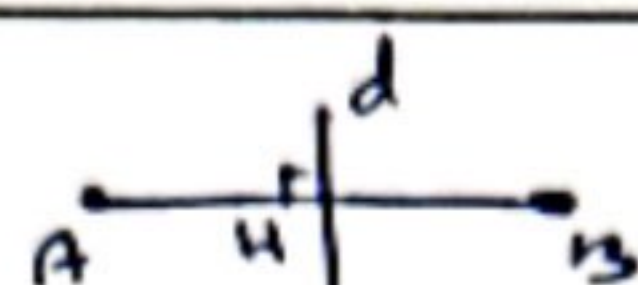


$A(3, -4) \text{ و } B(2, 1)$



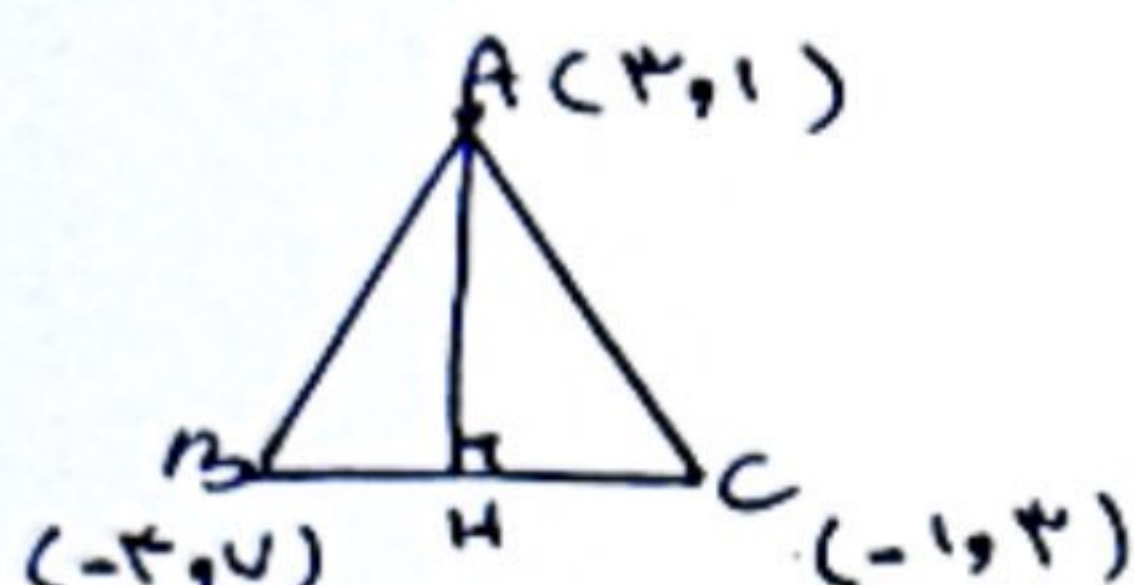
$H(\frac{x_A+x_B}{2}, \frac{y_A+y_B}{2})$
 $\Rightarrow H(3, 1) *$

$m_{AB} = \frac{-4-1}{3-2} = \frac{-5}{1} = -5$

$m_{AH} \Rightarrow m_{AH} \times m_{AB} = -1 \Rightarrow m_{AH} \times -5 = -1 \Rightarrow m_{AH} = \frac{1}{5}$

$y - y_0 = m(x - x_0) \Rightarrow y - 1 = \frac{1}{5}(x - 3) \Rightarrow y = \frac{1}{5}x - \frac{3}{5} + 1 \Rightarrow y = \frac{1}{5}x + \frac{2}{5}$
 نه جواب

۱



$BC = \sqrt{(\Delta y)^2 + (\Delta x)^2} \Rightarrow BC = \sqrt{(-4)^2 + (3)^2} = \sqrt{16+9} = \sqrt{25} = 5$

