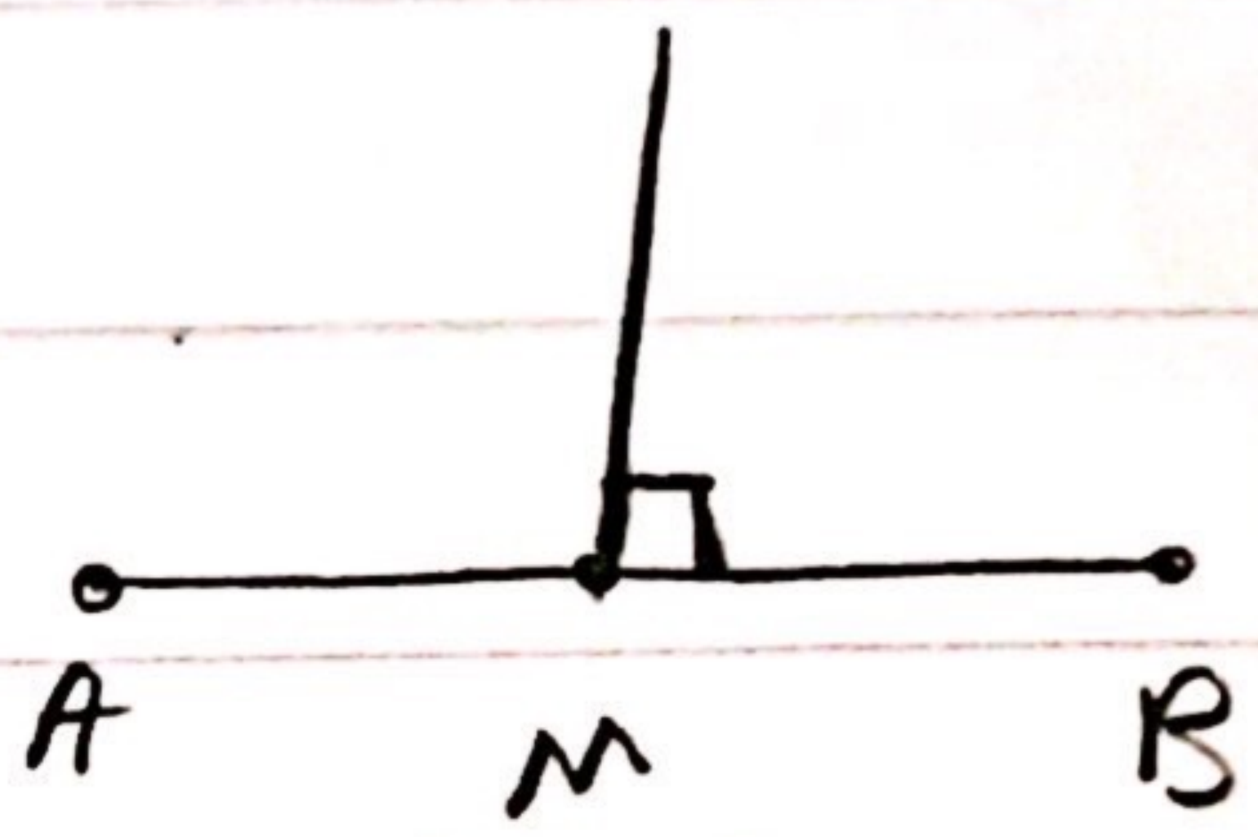
۲۰

۱-

$A(4,-6) \quad B(2,8)$



۲

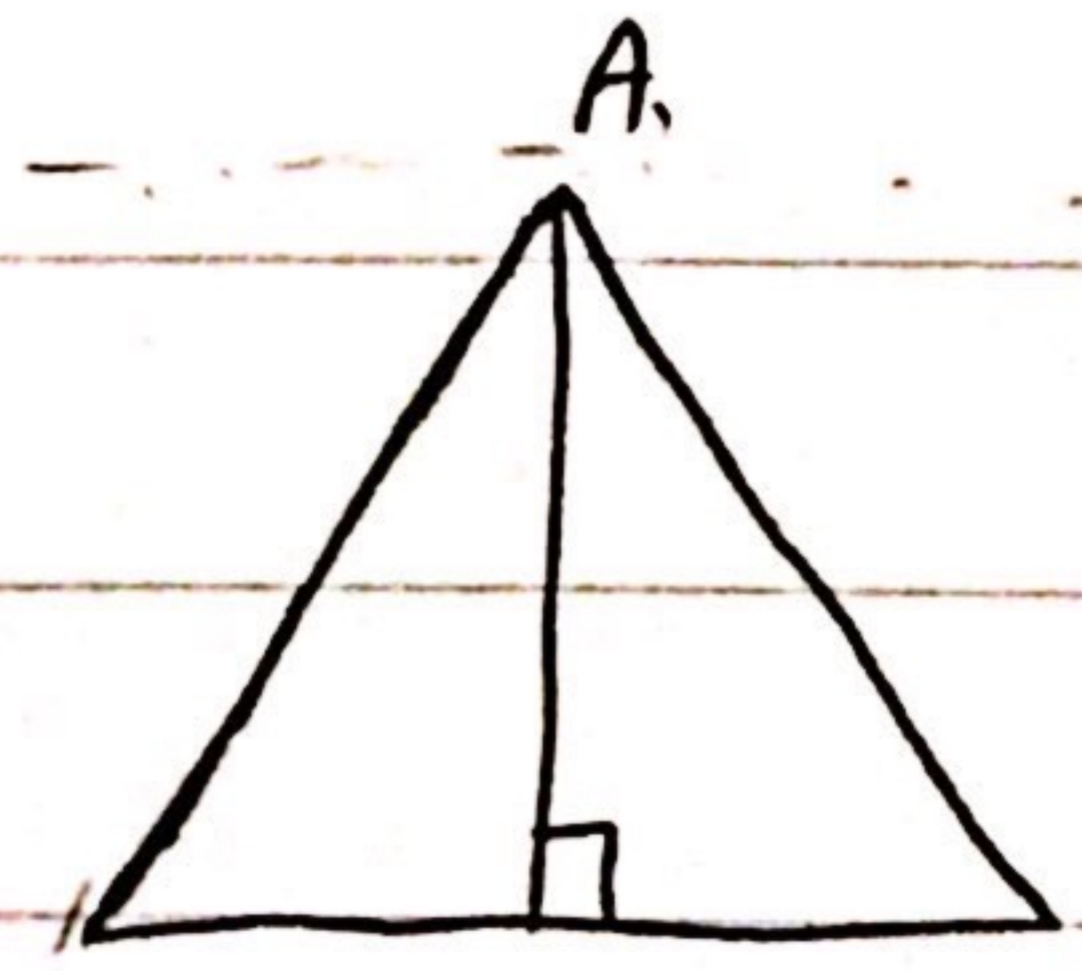
$m = \frac{8-(-6)}{2-4} = \frac{14}{-2} = -7$

$\Rightarrow m_{\text{عمود منصف}} = \frac{1}{7} \Rightarrow \frac{1}{7}(3) + h = 1 \Rightarrow h = \frac{4}{7} \Rightarrow y = \frac{1}{7}x + \frac{4}{7}$

$7y - x = 4$

۲-

$A(3,1) \quad B(-4,7) \quad C(-1,3)$



$\overline{BC} = \sqrt{\underbrace{(-4-(-1))^2}_{9} + \underbrace{(7-3)^2}_{16}} = \sqrt{25} = 5$

