

الف) $\left| \begin{smallmatrix} \omega & 1 \\ -2 & 1 \end{smallmatrix} \right| \rightarrow \left| \begin{smallmatrix} 4 & \omega \\ 2 & -2 \end{smallmatrix} \right| \quad m = \frac{2 - (-2)}{4 - \omega} = \frac{4}{-1} = -4 \Rightarrow y - 2 = -4(x - 4) \quad \left| \begin{smallmatrix} 4 \\ 2 \end{smallmatrix} \right|$
 $y = -4x + 12 + 2 \Rightarrow y = -4x + 14$
 ب) $2x + y = 1 \quad \rightarrow m = -2 \Rightarrow y - 2 = -2(x - 4) \Rightarrow y = -2x + 8 + 2 \Rightarrow y = -2x + 10$
 ج) $x + y = 1 \quad \rightarrow m = -1 \Rightarrow y - 2 = -1(x - 4) \Rightarrow y = -x + 4 + 2 \Rightarrow y = -x + 6$
 د) $\frac{\pi}{3} \rightarrow \tan\left(\frac{\pi}{3}\right) = \sqrt{3} \Rightarrow y = \sqrt{3}x + b \xrightarrow{\left| \begin{smallmatrix} 4 \\ 2 \end{smallmatrix} \right|} 2 = 4\sqrt{3} + b \Rightarrow b = 2 - 4\sqrt{3} \Rightarrow y = \sqrt{3}x + 2 - 4\sqrt{3}$

الف) $\left| \begin{smallmatrix} -1 & 1 \\ 2 & 1 \end{smallmatrix} \right| \quad \left| \begin{smallmatrix} 2 & -1 \\ 1 & 1 \end{smallmatrix} \right| \quad \sqrt{(2 - (-1))^2 + (1 - 1)^2} = \sqrt{9 + 0} = 3$
 ب) $2x + y = 3 \quad \rightarrow$
 $\frac{|2x + y - 3|}{\sqrt{2^2 + 1^2}} = \frac{|4 + 12 - 3|}{\sqrt{5}} = \frac{13}{\sqrt{5}}$

فاصله این دو خط
 $2x + y = 4 \quad , \quad 4x + y = 8$
 الف) $\frac{|1 - 4(2 + 4)|}{\sqrt{2^2 + 1^2}} = \frac{2}{\sqrt{5}}$
 $\frac{2\sqrt{5}}{5}$
 ب) $2x + y = 2 \quad , \quad 4x + y = 1 \quad \rightarrow$
 $\frac{|2x + y - 2|}{\sqrt{5}} = \frac{|2x + y - 1|}{\sqrt{5}} \Rightarrow 2x + y - 2 = 2x + y - 1 \Rightarrow -2 = -1$

فاصله خط عمود بر خط
 $2x - y = 1 \quad , \quad 2x + y = 3$
 $\frac{|2x - y - 1|}{\sqrt{4 + 1}} = \frac{|2x + y - 3|}{\sqrt{5}} \Rightarrow |2x - y - 1| = |2x + y - 3|$
 $2x - y - 1 = 2x + y - 3 \Rightarrow -y - 1 = y - 3 \Rightarrow -2y = -2 \Rightarrow y = 1$
 $2x - y - 1 = -(2x + y - 3) \Rightarrow 2x - y - 1 = -2x - y + 3 \Rightarrow 4x = 4 \Rightarrow x = 1$

زاویه بین دو خط
 $y + 2x = 3 \quad , \quad y - 2x = 5$
 $m = -2 \quad , \quad m' = -\frac{1}{2}$
 $\tan \alpha = \frac{|m - m'|}{1 + mm'} \Rightarrow \frac{|-2 - (-\frac{1}{2})|}{1 - 1} = \frac{\frac{3}{2}}{0} = \infty \Rightarrow \alpha = 90^\circ$
 $\tan \alpha = -1 \Rightarrow \alpha = 135^\circ$

$$A \begin{vmatrix} 1 \\ -1 \end{vmatrix} \quad B \begin{vmatrix} -1 \\ 1 \end{vmatrix}$$

(الف) حاصل این دو

$$\sqrt{(1-1)^2 + (-1-1)^2} = \sqrt{4+1} = \sqrt{5} = 1$$

(ب) تقاطع این دو

$$M = \begin{vmatrix} \frac{1-1}{2} = -1 \\ \frac{-1+1}{2} = 1 \end{vmatrix} \quad M = (-1, 1)$$

$$\begin{vmatrix} -1 \\ -13 \end{vmatrix} \quad \begin{vmatrix} -1 \\ 1 \end{vmatrix} \quad \begin{vmatrix} 1 \\ 1 \end{vmatrix}$$

(الف) در نقطه

$$G \begin{vmatrix} \frac{-1-1+1}{1} = -1 \\ \frac{-13+1+1}{1} = -11 \end{vmatrix} \quad G \begin{vmatrix} -1 \\ -11 \end{vmatrix}$$

(ب) مساحت این مثلث

$$\begin{vmatrix} -1 & -13 & 1 \\ -1 & 1 & 1 \\ 1 & 1 & 1 \end{vmatrix} = (-1-13-1) - (1+13-1) = -15-13 = -30$$

$$\text{(الف) } \begin{cases} x = \frac{y+1}{y-1} \\ y = \frac{x+1}{x-1} \end{cases} \quad \text{(ب) } \begin{cases} x = \frac{y+1}{y-1} \\ y = \frac{x+1}{x-1} \end{cases}$$

$$\text{(ج) } \begin{cases} x = \frac{y+1}{y-1} \\ y = \frac{x+1}{x-1} \end{cases} \rightarrow x = \frac{y+1}{y-1} \rightarrow y = \frac{x+1}{x-1} \rightarrow y(x-1) = x+1 \rightarrow yx - y = x+1 \rightarrow yx - x = y+1 \rightarrow x(y-1) = y+1 \rightarrow x = \frac{y+1}{y-1}$$

$$\text{(د) } \begin{cases} x = \frac{y+1}{y-1} \\ y = \frac{x+1}{x-1} \end{cases} \rightarrow x = \frac{y+1}{y-1} \rightarrow y = \frac{x+1}{x-1} \rightarrow y(x-1) = x+1 \rightarrow yx - y = x+1 \rightarrow yx - x = y+1 \rightarrow x(y-1) = y+1 \rightarrow x = \frac{y+1}{y-1}$$

(الف) انتقال

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

$$\begin{cases} x + y = 1 \\ x - 2y = 1 \end{cases} \rightarrow \begin{cases} x + y = 1 \\ x - 2y = 1 \end{cases} \rightarrow \begin{cases} x + y = 1 \\ x - 2y = 1 \end{cases} \rightarrow \begin{cases} x + y = 1 \\ x - 2y = 1 \end{cases}$$

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