

1) $m = \frac{-4-1}{-2} = \frac{5}{2} \rightarrow m' = \frac{1}{5}$ $\rightarrow y - 1 = \frac{1}{5}(x - 3)$
 $M: x_M = \frac{3+2}{2} = \frac{5}{2}, y_M = \frac{1-4}{2} = -\frac{3}{2} \rightarrow (3, 1)$ $y = \frac{1}{5}x - \frac{3}{5} + \frac{4}{5} \Rightarrow y = \frac{1}{5}x + \frac{1}{5}$ (2)

BC: $\sqrt{\frac{(3-1)^2}{16} + \frac{(-2+1)^2}{9}} = \frac{5}{6}$ $m = \frac{1-3}{-2+1} = -2 \rightarrow y - 3 = -2(x - 1) \rightarrow y = -2x + 5$
 $3y - 9 = -2x + 12 \rightarrow 3y + 2x = 21$

2) AM: $\frac{|3(1) + 2(-2) - 21|}{\sqrt{9+4}} = \frac{4}{\sqrt{5}}$ $\rightarrow \frac{4}{\sqrt{5}} = \frac{2\sqrt{5}-4}{\sqrt{5}} \Rightarrow 4 - \sqrt{5} = 2$ (1)

$S = \pi r^2$ $Ey = ax + 2, Ky = x + 1 \rightarrow \text{خطوط موازی} \rightarrow \frac{a}{1} = \frac{1}{1} \rightarrow a = 1$

3) $Ey = x + 2 \rightarrow Ky = x + 1$ (2)

مساحت خطوط موازی: $\frac{|1-1|}{\sqrt{1+1}} = \frac{4}{\sqrt{2}} \rightarrow r = \frac{2}{\sqrt{2}} \rightarrow S = \pi \left(\frac{2}{\sqrt{2}}\right)^2 = 2\pi$

4) $AB \perp CH \rightarrow m' = 1$ $M: x_M = \frac{2+2}{2} = 2, y_M = \frac{3+1}{2} = 2 \rightarrow M(2, 2)$
 $m = \frac{3-1}{2-2} = -1 \rightarrow y + 3 = 1(x + 1) \rightarrow y = x - 2$ (5)

مساحت CH: $\frac{|3-2-2|}{\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

5) $(a-m)y = (r-x_m)x + 1 \rightarrow \frac{1}{a-m} = \frac{r-x_m}{a-m}$ $\rightarrow \frac{1}{a-m} = \frac{r-x_m}{a-m}$ $\rightarrow \frac{1}{a-m} = \frac{r-x_m}{a-m}$ (2)

$\rightarrow \frac{r-x_m}{a-m} = \frac{r-x_m}{m+1} \rightarrow r - x_m = \frac{r-x_m}{m+1} \rightarrow r - x_m = \frac{r-x_m}{m+1}$
 $\rightarrow r - x_m = \frac{r-x_m}{m+1} \rightarrow r - x_m = \frac{r-x_m}{m+1}$

6) $A(1, 1), B(2, 1), C(2, \frac{1}{2})$ $M: \left(\frac{2+2}{2}, \frac{1+\frac{1}{2}}{2}\right) = (2, \frac{3}{4})$ $\rightarrow \frac{1}{2} = \frac{1}{2}$ (5)

AM: $\frac{|1+1-2|}{\sqrt{2}} = \frac{0}{\sqrt{2}} = 0$ $\rightarrow \frac{AM}{AH} = \frac{0}{\sqrt{2}} = 0$

$y = -\frac{1}{2}x + b \rightarrow B(0, b)$ $\rightarrow A(2, b)$ $\rightarrow \frac{|0+0-b|}{\sqrt{1+\frac{1}{4}}} = \sqrt{\frac{1}{5}}b = \sqrt{2} \Rightarrow b = 2\sqrt{2}$ (2)

7) $B(0, 2\sqrt{2}), A(1, 0) \rightarrow AB = \sqrt{1^2 + (2\sqrt{2})^2} = \sqrt{9} = 3$

$$\left. \begin{array}{l} y \leq \frac{1}{m}x + 2 \quad (A) \\ y \leq (1-m)x + 2 \quad (B) \end{array} \right\} \rightarrow \text{مقدار قطع: } (0, 2) \rightarrow \text{نقطه اشتراک}$$

۱) $x_A = -\frac{r}{m-1}, x_B = \frac{r}{m-1} \rightarrow S = \frac{1}{r} |x_B - x_A| \leq \frac{2}{r}$

$\rightarrow \frac{2}{r} \leq \left| \frac{m}{r} - \frac{r}{m-1} \right| \rightarrow \pm d \leq \frac{m^2 - m + 1}{m-1}$

$\left. \begin{array}{l} r - \sqrt{d} - 2 \leq m \\ m \leq -2 + \sqrt{d} \\ m \leq r \end{array} \right\} \rightarrow S = 2$

۲) $\begin{array}{l} \text{دقیقه} \\ \text{در خط} \end{array} : \begin{array}{l} (0, -2) \xrightarrow{\text{خط}} (1, -1) \\ (1, -1) \xrightarrow{\text{خط}} (2, -2) \end{array} \rightarrow m = \frac{-2+1}{1-0} = -1$

$\rightarrow y+1 \leq 2(x-2) \rightarrow y \leq 2x-9$

$(1, 2) \rightarrow y \leq x+1$

$m \leq 1 \rightarrow m' \leq -1 \rightarrow (y-2) \leq -1(x-1) \rightarrow y \leq -x+3$

$\left\{ \begin{array}{l} y - x \leq 1 \\ y + x \leq 3 \end{array} \right\} \rightarrow \begin{array}{l} y \leq 1 \\ x \leq 1 \end{array}$

۱۰) $\rightarrow -1 \leq \frac{1+a}{r} \rightarrow a \leq -2, \quad 1 \leq \frac{2+b}{r} \rightarrow b \geq 9 \rightarrow A'(-2, 9)$

$\rightarrow 2b-9 \leq 2(9)+2 \leq 10$