۲

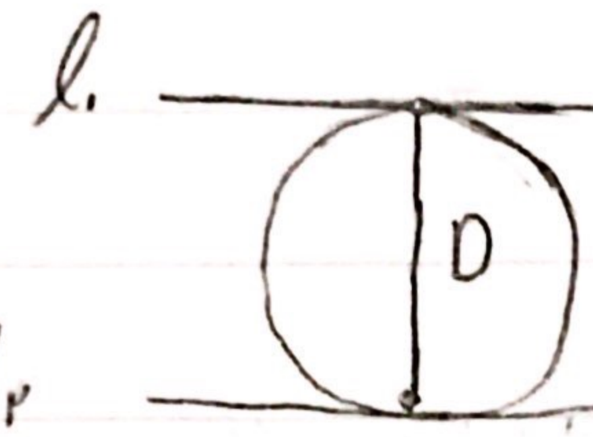
$m_{BC} = \frac{7-3}{-4-(-1)} = \frac{4}{-3}$

$\frac{-4}{3}(-1) + h = 3 \Rightarrow h = \frac{5}{3} \Rightarrow y = \frac{-4}{3}x + \frac{5}{3} \Rightarrow 3y + 4x = 5$

(طول AH برابر با فاصله رأس A تا $\overline{BC}$ است)

$\overline{AH} = \frac{|4(3) + 3(1) - 5|}{\sqrt{25}} = \frac{15}{5} = 2 \Rightarrow 5 - 2 = 3$

۳-



$4y = ax + 2$

$2y - x = 7$

$\Rightarrow$ متقارن $\Rightarrow m_{l_1} = m_{l_2}$

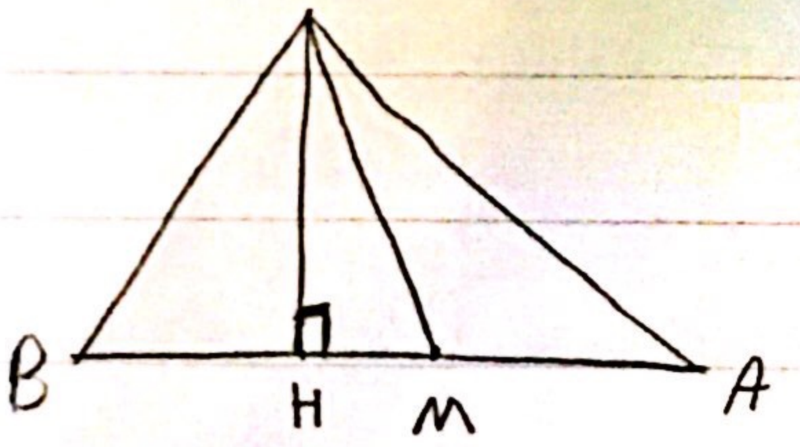
$l_1 : y = \frac{a}{4}x + \frac{1}{2} \Rightarrow$

$l_2 : y = \frac{x}{2} + \frac{7}{2}$ $\Rightarrow$ $\frac{a}{4} = \frac{1}{2} \Rightarrow a = 2$

$D = \frac{|\frac{7}{2} - \frac{1}{2}|}{\sqrt{\frac{5}{4}}} = \frac{3}{\frac{\sqrt{5}}{2}} = \frac{6}{\sqrt{5}}$ قطر دایره $\Rightarrow$ شعاع $r = \frac{3}{\sqrt{5}}$

$S = \pi r^2 = \pi \times (\frac{3}{\sqrt{5}})^2 = \frac{9}{5}\pi$

۴- $A(2,3)$ $B(4,1)$ $C(-1,-3)$



$M = (\frac{2+4}{2}, \frac{3+1}{2}) = (3,2)$

$m_{AB} = \frac{3-1}{2-4} = \frac{2}{-2} \Rightarrow m_{CH} = 1$ $\Rightarrow$ $1(-1) + h = -3 \Rightarrow h = -2$

$y = x - 2$ $\Rightarrow$ $x - 2 = -x + 3 \Rightarrow 2x = 5 \Rightarrow x = \frac{5}{2}$ (مختصات H)

$H = (\frac{5}{2}, \frac{3}{2})$ $\Rightarrow$ $\overline{MH} = \sqrt{\underbrace{(\frac{5}{2} - 2)^2}_{\frac{1}{4}} + \underbrace{(\frac{3}{2} - 2)^2}_{\frac{1}{4}}} = \sqrt{\frac{1}{2}}$

