درسا صادقی

۱-

$m_{AB}=\frac{y_B-y_A}{x_B-x_A}=\frac{۸-(-۶)}{۲-۴}=-\frac{۱۴}{۲}=-۷$

$m_{\text{عمودمنصف}}\to m_{AB}\times m=-۱\to m=\frac{۱}{۷}$

$\frac{x_A+x_B}{۲}=\frac{۲+۴}{۲}=۳$

$\frac{y_A+y_B}{۲}=\frac{۸-۶}{۲}=۱$

$y-y_M=m(x-x_M)$

$y-۱=\frac{۱}{۷}(x-۳)\to y=\frac{۱}{۷}x+\frac{۴}{۷}$

۲-

$m_{BC}=\frac{y_C-y_B}{x_C-x_B}=\frac{۳-۷}{-۱-(-۴)}=-\frac{۴}{۳}$

$y-y_B=m(x-x_B)=y-۷=-\frac{۴}{۳}(x+۴)\to y=-\frac{۴}{۳}x+\frac{۵}{۳}$

$۳y=-۴x+۵=۰$ $AH=\frac{۳\times۱+۴\times۳-۵}{\sqrt{۳^۲+۴^۲}}=\frac{۱۰}{۵}=۲$

۳-

$(۲y-x-۷=۰)\to ۴y-۲x-۱۴=۰$ $۴y-ax-۲=۰\to a=۲$

$۲r=\frac{|c'-c|}{\sqrt{a^۲+b^۲}}=\frac{|-۲-(-۱۴)|}{\sqrt{۱۶+۴}}=\frac{۱۲}{\sqrt{۲۰}}=\frac{۱۲}{۲\sqrt{۵}}=\frac{۶}{\sqrt{۵}}\to r=\frac{۳}{\sqrt{۵}}$

$S=\pi r^۲=\pi\times\frac{۹}{۵}\to\frac{۹}{۵}\pi$

$M\left|\begin{array}{l}\frac{x_A+x_B}{۲}=\frac{۲+۴}{۲}=۳\\ \frac{y_A+y_B}{۲}=\frac{۱+۳}{۲}=۲\end{array}\right.$

$m_{AB}=\frac{y_B-y_A}{x_B-x_A}=\frac{۱-۳}{۴-۲}=-۱\to m_{CH}=\frac{-۱}{-۱}$

$CH\to y-y_C=m(x-x_C)$

$y+۳=x+۱=y=x-۲$

$y-۲=-۱(x-۳)\to y=-x+۵$

$x-۲=-x+۵\to ۲x=۷\to x=\frac{۷}{۲},\ y=\frac{۳}{۲}$

$\sqrt{(y_H-y_M)^۲+(x_H-x_M)^۲}$

$\sqrt{(\frac{۱}{۲})^۲+(\frac{۱}{۲})^۲}=\frac{\sqrt{۲}}{۲}$

۵-

$(3m-2)x+(5-m)y-7=0$, $m_1=\dfrac{-(3m-2)}{5-m}=\dfrac{3m-2}{m-5}$

$(m+1)x-(2m-4)y+1=0$, $m_2=-\dfrac{(m+1)}{-(2m-4)}=\dfrac{m+1}{2m-4}$

$m_1\times m_2=-1$, $\dfrac{3m-2}{m-5}\times\dfrac{m+1}{2m-4}=-1 \longrightarrow 3m^2-2m+3m-2=-2m^2+4m+10m-20$

$5m^2-13m+18=0 \longrightarrow \Delta<0$

m عددی نمی‌تواند باشد

۶-

$AB: x+2y=3$, $y=-\frac{1}{2}x+\frac{3}{2}$

$AC: y=2x-1$

$BC: x+y=4 \to y=-x+4$

$A(1,1)$, $B(5,-1)$, $C(\frac{5}{3},\frac{7}{3})$

$-\frac{1}{2}x_A+\frac{3}{2}=2x_A-1 \longrightarrow \frac{5}{2}x_A=\frac{5}{2} \longrightarrow x_A=1$, $y_A=1$

$-x_B+4=-\frac{1}{2}x_B+\frac{3}{2} \to \frac{1}{2}x_A=\frac{5}{2} \longrightarrow x_A=5$, $y_B=-1$

$2x_C-1=-x_C+4 \to 3x_C=5 \longrightarrow x_C=\frac{5}{3}$, $y=\frac{7}{3}$

$M \left| \begin{array}{l} \dfrac{x_B+x_C}{2} \longrightarrow \dfrac{5+\frac{5}{3}}{2}=\dfrac{10}{3} \\ \dfrac{y_B+y_C}{2} \quad \dfrac{\frac{7}{3}-1}{2}=\dfrac{2}{3} \end{array}\right.$

$AM=\sqrt{(x_A-x_M)^2+(y_A-y_M)^2}=\sqrt{(\frac{1}{3})^2+(\frac{7}{3})^2}$, $\sqrt{\frac{50}{9}}=\frac{5\sqrt{2}}{3}$

$AH=\dfrac{|1+1-4|}{\sqrt{2}}=\dfrac{2}{\sqrt{2}}=\sqrt{2}$, $\dfrac{AM}{AH}=\dfrac{\frac{5\sqrt{2}}{3}}{\sqrt{2}}=\dfrac{5}{3}$

۷-

$d: y=-\frac{1}{2}x+b \xrightarrow{A(a,0)} 0=-\frac{1}{2}a+b \to b=\frac{1}{2}a \to a=2b$

$\dfrac{|b|}{\sqrt{1+\frac{1}{4}}}=\dfrac{|b|}{\frac{\sqrt{5}}{2}}=\sqrt{20} \longrightarrow |b|=5$, $AD\sqrt{a^2+b^2}=\sqrt{25+100}=\sqrt{125}=5\sqrt{5}$

-۸

$my - 4x = 2m \to y = \frac{4}{m}x + 2$ نقطه برخورد (دو)

$y + mx = x + 2 \to y = (1-m)x + 2$

$y = 0$

$y_B = \frac{4}{5}x_B + 2, y_B = 0 \to \frac{4}{5}x_B + 2 = 0 \to \frac{4}{m}x_B = -2 = x_B = \frac{-m}{2}$

$y_C = (1-m)x_C + 2, y_C = 0 \to 0 = (1-m)x_C + 2 \to (1-m)x_C = -2$ $y_B = 0$

$x_C = \frac{2}{m-1} \to y_C = 0$

-۹

$-2 = 4 - \frac{c+3}{2} \to \frac{c+3}{2} = 6 \quad c + 3 = 12 \quad c = 9$

$d_1\ y = 2x - 3$

$d_2 = y = 2x - c$

$d_3 = 2x - \frac{c+3}{2} \to$ وسط d_1 و d_2

$d_2 = y = 2x - 9$

-۱۰

$y = x + 5$

$m_d = 1 \to m_{AA'} = -1$

$y - y_A = -1(x - x_A) \to y - 2 = -x + 1$

$y = -x + 3$

$x + 5 = -x + 3 \to 2x = -2 \to x = -1 \to y = 4$

وسط A و A′ $\left|\begin{array}{l} \frac{a+1}{2} = -1 \to a + 1 = -2 \to a = -3 \\ \frac{b+2}{2} = 4 \to b + 2 = 8 \to b = 6 \end{array}\right.$

$2b - a = 12 - (-3) = 12 + 3 = 15$