۱- $A(4,-4)$ $B(2,1)$ عمود منصف

$a = \frac{\Delta y}{\Delta x} = \frac{1+4}{2-4} = \frac{14}{-2} = -7 \xrightarrow{aa'=-1} a' = \frac{1}{7}$

$y - y_0 = m(x - x_0)$

$y - 1 = \frac{1}{7}(x - 3)$

$y = \frac{1}{7}x + \frac{4}{7}$

A,B وسط $= \left| \begin{array}{l} \frac{4+2}{2} = 3 \\ \frac{-4+8}{2} = 1 \end{array} \right.$

۲- $A(3,1)$ $B(-4,7)$ $C(-1,3)$

$BC = \sqrt{(\Delta y)^2 + (\Delta x)^2} = \sqrt{(7-3)^2 + (-4+1)^2} = \sqrt{16+9} = 5$

$a_{BC} = \frac{7-3}{-4+1} = \frac{4}{-3} \rightarrow y - 3 = -\frac{4}{3}(x+1) \rightarrow y = -\frac{4}{3}x + \frac{5}{3} \rightarrow y + \frac{4}{3}x - \frac{5}{3} = 0$

$a - 2 = 3$ بیشتره

$AH = \frac{\left| +\frac{4}{3} \times 3 + 1 \times 1 - \frac{5}{3} \right|}{\sqrt{\frac{16}{9} + \frac{9}{9}}} = \frac{\frac{10}{3}}{\frac{5}{3}} = 2$

۳- $ay = ax + 2$ $2y - x = 7$

$ay - ax - 2 = 0$ $2y - x - 7 = 0$

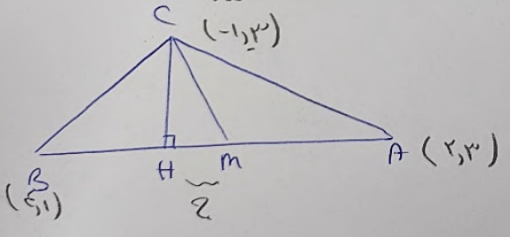
$\frac{2}{1} = \frac{-a}{-1} \neq \frac{2}{-7} \Rightarrow a = 2$

$4y - 2x - 2 = 0$ و $4y - 2x - 14 = 0$

فاصله دو خط موازی $= \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|-2+14|}{\sqrt{4+16}} = \frac{12}{2\sqrt{5}}$

$\Rightarrow$ شعاع $= \frac{3}{\sqrt{5}}$

مساحت دایره $= \pi r^2 = \pi \times \frac{9}{5} = \frac{9}{5}\pi$



۴- $m = A,B$ وسط $= \left| \begin{array}{l} \frac{4+2}{2} = 3 \\ \frac{1+5}{2} = 2 \end{array} \right.$ $m = (3,2)$

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

$y - 3 = -1(x - 2)$

$y = -x + 5$

عمودمنصف $\leftarrow a' = 1$

$aa' = -1$

$y + 3 = 1(x + 1)$

$y = x - 2$

$\Rightarrow x - 2 = -x + 5 \quad 2x = 7 \rightarrow x = \frac{7}{2}, \; y = \frac{3}{2}$

$MH = \sqrt{(3 - \frac{7}{2})^2 + (2 - \frac{3}{2})^2} = \sqrt{(-\frac{1}{2})^2 + (\frac{1}{2})^2} = \sqrt{2 \times \frac{1}{4}} = \frac{\sqrt{2}}{2}$

۵- $(2m-2)x + (a-m)y - 7 = 0$

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

دو خط عمود بر هم $\xrightarrow{m m' = -1} \frac{-(2m-2)}{a-m} \times \frac{-(m+1)}{(2m-4)} = -1 \rightarrow \frac{2m-2}{a-m} = \frac{2m-4}{m+1}$

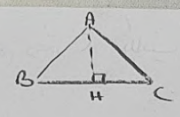
$2m^2 + 2m - 2m - 2 = 10m - 20 - 2m^2 + 4m \rightarrow 5m^2 - 14m + 18 = 0 \quad \Delta < 0$

