

A, V, 5

$A(4, -6)$ $C(3, 1)$ $B(2, 1)$
 از طریق میانه‌های AM و BN چون متقاطع است

$m_{AB} = \frac{1+6}{2-4} = \frac{14}{-2} = -7$

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

$\Rightarrow m_{CH} = \frac{1}{7} \rightarrow$ چون عمود است $\rightarrow y = \frac{1}{7}x + b \xrightarrow{(3,1)} 1 = \frac{3}{7} + b \Rightarrow b = \frac{4}{7}$

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

$m_{BC} = \frac{7-3}{-4+1} = \frac{4}{-3} \rightarrow y_{BC} = -\frac{4}{3}x + \frac{d}{3}$ ✓

$d_{AH} = \frac{|1 + \frac{4}{3} - \frac{d}{3}|}{\sqrt{1 + \frac{16}{9}}} = \frac{\frac{10}{3}}{\frac{5}{3}} = \frac{10}{5} = 2$

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

$BC - AH = 5 - \frac{10}{5} = \frac{5d-10}{5} = \frac{10}{5} = 2$

چون سب آن هم $\frac{1}{7}$ است پس $a = \frac{1}{7}$

$\begin{cases} y = ax + 2 \\ y = x + 7 \end{cases} \rightarrow \begin{cases} y = x + 1 \\ y = x + 7 \end{cases} \rightarrow d = \frac{|7-1|}{\sqrt{4+1}} = \frac{6}{\sqrt{5}}$

$\frac{3}{\sqrt{5}} = \text{مساحت}$

$S_{\text{دایره}} = \pi r^2 = \left(\frac{3}{\sqrt{5}}\right)^2 \pi = \frac{9}{5} \pi$ ✓

$A(-1, -3)$ $B(5, 1)$ $C(2, 3)$ $H(\frac{3}{2}, \frac{3}{2})$

$m_{AB} = \frac{1-(-3)}{5-(-1)} = \frac{4}{6} = \frac{2}{3} \rightarrow m_{CH} = 1$

$y_{AB} = -\frac{3}{2}x + d$ $y_{CH} = x - 2$

$H = \text{تقاطع خطوط}$

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

$d_{MH} = \sqrt{(-\frac{7}{2}-\frac{3}{2})^2 + (2-\frac{3}{2})^2} = \sqrt{(-5)^2 + (\frac{1}{2})^2} = \sqrt{\frac{25}{1} + \frac{1}{4}} = \sqrt{\frac{101}{4}} = \frac{\sqrt{101}}{2}$ ✓

$\begin{cases} y = \frac{-(3m-2)x+7}{d-m} \rightarrow m = \frac{-(3m-2)}{d-m} = \frac{3m-2}{m-d} \\ y = \frac{(m+1)x-1}{2m-4} \rightarrow m = \frac{m+1}{2m-4} \end{cases}$

$\frac{-(3m-2)}{d-m} \times \frac{m+1}{2m-4} = 1 \rightarrow (3m-2)(m+1) = (d-m)(2m-4)$

$3m^2 + 3m - 2m - 2 = 2dm - 2d - 2m^2 + 4m$

$5m^2 - 13m + 2d - 2 = 0 \rightarrow \Delta < 0 \rightarrow m \text{ صحیح متکثر}$

