

$$A(4, -4) \quad B(2, 1) \rightarrow m = \frac{1 - (-4)}{2 - 4} = -\frac{5}{2}$$

$$m' = -\frac{1}{m} \quad m' = \frac{1}{5/2}$$

$$\text{تقاطع وسط} \rightarrow \left(\frac{2+4}{2}, \frac{1-4}{2} \right) = (3, -1.5) \quad \left. \begin{aligned} y = ax + b \quad 1 &= \frac{1}{5/2} \times 2 + b \quad b = \frac{4}{5} \\ y &= \frac{2}{5}x + \frac{4}{5} \end{aligned} \right\}$$

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$$A(3, 1) \quad B(-4, 5) \quad C(-1, 3) \quad m_{BC} = \frac{3-5}{-1+4} = -\frac{2}{3} \rightarrow$$

$$y - 5 = -\frac{2}{3}(x + 4) \quad 3x + 2y - \omega = 0 \quad BC = \sqrt{(-1+4)^2 + (3-5)^2} = \sqrt{10} = \omega$$

$$AH = \frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}} = \frac{|1(3) + 2(1) - \omega|}{\sqrt{3^2 + 2^2}} = \frac{10}{\omega} = 2$$

$$BC - AH = \omega - 2 = \boxed{3}$$

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$$3y - x = 5 \quad y = \frac{1}{3}x + \frac{5}{3} \quad 4y = ax + 2 \quad y = \frac{a}{4}x + \frac{1}{2}$$

$$m_1 = m_2 \text{ موازی} \rightarrow \frac{1}{3} = \frac{a}{4} \quad \boxed{a=4} \quad \left\{ \begin{aligned} y &= \frac{1}{3}x + \frac{5}{3} \\ y &= \frac{1}{3}x + \frac{1}{2} \end{aligned} \right.$$

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$$d = \frac{|\frac{5}{3} - \frac{1}{2}|}{\sqrt{1 + \frac{1}{9}}} = \frac{7}{6} = \frac{7 \times 2}{\sqrt{10}} = \frac{7}{\sqrt{10}} \quad r = \frac{d}{2} = \frac{7}{2\sqrt{10}} \quad S = \pi r^2 = \pi \left(\frac{7}{2\sqrt{10}} \right)^2 = \boxed{\frac{49\pi}{20}}$$

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

$$M \rightarrow AB \text{ بس} \rightarrow M\left(\frac{4+2}{2}, \frac{3+1}{2}\right) = (3, 2) \quad H \text{ در } AB \rightarrow m' = +1$$

$$CH \rightarrow y + 3 = 1(x + 1) \quad y = x - 2 \quad H = \begin{cases} y = -x + 5 \\ y = x - 2 \end{cases} \quad x = \frac{3}{2} \quad y = \frac{7}{2}$$

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$$\left. \begin{aligned} M(3, 2) \\ H\left(\frac{3}{2}, \frac{7}{2}\right) \end{aligned} \right\} MH = \sqrt{\left(\frac{3}{2} - 3\right)^2 + \left(\frac{7}{2} - 2\right)^2} = \sqrt{\frac{1}{4} + \frac{1}{4}} = \boxed{\frac{\sqrt{2}}{2}}$$

$$(3m - 2)x + (\omega - m)y - 5 = 0 \rightarrow m_1 = -\frac{3m - 2}{\omega - m}$$

$$x - (3m - 4)y + 1 = 0 \rightarrow m_2 = \frac{m + 1}{3m - 4}$$

$$موازی \rightarrow m_1 \times m_2 = -1 \quad -\frac{3m - 2}{\omega - m} \times \frac{m + 1}{3m - 4} = -1 \quad (3m - 2)(m + 1) = (\omega - m)(3m - 4)$$

$$3m^2 + 3m - 2m - 2 = 10m - 20 - 3m^2 + 4m \quad m^2 - 3m + 3 = 0 \quad \Delta < 0 \quad \boxed{\text{وجود ندارد}}$$