این دو خط نمی‌توانند بر هم عمود باشند

AB $x+2y=4$

AC $y=2x-1$

BC $x+y=6$



۷-

A → $-\frac{1}{2}x+\frac{4}{2}=2x-1 \rightarrow \frac{5}{2}=\frac{5}{2}x$ $(1,1)$ A

B → $-\frac{1}{2}x+\frac{4}{2}=-x+6 \rightarrow \frac{1}{2}x=\frac{10}{2}$ $(10,-1)$ B

C → $2x-1=-x+6 \rightarrow 3x=7$ $(\frac{7}{3},\frac{11}{3})$ C

BC عمود = $m = \left|\frac{\frac{1}{2}}{\frac{2}{2}}\right| = \frac{\frac{5}{2}+5}{2}$

$\frac{-1+\frac{4}{2}}{2}$

AH معادله = $x=y$

BC معادله = $-x+4=y$ عمود منصف

AH شیب = -1 ← $-x+4=x$

$2x=4$

$x=2$

$H\left|\begin{matrix}2\\2\end{matrix}\right.$

$AH=\sqrt{(2-1)^2+(2-1)^2}=\sqrt{2}$

$\Rightarrow AM=\sqrt{(\frac{11}{3}-1)^2+(\frac{7}{3}-1)^2}=\frac{5\sqrt{2}}{3}$

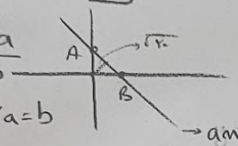
$\frac{AM}{AH}=\frac{\frac{5\sqrt{2}}{3}}{\sqrt{2}}=\frac{5}{3}$ جواب

۷-

فاصله نقطه از خط = $\frac{|3x_0+4y_0+c|}{\sqrt{3^2+4^2}}=2\sqrt{5}$ $\quad |c|=10a$

$m=-\frac{1}{2}=\frac{-a}{b}$

$\frac{a}{b}=\frac{1}{2} \rightarrow 2a=b$



$\rightarrow ax+by+c=0 \rightarrow ax+2ay+c=0$

$B \rightarrow y=0 \rightarrow x=-\frac{c}{a}$

$A \rightarrow x=0 \rightarrow y=-\frac{c}{2a}$

$AB=\sqrt{(\frac{c}{2a})^2+(\frac{c}{a})^2}$

$AB=\sqrt{\frac{c^2}{4a^2}+\frac{c^2}{a^2}}$

$\Rightarrow AB=\sqrt{\frac{5c^2}{4a^2}}=\frac{c\sqrt{5}}{2a}$

۸-

$y=x(1-m)+2$ دارای عرض از مبدا برابر

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

$y=0$

$y=0 \rightarrow x=\frac{-2}{1-m}$

$y=0 \rightarrow x=\frac{-m}{2}$

$S=\frac{\text{قاعده} \times \text{ارتفاع}}{2}=\frac{5}{2}$

$\rightarrow \left|\frac{-m+m^2+4}{2(1-m)}\right|=\frac{5}{2}$

$\frac{m^2-m+4}{2(1-m)}=\frac{5}{2}$

$\text{قاعده}=\frac{5}{2}=\left|\frac{-m}{2}-\left(\frac{-2}{1-m}\right)\right|$

$m^2-m+4=5-5m$

$m^2+4m-1=0$ → صفرش کن: $\Delta=-1$

$\frac{m^2-m+4}{2(1-m)}=\frac{-5}{2}$

$m^2-m+4=-5+5m$

$m^2-4m+9 \rightarrow (m-2)^2+5$ $m=2$

$-1\times 3=-3$ جواب

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

۹-

نقطه دلخواه ← $x=1 \rightarrow y=-1$

$x_m=\frac{+1+x_{B'}}{2}=2$ $\quad x_B=3$

$y_m=\frac{-1+y_{B'}}{2}=-2$ $\quad y_{B'}=-3$

قرینه نظر $\xrightarrow{(3,-3)}$ $y=2x+b$

$y=2x-9$

$y=x+a$ $\quad A(1,2)$ $\quad A'(a,b)$ $\quad 2b-a=?$

$aa'=-1$

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

شیب عمود

$-x+3=x+a$ | -1 | 4

$-2=2a$

۱۰-

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

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

$A' \Rightarrow A'(-3,6)$

$a \quad b$

$2\times 6-(-3)=15$