$m_{BC} = \frac{3-5}{-1-(-3)} = \frac{-2}{2} = -1 *$

$y - y_0 = m(x - x_0) \Rightarrow y - 3 = -1(x + 1) \Rightarrow y = -x + 4$
 $\Rightarrow 3y = -3x + 12 \Rightarrow 3y + 3x - 12 = 0 \Rightarrow x + y - 4 = 0$

$(AH) \text{ د } A \text{ از خط } d \text{ فاصله} \Rightarrow \frac{|1+3-4|}{\sqrt{1^2+1^2}} = \frac{0}{\sqrt{2}} = 0$

$BC - AH = 5 - 2 = 3$
 نه جواب

۲

$2y - x = 5 \text{ و } 4y = 2x + 2 \Rightarrow$
 $4y = 2x + 2 *$

$\Rightarrow m = m' \Rightarrow \frac{1}{2} = +\frac{a}{2} \Rightarrow 2a = 1 \Rightarrow a = \frac{1}{2} *$



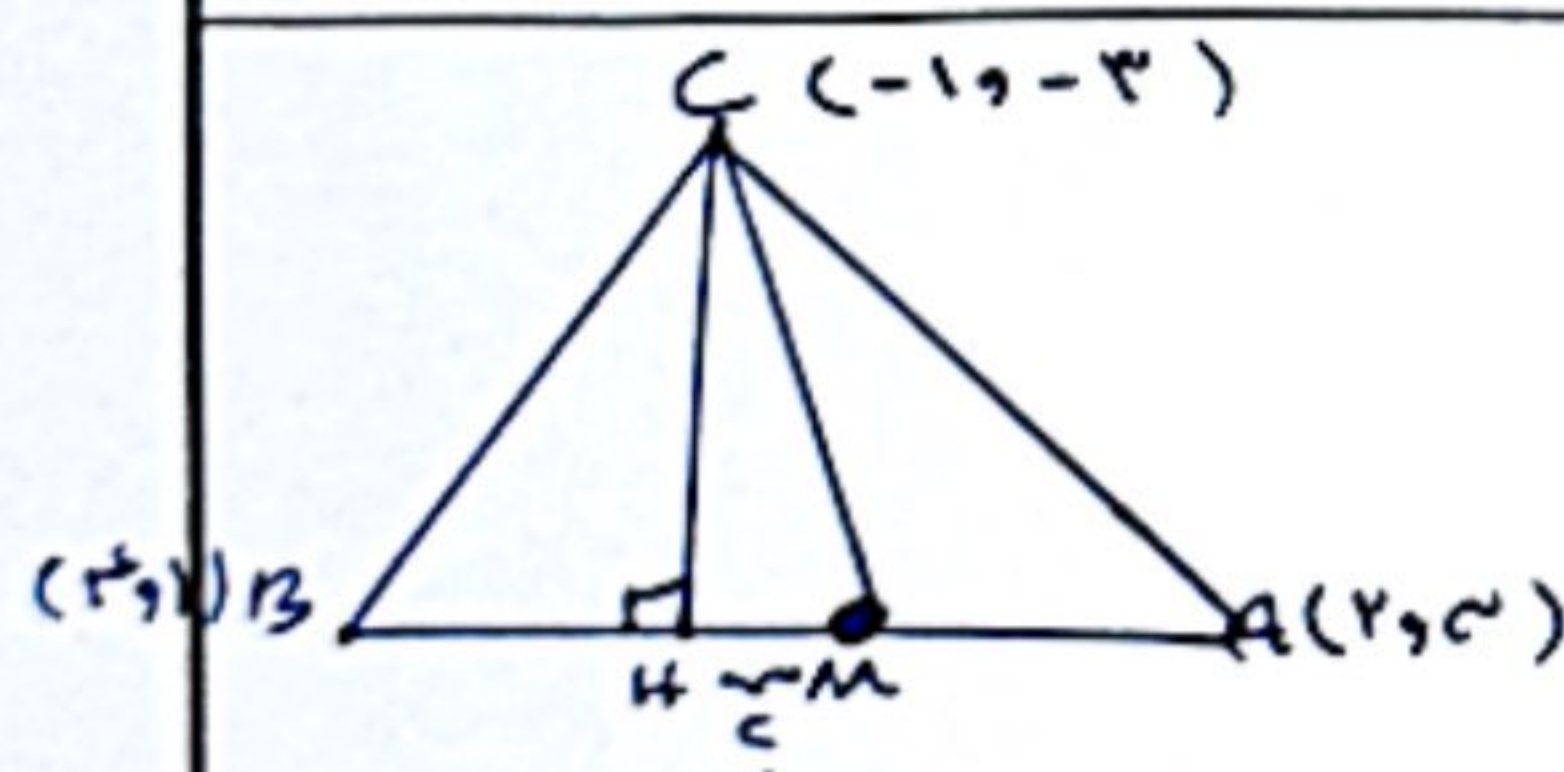
$2y - x = 5 \rightarrow$ خط د
 $4y - 2x = 2 \rightarrow$ خط د'

