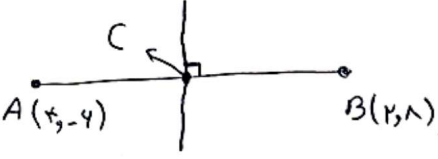
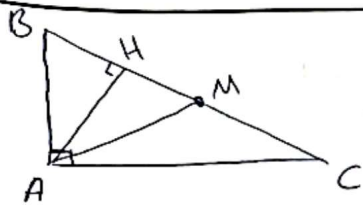


$A(4, -4) \quad B(2, 1) \rightarrow m_{AB} = \frac{1 - (-4)}{2 - 4} = -\frac{5}{2} \Rightarrow m_{\text{عمود منتهی}} = \frac{1}{5}$  $\frac{x+2}{2} = 3 = x_C \Rightarrow C(3, 1)$ $\frac{1-4}{2} = 1 = y_C$ $\Rightarrow y - 1 = \frac{1}{5}(x - 3) \Rightarrow 5y - x - 2 = 0$ معادله عمود منتهی AB	۱
$A(3, 1) \quad B(-2, 3) \quad C(-1, 3)$ $BC: y = -\frac{2}{5}x + \frac{13}{5} \rightarrow 2y + 2x - 13 = 0$ $AH = \frac{ 3 + 13 - 13 }{\sqrt{2^2 + 2^2}} = \frac{1}{2} = 2$ $BC = \sqrt{\Delta x^2 + \Delta y^2} = \sqrt{3^2 + 2^2} = \sqrt{13}$ $BC - AH = \sqrt{13} - 2 = 3$	۲
$A: 4y = ax + 2 \quad B: 2y - x = 5 \quad m_A = m_B \rightarrow \frac{m_A = \frac{a}{4}}{m_B = \frac{1}{2}} \Rightarrow a = 2$ $\Downarrow a = 2$ $4y = 2x + 2 \Rightarrow 2y - x - 1 = 0$ $\text{فاصله در خط} = \frac{ -5 - (-1) }{\sqrt{4 + 1}} = \frac{4}{\sqrt{5}}$ $\Rightarrow \text{شعاع دایره} = \frac{2}{\sqrt{5}} \quad S_{\text{دایره}} = \pi r^2 = \pi \times \left(\frac{2}{\sqrt{5}}\right)^2 = \frac{4\pi}{5}$	۳
$A(2, 2) \quad B(4, 1) \quad C(-1, 3)$ $m_{AB} = \frac{1-2}{4-2} = -\frac{1}{2} \rightarrow AB: y = -\frac{1}{2}x + 3$ $(AB, \mu) m_{CH} = 1 \rightarrow CH: y = x - 2$ $AB \text{ و } CH \text{ را در نقطه } H \text{ حل می‌کنیم} \rightarrow x - 2 = -\frac{1}{2}x + 3 \rightarrow \frac{3}{2}x = 5 \rightarrow x = \frac{10}{3}$ $y = \frac{10}{3} - 2 = \frac{4}{3} \rightarrow H(\frac{10}{3}, \frac{4}{3})$ $M = \left(\frac{x+2}{2}, \frac{y+1}{2}\right) = \left(\frac{4+2}{2}, \frac{1+1}{2}\right) = (3, 1)$ $MH = \sqrt{\left(\frac{10}{3} - 3\right)^2 + \left(\frac{4}{3} - 1\right)^2} = \sqrt{\frac{49}{9} + \frac{1}{9}} = \sqrt{\frac{50}{9}} = \frac{5\sqrt{2}}{3}$	۴
$(3m - 2)x + (5 - m)y - 7 = 0 \quad (m + 1)x - (2m - 5)y + 1 = 0$ $\text{شیب خط} = \frac{-(3m - 2)}{5 - m} \rightarrow \frac{3m - 2}{m - 5}$ $\text{شیب خط} = \frac{-(m + 1)}{-(2m - 5)} = \frac{m + 1}{2m - 5}$ $\frac{3m - 2}{m - 5} \times \frac{m + 1}{2m - 5} = -1 \rightarrow \frac{3m^2 + m - 2}{2m^2 - 15m + 25} = -1 \rightarrow 3m^2 + m - 2 = -2m^2 + 15m - 25$ $\rightarrow 5m^2 - 14m + 23 = 0 \rightarrow \Delta < 0$ (این دو خط عمود نیستند)	۵