$\begin{cases} x+ry=r \\ y=rx-1 \end{cases} \rightarrow \alpha=1 \begin{cases} x+ry=r \\ x+y=r \end{cases} \alpha=\omega \begin{cases} y=rx-1 & x=\frac{\omega}{r} \\ x+y=r & y=\frac{r}{r} \end{cases}$ $M(\frac{\omega}{r}, \frac{r}{r}) / \beta_C = -1 \quad y+1 = -1(x-\omega) \quad y = -x + r \quad \frac{b_{\text{new}}}{\beta_C} \Rightarrow M(\frac{\omega+\frac{\omega}{r}}{r}, \frac{-1+\frac{r}{r}}{r}) \Rightarrow$ $M(\frac{10}{r}, \frac{r}{r}) / \beta_C = -1 \quad AH=1 \rightarrow y-1 = 1(x-1) \quad y=x \quad \frac{x+y=r}{H(r,r)}$ $AM = \sqrt{(\frac{10}{r}-1)^2 + (\frac{r}{r}-1)^2} = \sqrt{\frac{\omega\omega}{r}} = \frac{\omega\sqrt{r}}{r} \quad \frac{AM}{AH} = \frac{\frac{\omega\sqrt{r}}{r}}{\frac{\sqrt{r}}{r}} = \boxed{\frac{\omega}{r}}$ $AH = \sqrt{(r-1)^2 + (r-1)^2} = \sqrt{r}$	6
$m = -\frac{1}{r} \rightarrow y = -\frac{1}{r}x + b \quad x+r \rightarrow x+ry-rb=0$ $\text{فاصله از مبدأ} \rightarrow d = \frac{ c }{\sqrt{a^2+b^2}} = \sqrt{r_0} \quad \frac{ 1-2b }{\sqrt{1+r^2}} \rightarrow \frac{r b }{\sqrt{\omega}} = \sqrt{r_0} \quad b = \omega \quad b = \pm \omega$ $\underline{x=0} \rightarrow A(0,b) \quad \underline{y=0} \rightarrow B(rb,0) \quad \Rightarrow AB = \sqrt{rb^2+b^2} = \sqrt{\omega b^2} \quad \frac{ b \sqrt{\omega}}{\omega} \rightarrow \boxed{\omega\sqrt{\omega}}$	7
$my-rx=r \rightarrow y = \frac{rx}{m} + r \quad y+m \alpha = x+r \rightarrow y = (1-m)x + r$ $\underline{y \rightarrow \infty} \rightarrow x=0 \quad y_1=r \quad y_r=r \quad \left. \begin{matrix} \\ \\ \end{matrix} \right\} M_1(r, \frac{m}{r}) \quad M_r(r, -\frac{r}{1-m})$ $\underline{x \rightarrow \infty} \rightarrow y=0 \quad x_1=\frac{r}{m} \quad x_r=-\frac{r}{1-m}$ $S_1 = \frac{1}{r} ab = \frac{1}{r} \times r \times \frac{m}{r} = \frac{1}{r} m \rightarrow \frac{1}{r} m = \frac{\omega}{r} \quad m = \pm \omega$ $S_r = \frac{1}{r} ab = \frac{1}{r} \times r \times \frac{r}{1-m} = \frac{r}{1-m} \rightarrow \frac{r}{1-m} = \frac{\omega}{r} \quad m = \frac{1}{\omega} \leq \frac{9}{\omega}$ $\text{فاصله ضرب} \rightarrow \omega x - \omega \times \frac{1}{\omega} \times \frac{9}{\omega} = \sqrt{-9}$	8
$y=rx-r \rightarrow (\frac{r}{r}, 0) \quad M(r, -r)$ $r = \frac{r}{r} + x' \quad r = \frac{r}{r} + x' \quad x' = \frac{\omega}{r} \rightarrow (\frac{\omega}{r}, -r) \quad m=r$ $-r = \frac{0+y'}{r} \quad -r = 0+y' \quad y' = -r \rightarrow -r = r \times \frac{\omega}{r} + b \quad b = -9$ $\boxed{y = rx - 9}$	9
$A(1,r) \quad y=x+\omega \rightarrow m=1 \quad m'=-1 \quad y=a\alpha+b \quad \underline{(1,r)} \rightarrow r = -1 \times 1 + b$ $b=r \quad y = -x+r \quad \begin{cases} y=x+\omega \\ y=-x+r \end{cases} \quad x+\omega = -x+r \quad x = -1 \quad y=r \quad (-1, r)$ $-1 = \frac{1+x'}{r} \quad -r = 1+x' \quad x' = -r \quad (-r, 4) \rightarrow rb-a = r(4) - (-r)$ $r = \frac{r+y'}{r} \quad \wedge \neq r+y' \quad y'=4 \quad (a,b) \rightarrow \boxed{= 1\omega }$	10