$d = \frac{|C - C'|}{\sqrt{a^2 + b^2}} \Rightarrow d = \frac{|1-2|}{\sqrt{1+4}} = \frac{1}{\sqrt{5}} = \frac{2}{5}$

$d = 2r \Rightarrow \frac{2}{5} = 2r \Rightarrow r = \frac{1}{5}$

$S = \pi r^2 \Rightarrow S = \pi \times (\frac{1}{5})^2 \Rightarrow S = \frac{\pi}{25}$
 جواب

۳



$\Rightarrow m(\frac{x_B+x_A}{2}, \frac{y_B+y_A}{2}) \Rightarrow m(3, 2) *$

$m_{AB} = \frac{3-0}{2-3} = -3 \text{ و } m_{AB} m_{CH} = -1 \Rightarrow m_{CH} = \frac{1}{3} *$

$y - y_0 = m(x - x_0) \Rightarrow y - 3 = \frac{1}{3}(x - 2) \Rightarrow y = \frac{1}{3}x + \frac{8}{3}$

$y - y_0 = m(x - x_0) \Rightarrow y + 3 = 1(x + 1) \Rightarrow y = x - 2$

$\begin{cases} y = -x + 5 \\ y = x - 2 \end{cases} \Rightarrow y = \frac{3}{2} \text{ و } x = \frac{7}{2} \Rightarrow H(\frac{7}{2}, \frac{3}{2}) *$

$\Rightarrow MH = \sqrt{(\Delta y)^2 + (\Delta x)^2}$

$\Rightarrow MH = \sqrt{(\frac{3}{2})^2 + (-\frac{5}{2})^2}$

$\Rightarrow MH = \sqrt{\frac{9}{4} + \frac{25}{4}} \Rightarrow MH = \frac{\sqrt{34}}{2}$
 نه جواب

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$mm' = -1 \rightarrow$ شرط عمود بودن دو خط

$(3m-2)x + (2-m)y - 5 = 0 \Rightarrow m = \frac{-3m+2}{2-m}, (m+1)x - (2m-2)y + 1 = 0 \Rightarrow m = \frac{m+1}{2m-2}$

$\frac{-3m+2}{2-m} \times \frac{m+1}{2m-2} = -1 \Rightarrow \frac{-3m^2-m+2}{-2m^2+4m-2} = -1 \Rightarrow -3m^2-m+2 = 2m^2-4m+2$

$\Rightarrow 5m^2 - 3m = 0 \Rightarrow \Delta = b^2 - 4ac \Rightarrow \Delta = 9 - 4(5)(0) < 0 \rightarrow$ ریشه حقیقی ندارد
 در خط نمی توانست برسی
 نه جواب

