow M = (3,2)$

$m_{AB} = \frac{2}{-2} = -1 \rightarrow m_{HC} = 1 \xrightarrow{(-1,-3)} -3 = -1 + b \rightarrow b = -2 \rightarrow y = x - 2$

$y - x + 2 = 0$ (۵)

$\rightarrow d = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2+b^2}} \xrightarrow{(3,2)} d = \frac{|-3+2+2|}{\sqrt{1+1}} = \frac{\sqrt{2}}{2}$

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⑤ $(5-m)y = 7-(3m-2)x \xrightarrow{\text{شیب}} a = \frac{-3m+2}{5-m}$

$-(2m-4)y = -(m+1)x - 1 \longrightarrow a' = \frac{+m+1}{2m-4} \longrightarrow a = -\frac{1}{a'} \longrightarrow$ (۲)

$\frac{-3m+2}{5-m} = \frac{2m-4}{-m-1} \longrightarrow -3m^2 - m + 2 = +2m^2 - 14m + 20 \longrightarrow$

$5m^2 - 13m + 18 = 0 \longrightarrow \Delta < 0 \longrightarrow m = \varnothing$

به ازای هیچ مقدار m این دو خط بر هم عمود نیستند.

⑥ $A \rightarrow$ برخورد دو خط AB و AC $\longrightarrow \begin{cases} x+2y=3 \\ 2y-3x=-2 \end{cases} \longrightarrow 5x = 5 \rightarrow x = 1$

$\longrightarrow y = 1 \longrightarrow A = (1,1)$

$B \rightarrow$ برخورد دو خط BC و AB $\longrightarrow \begin{cases} x+2y=3 \\ x+y=4 \end{cases} \longrightarrow y=-1,\ x=5 \longrightarrow B=(5,-1)$ (۲)

$C \rightarrow$ برخورد دو خط BC و AC $\longrightarrow \begin{cases} y-2x=-1 \\ x+y=4 \end{cases} \longrightarrow -3x=-5 \rightarrow x=\frac{5}{3},\ y=\frac{7}{3}$

$\longrightarrow C=(\frac{5}{3},\frac{7}{3})$

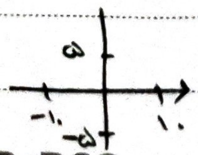
$\longrightarrow M_{\text{بین } C,B} = (\frac{10}{3}, \frac{2}{3}) \longrightarrow AM = \sqrt{\frac{49+1}{9}} = \frac{5\sqrt{2}}{3}$

$AH = \frac{|1+1-4|}{\sqrt{1+1}} = \sqrt{2} \longrightarrow \frac{AM}{AH} = \frac{5}{3}$

⑦ از مرکز $(0,0)$: $d = \sqrt{20} \longrightarrow \sqrt{20} = \frac{|ax_1+by_1+c|}{\sqrt{a^2+b^2}} \longrightarrow \sqrt{20} = \frac{|c|}{\frac{\sqrt{5}}{2}} \rightarrow$

$y = ax+b \longrightarrow y + \frac{1}{2}x + c = 0 \longrightarrow |c| = \frac{\sqrt{100}}{2} = 5$ (۲)

$\longrightarrow c = \pm 5$



$\longrightarrow 0 = -\frac{1}{2}x - 5 \rightarrow x = -10$

$\longrightarrow 0 = -\frac{1}{2}x + 5 \rightarrow x = 10$

$\hookrightarrow AB = \sqrt{100+25} = 5\sqrt{5}$

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(8)

$my - 4x = 2m \Rightarrow y = \frac{4}{m}x + 2$

$y + mx = x + 2 \rightarrow y = (1-m)x + 2$ } → نقطه برخورد : (۰,۲)

$\rightarrow 0 = \frac{4}{m}x_B + 2 \longrightarrow x_B = -\frac{m}{2}$

$0 = (1-m)x_C + 2 \rightarrow x_C = \frac{2}{m-1}$ } → $A(0,2)$ $B(-\frac{m}{2}, 0)$ $C(\frac{2}{m-1}, 0)$

۲

$S = \frac{|x_B - x_C| \times 2}{2} = \frac{5}{2} = \left|\frac{2}{m-1} + \frac{m}{2}\right| \Rightarrow \frac{4 + m^2 - m}{2m - 2} = \frac{5}{2}$

$\longrightarrow m^2 - m + 4 = 5m - 5 \rightarrow m^2 - 6m + 9 = 0 \rightarrow m = 3$

$\longrightarrow -5m + 5 = m^2 - m + 4 \rightarrow m^2 + 4m - 1 = 0 \rightarrow$ ضرب ریشه‌ها $= -1$

$\longrightarrow$ حاصلضرب مقادیر m $= 3 \times -1 = -3$

(9)

معادله خط : $-2 = 4 - \frac{c+3}{2} \rightarrow c + 3 = 12 \rightarrow c = 9 \rightarrow$

$d_1 : y = 2x - 3 \Longrightarrow d_2 : y = 2x - 9$

$M(2,-2)$ $d_3 : y = 2x - \frac{c+3}{2}$

$d_2 : y = 2x - c$

۲

قرینه خط d_1 نسبت به M، موازی با d_2 ← شیب $= 2$ ← M با دو خط d_1 و d_2 یکسان فاصله

$\hookrightarrow c' = \frac{-(c+3)}{2}$

(10)

$y - y_A = -1(x - x_A) \Rightarrow y - 2 = -x + 1 \rightarrow y = -x + 3$

۲

d و AA' نقطه برخورد M : $x + 5 = -x + 3 \rightarrow x = -1, y = 4$

AA' وسط M $\rightarrow$ $x_M = \frac{a+1}{2} = -1 \rightarrow a = -3$, $y_M = \frac{b+2}{2} = 4 \rightarrow b = 6$

$\rightarrow 2b - a = 12 + 3 = 15$

Elipon