۵- $(2m-2)x + (5-m)y - 7 = 0$ $(m+1)x - (2m-4)y + 1 = 0$

شیب‌ها عکس و قرینه هستند $\Rightarrow$ $\frac{m+1}{2m-4} = \frac{m-5}{2-2m}$

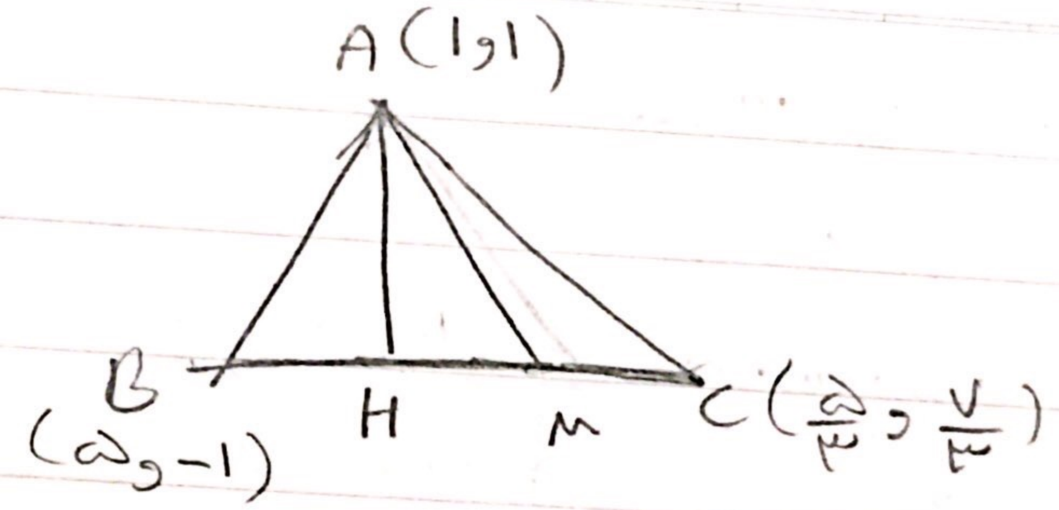
$(m+1)(2-2m) = (2m-4)(m-5) \Rightarrow -2m^2 + 2 - 2m = 2m^2 - 10m - 4m + 20 \Rightarrow 4m^2 - 12m + 18 = 0$

هیچ مقدار m $\Delta < 0$

$a = \frac{m+1}{2m-4}$

۶-

$$\begin{cases} AB: x+2y=3 \\ AC: y=2x-1 \\ BC: x+y=4 \end{cases}$$



(۵)

A عمود

$$\frac{-x}{2}+\frac{3}{2}=2x-1$$

$$-x+3=4x-2$$

$$5=5x \Rightarrow x=1 \Rightarrow y=1$$

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

$$M \text{ وسط } = \left(\frac{a+\frac{a}{3}}{2}, \frac{\frac{7}{3}-1}{2}\right)=\left(\frac{5}{3}, \frac{2}{3}\right)$$

C وسط $\Rightarrow 2x-1=-x+4 \Rightarrow 3x=5 \Rightarrow x=\frac{5}{3} \Rightarrow y=\frac{7}{3}$

B وسط $\Rightarrow \frac{-x}{2}+\frac{3}{2}=-x+4 \Rightarrow -x+3=-2x+8$

$x=5 \quad y=-1$

$$AM=\sqrt{\underbrace{(1-\frac{5}{3})^2}_{\frac{4}{9}}+\underbrace{(1-\frac{2}{3})^2}_{\frac{1}{9}}}=\frac{\sqrt{5}}{3} \Rightarrow \frac{AM}{AH}=\frac{\frac{\sqrt{5}}{3}}{\frac{2}{\sqrt{2}}}=\frac{5}{6}$$

