

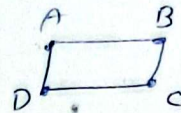
نشان داده شود که این دو خط موازی نیستند. ۱۷. سطح ۲۰

$$A \begin{bmatrix} -1 \\ 4 \end{bmatrix} \quad D \begin{bmatrix} 1 \\ 1 \end{bmatrix} \rightarrow \text{شیب} = \frac{-1}{4} = -\frac{1}{4} = \frac{y_1 - y_2}{x_1 - x_2} = \frac{m - k}{\frac{1}{4} + 1} = \frac{-1}{5} \rightarrow m - k = -5$$

$$\overline{AB} = \sqrt{(m_1 - m_2)^2 + (y_1 - y_2)^2} = \sqrt{(-5)^2 + 9} = \sqrt{25 + 9} = \sqrt{34} = \sqrt{34} \quad \text{ضلع مربع}$$

$$S = \sqrt{34} \times \sqrt{34} = \boxed{34}$$

$$A \begin{bmatrix} -1 \\ 4 \end{bmatrix} \quad B \begin{bmatrix} 1 \\ 1 \end{bmatrix} \quad C \begin{bmatrix} 2 \\ 3 \end{bmatrix} \quad D \begin{bmatrix} -1 - \lambda \\ y + 4 \end{bmatrix}$$



$$x_A + x_C = x_B + x_D \rightarrow -1 + 2 = 1 - 1 - \lambda \rightarrow 2x = 0 \rightarrow x = 0 \rightarrow \lambda = 0 \rightarrow C \begin{bmatrix} 2 \\ 3 \end{bmatrix} \quad B \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$y_A + y_C = y_B + y_D \rightarrow 4 + 3 = 1 + y + 4 \rightarrow y = 2$$

$$C \begin{bmatrix} 2 \\ 3 \end{bmatrix} \rightarrow \text{شیب} = \frac{3-1}{2-1} = \frac{2}{1} = 2$$

$$\overline{AB} = \sqrt{14 + 9} = 5$$

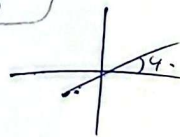
$$\overline{BC} = \sqrt{(2 - \frac{1}{2})^2 + (3 - 1)^2} = \sqrt{\frac{9}{4} + 4} = \sqrt{\frac{25}{4}} = \frac{5}{2}$$

$$C \begin{bmatrix} 2 \\ 3 \end{bmatrix} \rightarrow \text{شیب} = \frac{3-1}{2-1} = 2$$

$$D \begin{bmatrix} -1 \\ y \end{bmatrix} \rightarrow \text{شیب} = \frac{y-1}{-1-1} = \frac{y-1}{-2}$$

$$\text{مساحت} = 2 \left(5 + \frac{5}{2} \right) = \boxed{15}$$

$$m^2 x + (m^2 - 1)y = 0$$



$$\text{شیب} = \tan \theta = \sqrt{2}$$

$$\frac{-m}{m^2 - 1} = \sqrt{2} \rightarrow \sqrt{2} m^2 + m - \sqrt{2} = 0$$

$$-2m = \sqrt{2} m^2 - \sqrt{2}$$

$$\sqrt{2} m^2 + m - \sqrt{2} = 0$$

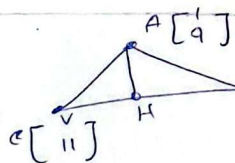
$$m^2 + \sqrt{2} m - 1 = 0$$

$$(m + \frac{\sqrt{2}}{2})(m - 1) = 0$$

$$(m + \sqrt{2})(\sqrt{2} m - 1) = 0$$

$$m = -\sqrt{2}$$

$$m = \frac{1}{\sqrt{2}}$$



$$B \begin{bmatrix} 1 \\ 1 \end{bmatrix} \rightarrow \text{شیب} = \frac{1-1}{1-1} = \frac{0}{0} = \text{undefined}$$

$$y - 1 = 2(x - 1) \rightarrow y - 1 = 2x - 2 \rightarrow y = 2x - 1$$

$$-2x + y + 1 = 0$$

$$BC \text{ لایه} = \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{|-2 + 1 + 1|}{\sqrt{4 + 1}} = \frac{0}{\sqrt{5}} = 0$$

$$AB: y + 2x = 1$$

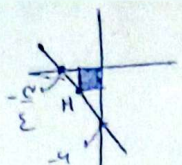
$$AC: 2y - x = 1$$

$$BC: 2y - x = -1$$

$$B \text{ لایه} = \frac{|-2(1) + 1(1) - 1|}{\sqrt{4 + 1}} = \frac{2}{\sqrt{5}}$$

$$AC: -x + 2y - 1 = 0$$

$$\frac{2}{\sqrt{5}} = \boxed{\frac{2}{\sqrt{5}}}$$



$$\vec{AH} = \begin{bmatrix} 4 \\ -5 \end{bmatrix} \quad \vec{AH} = \frac{4}{-5} = -\frac{4}{5} = -0.8 \rightarrow \text{خط} : y = -0.8x - 4$$

برای اینکه فاصله نقطه H تا نقطه A را پیدا کنیم
 باید از این خط عبور کنیم و از مرکز آن عبور کنیم
 و این خط را به خط عمود بر خط H نام می‌کنیم.

