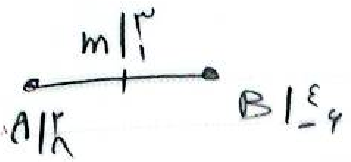
مهتا بخشی‌زاده

-۱



$mx = \frac{۴+۲}{۲} = ۳$

$my = \frac{۸-۶}{۲} = ۱$

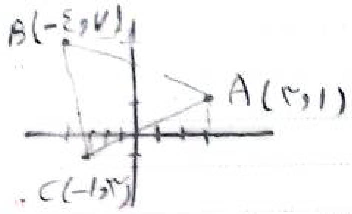
$a = \frac{y_A - y_B}{x_A - x_B} = \frac{۱۴}{-۲} = -۷ \rightarrow m = -۷ \rightarrow y = -۷x + ۲۲$

$m' = \frac{۱}{۷}$

عمود منصف: $y = \frac{۱}{۷}x + h \xrightarrow{(۳,۱)} ۱ = \frac{۳}{۷} + h \rightarrow h = \frac{۴}{۷}$

$y = \frac{۱}{۷}x + \frac{۴}{۷} \rightarrow \boxed{۷y = x + ۴}$

-۲



$BC: m = \frac{-۱-۷}{۳+۴} = \frac{-۸}{۷}$

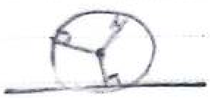
$y = \frac{-۸}{۷}x + h \longrightarrow y + \frac{۸}{۷}x - \frac{۱۳}{۷} = ۰$

$AH = \frac{۷ + \frac{۲۴}{۷} - \frac{۱۳}{۷}}{\sqrt{۱ + \frac{۶۴}{۴۹}}} = \frac{۱۸}{\sqrt{۴۹+۶۴}}$

$\overline{BC} = \sqrt{(۳+۴)^۲ + (۱+۷)^۲} = \sqrt{۴۹+۶۴}$

$BC - AH = \sqrt{۴۹+۶۴} - \frac{۱۸}{\sqrt{۴۹+۶۴}} = \frac{۹۵}{\sqrt{۱۱۳}}$

-۳



موازی $\frac{a}{۴} = \frac{۱}{۲} \Rightarrow a = ۲$

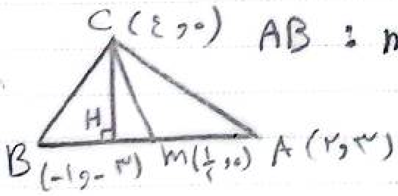
$۴y - ۲x - ۲ = ۰ \rightarrow ۲y - x - ۱ = ۰$

$۲y - x - ۷ = ۰$

$\sqrt{۵}\ ۲r \quad |c - c'|$

$c - c' = -۱ + ۷ = ۶ \rightarrow ۲r = ۶ \rightarrow \boxed{r = ۳}$

-۴



$AB: m = \frac{۳+۳}{۲+۱} = ۲ \rightarrow y = ۲x + k$ ($k = -۱$)

$CH = \frac{|۱ - ۸ + ۱|}{\sqrt{۵}} = \frac{۶}{\sqrt{۵}}$

$CM: \sqrt{(۴ - \frac{۱}{۲})^۲ + ۱} = \frac{۵\sqrt{۲}}{۲} \Rightarrow \sqrt{\frac{۲۵}{۲} - \frac{۳۶}{۵}} = \sqrt{\frac{۴۸}{۱۰}} = \sqrt{\frac{۲۴}{۵}}$

-۵

$m' = \frac{۳m-۲}{m-۵}$, $m = \frac{m+۱}{۲m-۴}$ $\xrightarrow{mm' = -۱} (۳m-۲)(m+۱) = (۵-m)(۲m-۴)$