۷-

$$-\frac{1}{2}x+h=y \Rightarrow -x+2h=2y$$

(۵)

فاصله تا مبدأ $=\frac{|2h|}{\sqrt{5}}=\sqrt{20} \Rightarrow |2h|=10 \Rightarrow h=\pm 5$

عرض از مبدأ $=\pm 5$ ، عرض تا مبدأ و طول از مبدأ $\Rightarrow$ حل‌های قرینه

طول از مبدأ $=2h=\pm 10$

$$\Rightarrow \sqrt{(10-0)^2+(0-5)^2}=\sqrt{125}=5\sqrt{5}$$

همواره مثبت یا صفر و شعاعی نیست

$3\times(-1)=(-3)$ مقادیر ضرب

$-\frac{5}{2}$

$8-2m+2m^2=10-10m$

$2m^2+8m-2=0 \Rightarrow$ حاصل ضرب $=-1$

۸-

$my-4x=2m$

$y+mx=x+2$ $\Rightarrow$ هر دو عرض از مبدأ برابر دارند

ارتفاع $=2$ و قاعده = اختلاف طول از مبدأ ها

$y=\frac{4}{m}x+2 \Rightarrow$ طول از مبدأ $=-\frac{m}{2}$

$y=(1-m)x+2 \Rightarrow$ طول از مبدأ $=-\frac{2}{1-m}$

قاعده $\left|\frac{-4+m-m^2}{2-2m}\right|$

$$\begin{cases}-8+2m-2m^2=10-10m\\ 2m^2-12m+18=2(m-3)^2 \Rightarrow m=3 \quad \frac{5}{2}\end{cases}$$

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

$$\frac{-4+m-m^2}{2-2m}=\pm\frac{5}{2}$$

۹-

$y=2x-3$ $\quad M(2,-2)$

$\Rightarrow$ شیب قرینه $\Rightarrow =2 \Rightarrow \frac{1+x}{2}=2 \Rightarrow x=3$

$(1,-1)$

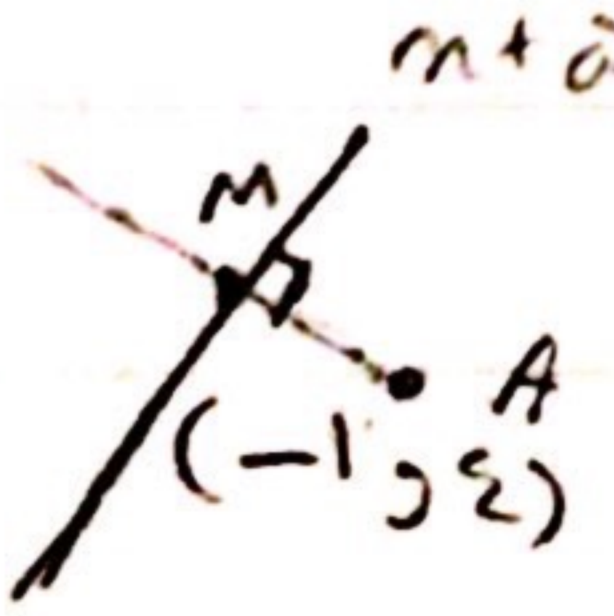
$\frac{-1+y}{2}=-2 \Rightarrow y=-3$

$2(3)+h=-3 \Rightarrow h=-9 \Rightarrow y=2x-9$

۱۰-

$y=x+5$ $\quad A(1,2)$

$2b-a=?$ $\quad -(1)+h=2 \Rightarrow h=3$



M تقاطع $\Rightarrow -x+3=x+5 \Rightarrow 2x=-2 \Rightarrow x=-1$

$y=4$

$\frac{1+x}{2}=-1 \Rightarrow 1+x=-2 \Rightarrow x=-3$

$\frac{y+2}{2}=4 \Rightarrow y=6$

$\Rightarrow (-3,6) \Rightarrow a=-3,\ b=6$

$12-(-3)=15$