$$H: \begin{bmatrix} x \\ y \end{bmatrix} \quad y = -0.8x - 4 \quad x = -0.8x - 4 \rightarrow x = -\frac{4}{1.8} = -\frac{20}{9}$$

$$y = -\frac{20}{9} \times -0.8 - 4 = \frac{16}{9} - 4 = -\frac{20}{9}$$

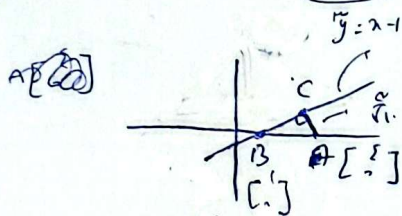
$$y = ax + 1 \rightarrow \text{خط عمود} \rightarrow a = \frac{1}{a} \Rightarrow a^2 = 1 \rightarrow a = \pm 1$$

$$\begin{cases} a = 1 \rightarrow y = x + 1 \\ a = -1 \rightarrow y = -x + 1 \end{cases}$$

$$y = x + 1 \quad \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$\text{فاصله نقطه} = \frac{|1 - 1 + 1|}{\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$\text{مساحت} = \frac{1}{2} \times \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{1}{4}$$



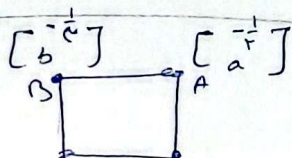
$$AC = \frac{|1 - 1 + 1|}{\sqrt{2}} = \frac{1}{\sqrt{2}} = \frac{\sqrt{2}}{2}$$

$$B = \begin{bmatrix} 1 \\ 1 \end{bmatrix} \rightarrow y = x - 1 \quad x = 1 \rightarrow B: \begin{bmatrix} 1 \\ 1 \end{bmatrix}$$

$$AB = \sqrt{a^2} = a$$

$$BC = \sqrt{a^2 - \left(\frac{a}{\sqrt{2}}\right)^2} = \sqrt{a^2 - \frac{a^2}{2}} = \frac{a}{\sqrt{2}}$$

$$\text{مساحت} = \frac{1}{2} \times \frac{a}{\sqrt{2}} \times \frac{a}{\sqrt{2}} = \frac{a^2}{4}$$



$$\text{خط عمود} = \sqrt{a^2} = \frac{b-a}{-\frac{1}{a} + \frac{1}{b}} \rightarrow b-a = \frac{\sqrt{a^2}}{4}$$

$$AB \text{ اندازه} = \sqrt{\frac{1}{a^4} + \left(\frac{b-a}{4}\right)^2} = \sqrt{\frac{1}{a^4} + \frac{1}{16}} = \sqrt{\frac{4}{a^4}} = \frac{2}{a^2} = \frac{1}{a}$$

$$\text{مساحت} = \frac{1}{2} \times \frac{1}{a} = \frac{1}{2a}$$

$$\text{مساحت} = \frac{1}{2} \times \frac{1}{a} = \frac{1}{2a} \rightarrow \text{خط عمود} = \frac{1}{a} \rightarrow \text{خط عمود} = \frac{\sqrt{2}}{a}$$

$$(I) AO \text{ عمود} = BM \text{ عمود} = \frac{0+4}{-1+0} = -4$$

$$(II) \text{ نصف دایره} : \sqrt{9+4} = 5$$

$$(III) M: \begin{bmatrix} -\frac{9}{5} \\ \frac{4}{5} \end{bmatrix}$$

$$(IV) AO \text{ عمود} : y = \frac{4}{9}x$$

$$BM \text{ عمود} = \frac{4}{9}$$

$$\text{خط عمود} = \frac{4}{9}, \begin{bmatrix} -4 \\ -1 \end{bmatrix}$$

$$\text{خط عمود} = y - y_1 = m(x - x_1)$$

$$y + 4 = -\frac{4}{9}(x + 9)$$

$$y = -\frac{4}{9}x - \frac{20}{9}$$

$$\begin{aligned}
 & \xrightarrow{(III), (IV)} \text{imposed} = 0 \\
 & \text{AO } \frac{1}{2} \\
 & \text{AO: } -\frac{\varepsilon}{c} n + y = 0 \\
 & \left| -\frac{\varepsilon}{c} n - \frac{c}{\varepsilon} n - \frac{r_0}{\varepsilon} \right| = 0 \rightarrow \left| -\frac{r_0}{12} n - \frac{r_0}{\varepsilon} \right| = \frac{r_0}{c} \\
 & \quad \quad \quad \cancel{\frac{r_0}{9}} \quad \cancel{\frac{r_0}{c}} \\
 & \quad \quad \quad -\frac{r_0}{12} n - \frac{r_0}{\varepsilon} = \frac{r_0}{c} \\
 & \quad \quad \quad \frac{r_0}{12} n = -\frac{1r_0}{12} \\
 & \quad \quad \quad \underline{n = -1} \\
 & y = -\frac{c}{\varepsilon} n - \frac{r_0}{\varepsilon} \rightarrow \underline{y = -1} \Rightarrow \text{✓}
 \end{aligned}$$