$۵m^۲ - ۱۲m + ۱۸ = ۰$

$\Delta < ۰ \rightarrow$ هیچ مقدار m

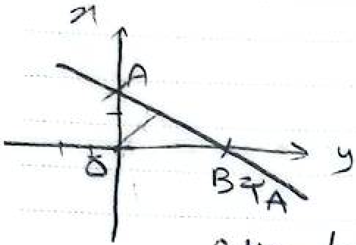
۶- $AB \perp AC \rightarrow \hat{A} = 90^\circ$ $\quad A(1,1) \quad B(5,-1) \quad C(\frac{5}{3}, \frac{7}{3})$

$Am = \sqrt{(\frac{7}{3})^2 + (\frac{1}{3})^2} = \frac{\sqrt{50}}{3} = \frac{5\sqrt{2}}{3}$ $\quad m(\frac{10}{3}, \frac{2}{3})$

$AH = \frac{|1+1-4|}{\sqrt{2}} = \frac{2}{\sqrt{2}} = \sqrt{2}$

$Am = \frac{5\sqrt{2}}{3}, \ AH = \sqrt{2} \Rightarrow \frac{Am}{AH} = \frac{5}{3}$

۷-



$S_{OAB} = \sqrt{A^2 + B^2}$

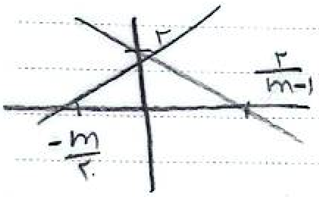
$y = -\frac{1}{2}x + h \xrightarrow{(B,0)} h = \frac{B}{2} \Rightarrow \boxed{2A = B}$

$\xrightarrow{(0,A)} h = A$

$\frac{|0y + \frac{1}{2}x + A|}{\sqrt{1 + \frac{1}{4}}} = \sqrt{20} \Rightarrow A = \sqrt{20} \times \frac{\sqrt{5}}{2} = 5 \quad A = 5, \ B = 10$

$L = \sqrt{10^2 + 5^2} = \sqrt{125} = 5\sqrt{5}$

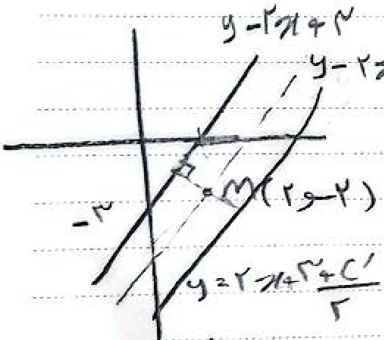
۸-



$(\frac{2}{m-1} + \frac{m}{2}) \times 2 \times \frac{1}{2} = \frac{5}{2}$

$2(4 + m^2 - m) = 10(m-1) \Rightarrow m^2 - 6m + 9 = 0 \Rightarrow \boxed{\frac{c}{a} = 9}$

۹-



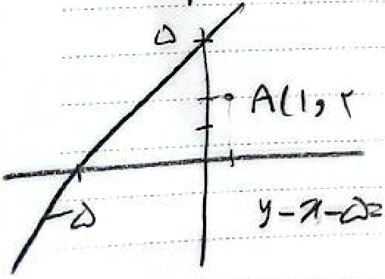
$y - 2x + \frac{3 + C'}{2} = 0$

$\xrightarrow{m(2,-2)} 2 + 4 = -\frac{3+C'}{2} \Rightarrow 12 = -3 - C'$

$C' = -15$

$\boxed{y - 2x - 6 = 0}$

۱۰-



$\frac{|2-1-5|}{\sqrt{2}} = \frac{b-a-5}{\sqrt{2}}$

$4 = b - a - 5 \rightarrow b - a = 9$

$-4 = b - a - 5 \qquad b - a = 1$

$y = -x + h \rightarrow y = -x + 3$

$b = -a + 3$

$\left.\begin{matrix} b - a = 1 \\ b + a = 3 \end{matrix}\right\} \begin{matrix} b = 2 \\ a = 1 \end{matrix}$ غ ق ق $\qquad \left.\begin{matrix} b - a = 9 \\ b + a = 3 \end{matrix}\right\} \boxed{\begin{matrix} b = 6 \\ a = -3 \end{matrix}} \rightarrow 2b - a = 15 \checkmark$