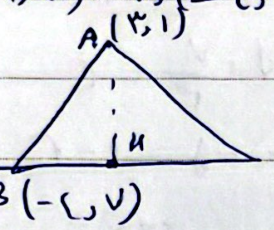
۱۹٫۲۵

عسل طاهری — یازدهم پنجشنبه ها

سوال ۱ ← مختصات وسط دو نقطه → $\frac{4+2}{2} = 3$, $\frac{8+(-4)}{2} = 1$ → $(2, 1)$ (۳)

$a = \frac{8-(-6)}{2-4} = -7 \rightarrow a' = \frac{1}{7} \rightarrow y = \frac{1}{7}x + \frac{6}{7}$

سوال ۲ ← $C(-1, 3)$ $B(-4, 7)$ $A(3, 1)$ $BC = \sqrt{9+16} = 5$



$\rightarrow m_{BC} = \frac{7-3}{-4+1} = -\frac{4}{3}$ (۱٫۲۵)

$\rightarrow y = -\frac{4}{3}x + \frac{5}{3}$

$\rightarrow y + \frac{4}{3}x - \frac{5}{3} = 0 \xrightarrow{\times 3} 3y + 4x - 5$

$\rightarrow \frac{3(1) + 4(3) - 5}{\sqrt{25}} = \frac{10}{5} = 2$ $5 - 2 = 3$

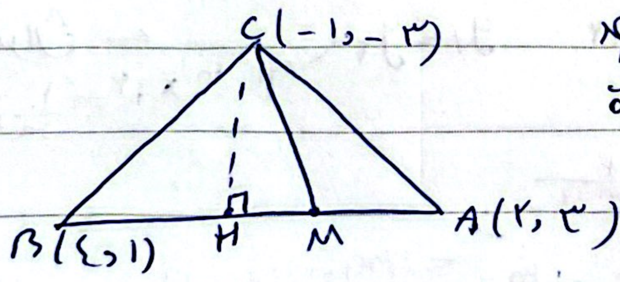
سوال ۳ ← $2y - x = 7$, $4y - ax = +2$ →

$\xrightarrow{\times 2} 4y - 2x = 14$, $4y - 2x = +2$ (۲)

$\rightarrow \frac{|c-c'|}{\sqrt{a^2+b^2}} = \frac{12}{2\sqrt{5}} \rightarrow \times$ نصف $= \frac{6}{2\sqrt{5}}$

$\rightarrow \frac{36}{20} \times \pi = \boxed{\frac{36\pi}{20}}$

سوال ۴ ←



$x_M = \frac{2+4}{2} = 3$

$y_M = \frac{3+1}{2} = 2 \rightarrow M(3, 2)$ (۲)

$m_{AB} = \frac{3-1}{2-4} = -1 \rightarrow y = -x + 5$

$m_{CH} = 1 \rightarrow y = x - 2$

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

$H(\frac{7}{2}, \frac{3}{2})$
$M(3, 2)$ $\rightarrow \sqrt{(\frac{1}{2})^2 + (\frac{1}{2})^2} = \boxed{\frac{\sqrt{2}}{2}}$

سوال ۵ ←

$(3m-2)x+(5-m)y=7 \longrightarrow (5-m)y=(2-3m)x+7$

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

$\longrightarrow \frac{2-3m}{5-m} \times \frac{m+1}{4-2m} = -1 \longrightarrow$ به ازای m صحیح ندارد

(۲)

سوال ۶ ←

$AB = x+2y=3$

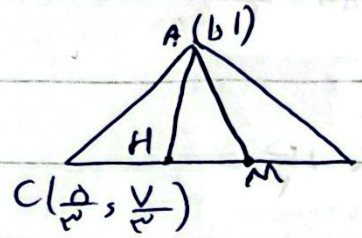
$AC = -2y+4x=2$ } $\longrightarrow 5x=5 \longrightarrow x=1, y=1 = A$

$BC = 2x+2y=8$ } $\longrightarrow 6x=10 \longrightarrow x=\frac{5}{3}, y=\frac{7}{3} = C$

$AB = x+2y=3$

$BC = -2x-2y=-8$ } $\longrightarrow -x=-5 \rightarrow x=5, y=-1 = B$

(۲)



$M(\frac{10}{3}, \frac{2}{3}) \longrightarrow d\,AM = \frac{5\sqrt{2}}{3}$

$B(5,-1)\quad H(2,2) \longrightarrow d\,AH=\sqrt{2} \longrightarrow \frac{d\,AM}{d\,AH} = \frac{\frac{5\sqrt{2}}{3}}{\sqrt{2}} = \boxed{\frac{5}{3}}$

سوال ۷ ←

$y = -\frac{1}{2}x+b \longrightarrow \frac{|y+\frac{1}{2}x-b|}{\sqrt{\frac{5}{4}}} = \sqrt{20}$

(۲)

$\longrightarrow |-b| \longrightarrow \sqrt{25} \longrightarrow |-b|=5 \longrightarrow b=5$ یا -5

$\longrightarrow -\frac{1}{2}x+5 \longrightarrow x_0=10, y_0=5 \longrightarrow \boxed{5\sqrt{5}}$

$\longrightarrow -\frac{1}{2}x-5 \longrightarrow x_0=-10, y=-5 \longrightarrow \boxed{5\sqrt{5}}$

سوال ۸ ←

$y=(1-m)x+2 \qquad y=\frac{4}{m}x+2 \qquad y_1=y_2 \searrow (1-m)x+2=\frac{4}{m}x+2$

$\Rightarrow x=0, y=2 \Rightarrow A(0,2)$

(۲)

محل برخورد با x

$(1-m)x+2=0 \longrightarrow x_1=\frac{2}{m-1}$

$\frac{4}{m}x+2=0 \longrightarrow x_2=-\frac{m}{2} \Rightarrow (x_1,0)(x_2,0)(0,2) \Rightarrow h_\Delta=2$

$S_\Delta = \frac{1}{2} \times 2 \times |x_1-x_2| = |x_1-x_2| = (\frac{2}{m-1}+\frac{m}{2}) = \frac{5}{2}$

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$$\begin{cases} \frac{2}{m-1}+\frac{m}{2}=\frac{5}{2} \Rightarrow m=3 \\ \frac{2}{m-1}+\frac{m}{2}=-\frac{5}{2} \Rightarrow m=-2-2\sqrt{5} \quad m=-2+2\sqrt{5} \end{cases} \longrightarrow 3\times(-2+2\sqrt{5})(-2-2\sqrt{5}) = \boxed{-3}$$

سوال ۹ ←

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

$x_M=\frac{x+x'}{2} \rightarrow 2=\frac{0+x'}{2} \rightarrow x'=4$

$y_M=\frac{y+y'}{2} \Rightarrow -2=\frac{0+y'}{2} \rightarrow y'=-1$

$\rightarrow m_d=m'_d \rightarrow \boxed{y=2x-9}$

(۴)

سوال ۱۰ ←

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

$\rightarrow a=1, a'=-1 \rightarrow y=-x+3 , -x+3=x+5 \rightarrow x=-1 , y=4$

$2(-1)-1=-3 , (4)2-2)=6 \rightarrow (-3,6) \rightarrow (a,b)$

$12-(-3)=\boxed{15}$

(۴)

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