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$$m_{AB} = -\frac{1}{r}, m_{AC} = r \rightarrow \text{خط } AC \text{ مواز } r \Rightarrow$$



$$\begin{cases} AB: x+ry=r \\ AC: y-ru=-1 \end{cases}$$

$$\omega y = \omega \Rightarrow y = 1 \text{ و } u = 1 \Rightarrow A(1,1)$$

$$\begin{cases} AC: y-ru=-1 \\ BC: -(u+y)=\omega \end{cases}$$

$$-ru = -\omega \Rightarrow u = \frac{\omega}{r} \text{ و } y = \frac{\omega}{r} \Rightarrow C(\frac{\omega}{r}, \frac{\omega}{r})$$

$$\Rightarrow AM = \sqrt{(\frac{1}{r})^2 + (-\frac{\omega}{r})^2} = \frac{\omega\sqrt{r}}{r}$$

$$M(\frac{1+\omega}{r}, \frac{r+\omega}{r})$$

$$\begin{cases} AB: -(u+ry)=r \\ BC: u+y=\omega \end{cases}$$

$$-y=1 \Rightarrow y=-1 \text{ و } u=\omega \Rightarrow B(\omega, -1)$$

$$m_{BC} = -1, y-y_0 = m(u-u_0) \Rightarrow y+1 = -1(u-\omega) \Rightarrow y = -u + \omega \Rightarrow y+u = \omega$$

$$\text{فاصله نقطه } A \text{ از خط } d \Rightarrow \frac{|1+1-\omega|}{\sqrt{2}} = \frac{r}{\sqrt{2}} \times \frac{\sqrt{2}}{\sqrt{2}} = \sqrt{r} \Rightarrow AH$$

$$\frac{AM}{AH} = \frac{\frac{\omega\sqrt{r}}{r}}{\sqrt{r}} \times \frac{1}{\sqrt{2}} = \frac{\omega}{\sqrt{2}}$$

$$B(0, b) \text{ و } A(a, 0)$$

$$y = -\frac{1}{r}u + b \xrightarrow{A(a,0)} 0 = -\frac{1}{r}a + b \Rightarrow b = \frac{1}{r}a \Rightarrow a = rb \Rightarrow a = r\omega = 10$$

$$\text{فاصله} \Rightarrow \frac{|b|}{\sqrt{1+\frac{1}{r^2}}} = \frac{|b|}{\frac{\sqrt{r}}{r}} = \sqrt{a} \Rightarrow |b| = \omega \Rightarrow \underline{b = \omega}$$

$$AB = \sqrt{a^2 + b^2} = \sqrt{r^2\omega^2 + \omega^2} = \sqrt{r^2 + 1}\omega = \omega\sqrt{a}$$

$$\begin{cases} my - \varepsilon u = rm \Rightarrow y = \frac{\varepsilon}{m}u + r \\ y + mu = u + r \Rightarrow y = (1-m)u + r \end{cases} \text{ کجایان؟} \Rightarrow (0, r)$$

$$y_B = \frac{\varepsilon}{m}u_B + r, y_B = 0 \Rightarrow \frac{\varepsilon}{m}u_B + r = 0 \Rightarrow \frac{\varepsilon}{m}u_B = -r \Rightarrow u_B = -\frac{r}{\varepsilon} \text{ و } y_B = 0$$

$$y_C = (1-m)u_C + r, y_C = 0 \Rightarrow 0 = (1-m)u_C + r \Rightarrow (1-m)u_C = -r \Rightarrow u_C = \frac{-r}{1-m} \text{ و } y_C = 0$$