۱. معادله خط AB و AC پیدا کنید

$$A = \begin{cases} AB: x+cy-4=0 \\ AC: (y-cx+1=0) \times -2 \rightarrow -2y+2cx-2=0 \end{cases} \rightarrow x=1, y=1 \rightarrow A(1,1)$$

$$B = \begin{cases} AB: x+cy-4=0 \\ BC: (x+y-2=0) \times -1 \rightarrow -x-y+2=0 \end{cases} \xrightarrow{+} y=-1 \rightarrow B(5,-1)$$

$$C = \begin{cases} AC: y-cx+1=0 \\ BC: x+y-2=0 \end{cases} \rightarrow C\left(\frac{5}{2}, \frac{1}{2}\right) \rightarrow AM = \sqrt{\frac{50}{4}}, AH = \sqrt{2} \Rightarrow \frac{AM}{AH} = \frac{\sqrt{\frac{50}{4}}}{\sqrt{2}} = \frac{5}{2}$$

$$y = -\frac{1}{c}x + b \rightarrow cy + x - cb = 0 \xrightarrow{\text{فاصله نقطه از خط}} \frac{|2(1)+0-2b|}{\sqrt{c^2+1}} = \sqrt{2}$$

$$\Rightarrow |2-2b| = \sqrt{2} \rightarrow |2-2b| = 1 \rightarrow \begin{cases} -2b = 1 \rightarrow b = -\frac{1}{2} \\ -2b = -1 \rightarrow b = \frac{1}{2} \end{cases}$$

$$y = -\frac{1}{c}x + \frac{1}{2} \rightarrow cy + x - 1 = 0 \rightarrow \begin{cases} x=0 \rightarrow y=1 \\ y=0 \rightarrow x=1 \end{cases} \rightarrow A(0,1), B(1,0) \rightarrow AB = \sqrt{1+1} = \sqrt{2}$$

۲. شیب d با قرینه اش نسبت به نقطه M (d') برابر است

$$d: y=cx-3 \rightarrow m=c$$

$$d': y=2x+b$$

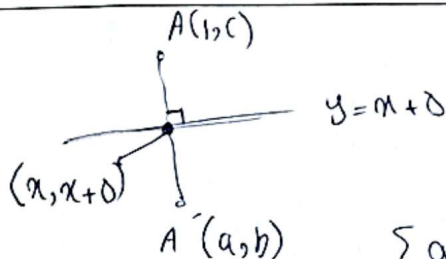
$$\begin{cases} \frac{0+x}{2} = 2 \rightarrow x=4 \\ \frac{2+y}{2} = -2 \rightarrow y=-6 \end{cases}$$

$$d': y=2x-4$$

$$\begin{cases} (y+(m-1)x-2=0) \times -m \rightarrow -my + (-m^2+m)x + 2m=0 \\ my - cx - 2m=0 \end{cases} \xrightarrow{+} (-m^2+m-2)x = 0 \rightarrow x=0$$

$$S_{\text{مثلث}} = \frac{1}{2} \times \text{فاصله} \times \text{ارتفاع} = \frac{5}{2} \rightarrow \text{ارتفاع} = 5 \rightarrow \text{فاصله} = \frac{5}{2}$$

$$\begin{cases} -2x = 2m \rightarrow x = -m \\ (m-1)x = 2 \rightarrow x = \frac{2}{m-1} \end{cases} \rightarrow \left| \frac{2}{m-1} - \frac{-m}{2} \right| = \frac{5}{2} \Rightarrow \begin{cases} m^2-9m+9=0 \rightarrow m=3 \\ m^2+5m-1=0 \rightarrow m = \frac{-5 \pm \sqrt{33}}{2} \end{cases}$$



$$m_{AA'} = -1 \Rightarrow \frac{b-5}{a-1} = -1 \rightarrow b-5 = 1-a \rightarrow a+b=6$$

$$\rightarrow \frac{a+1}{2} + 5 = \frac{b+5}{2} \xrightarrow{\times 2} a+1+10 = b+5 \rightarrow a-b=-4$$

$$\begin{cases} a+b=6 \\ a-b=-4 \end{cases} \rightarrow \begin{cases} 2a=2 \rightarrow a=1 \\ b=5 \end{cases}$$

$$2b-a = 2(5)-1 = 9$$