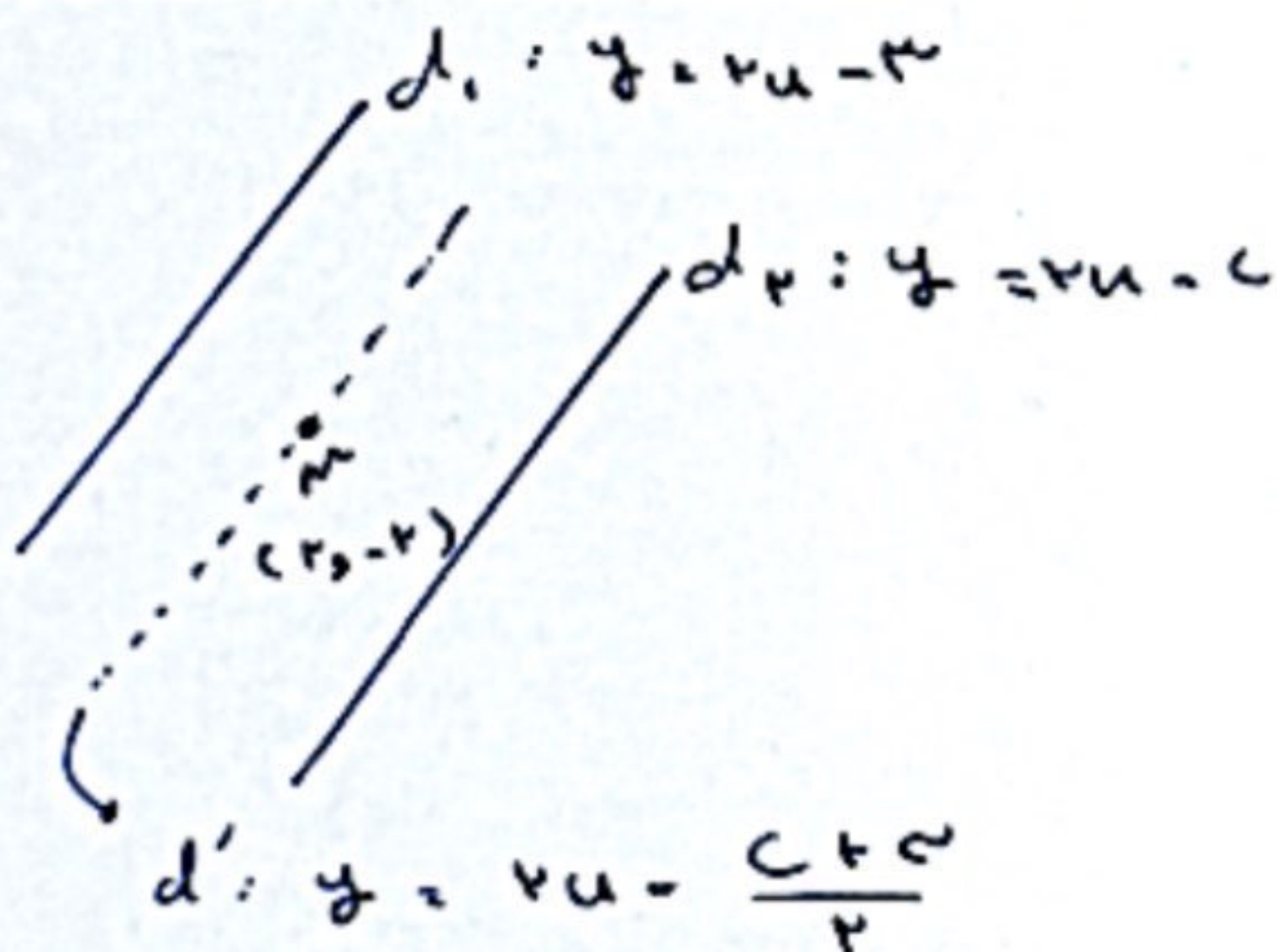
$$\Rightarrow A(0, r), B(-\frac{r}{\varepsilon}, 0), C(\frac{r}{1-m}, 0)$$

$$\omega = |u_B - u_C| = \frac{\omega}{r} \Rightarrow |\frac{r}{m-1} + \frac{r}{\varepsilon}| = \frac{\omega}{r} \Rightarrow \frac{r}{m-1} + \frac{r}{\varepsilon} = \frac{\omega}{r} \Rightarrow \frac{m^2 - m + \varepsilon}{m-1} = \frac{\omega}{r}$$

$$\Rightarrow m^2 - m + \varepsilon = \omega m - \omega \Rightarrow m^2 - 4m + 9 = 0 \Rightarrow \underline{m = 3} \text{ I}$$

$$\frac{r}{m-1} + \frac{r}{\varepsilon} = -\frac{\omega}{r} \Rightarrow \frac{m^2 - m + \varepsilon}{m-1} = -\frac{\omega}{r} \Rightarrow m^2 - m + \varepsilon = -\omega m + \omega \Rightarrow m^2 + \varepsilon m - 1 = 0 \Rightarrow \underline{m = -1} \text{ II}$$

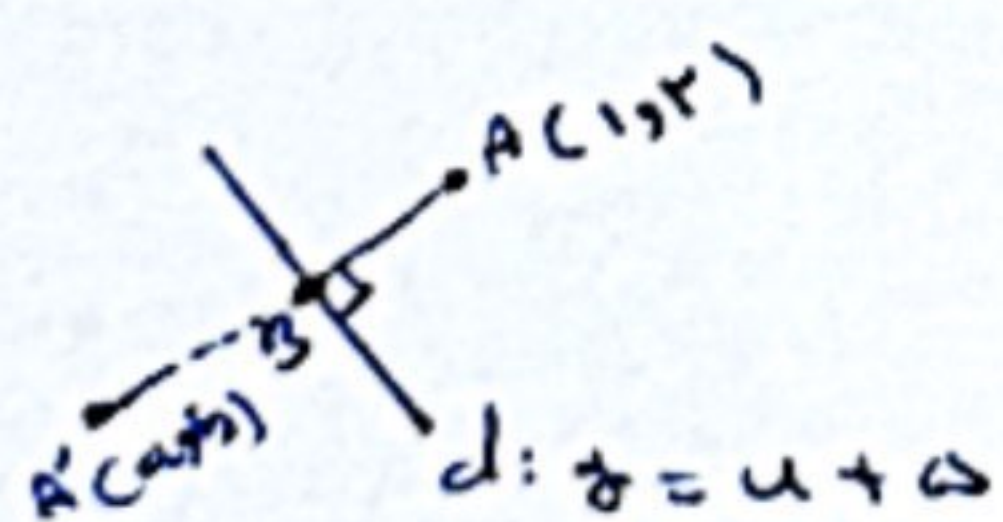
$$\text{I} \times \text{II} = -1 \times 3 = -3 \rightarrow \text{جواب}$$



$$d' \text{ موازی } d \Rightarrow -r = r - \frac{c+r}{r} \Rightarrow \frac{c+r}{r} = 4 \Rightarrow c = 9$$

$$d: y = ru - 9$$

جواب



$$\rightarrow rb - a = r \times 4 + 3 = 10$$

جواب

$$\textcircled{1} \text{ برداری خط } d \text{ و برداری } A \text{ را حساب (خط } d') \\ m_d = 1 \Rightarrow m_d m_{AB} = -1 \Rightarrow m_{AB} = -1$$

$$y - y_0 = m(u - u_0) \Rightarrow y - 2 = -1(u - 1) \Rightarrow y = -u + 3: d'$$

$$\textcircled{2} \text{ محل تقاطع دو خط } d \text{ و } d' \text{ را به دست آوریم (نقطه } B)$$

$$d': -u + 3 = y$$

$$d: u + \omega = y$$

$$ru = 1 \Rightarrow y = 4 \text{ و } u = -1 \Rightarrow B(-1, 4)$$

$$\textcircled{3} \text{ باقی بماند } B \text{ و خط } d \text{ و } A \text{ و } A' \text{ نقاط نقطه } A$$

$$u_{A'} = \frac{1+a}{r} = -1 \Rightarrow \underline{a = -3}$$

$$y_{A'} = \frac{r+b}{r} = 4 \Rightarrow \underline{b = 4}$$