

۱- $\frac{y_2 - y_1}{x_2 - x_1} = \frac{2 - (-2)}{4 - 5} = \frac{4}{-1} = -4 \rightarrow y = -4x + b$ حالتی از نقطه

$\frac{4}{2} \rightarrow 2 = -4(4) + b \Rightarrow 2 = -16 + b \Rightarrow b = 18 \rightarrow y = -4x + 18$

۲- $\frac{y_2 - y_1}{x_2 - x_1} = \frac{b}{a} = \frac{4}{2} = 2 \rightarrow y = 2x + b$ حالتی از نقطه

$\frac{4}{2} \rightarrow 2 = 2(4) + b \Rightarrow 2 = 8 + b \Rightarrow b = -6 \rightarrow y = 2x - 6$

۳- $x + 3y = 1 \rightarrow m_1 = -\frac{1}{3} \rightarrow m_1 \cdot m_2 = -1 \rightarrow -\frac{1}{3} \cdot m_2 = -1 \Rightarrow m_2 = 3 \rightarrow y = 3x + b$

$\frac{4}{2} \rightarrow 2 = 3(4) + b \Rightarrow 2 = 12 + b \Rightarrow b = -10 \rightarrow y = 3x - 10$

۴- $\frac{\pi}{3} = 60^\circ \Rightarrow m = \tan 60^\circ = \sqrt{3} \rightarrow y = \sqrt{3}x + b$ حالتی از نقطه

$\frac{4}{2} \rightarrow 2 = \sqrt{3}(4) + b \Rightarrow b = 2 - 4\sqrt{3} \rightarrow y = \sqrt{3}x + 2 - 4\sqrt{3}$

الف) $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(2 - (-1))^2 + (3 - 7)^2} = \sqrt{3^2 + (-4)^2} = \sqrt{9 + 16} = \sqrt{25} = 5$

ب) $\frac{|ax_1 + by_1 + c|}{\sqrt{a^2 + b^2}} = \frac{|6 + 12 - 3|}{\sqrt{3^2 + 4^2}} = \frac{|15|}{5} = 3$

$\frac{4}{2} \rightarrow 2 = 3x + 4y \rightarrow 3x + 4y - 2 = 0$

$4x + 3y = 8 \rightarrow 2x + 3y = 4$

الف) $\frac{c + c'}{r} \Rightarrow 2x + 3y = \frac{4 + 8}{2} = 6 \Rightarrow 2x + 3y = 6$

ب) $d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} \Rightarrow d = \frac{|8 - 4|}{\sqrt{2^2 + 3^2}} = \frac{4}{\sqrt{13}}$

$2x + 3y = 3$ و $3x - 2y = 1$

$\Rightarrow \begin{cases} 3x - 2y - 1 = 2x + 3y - 3 \Rightarrow x - 5y = -2 \\ 3x - 2y - 1 = -2x - 3y + 3 \Rightarrow 5x + y = 4 \end{cases}$

$y + 3x = 3$ و $y - 2x = 5$

$\begin{cases} y + 3x = 3 \Rightarrow m = -\frac{1}{3} \\ y - 2x = 5 \Rightarrow m' = \frac{1}{2} \end{cases}$

$\tan \alpha = \left| \frac{m - m'}{1 + mm'} \right| = \left| \frac{-\frac{1}{3} - \frac{1}{2}}{1 + (-\frac{1}{3})(\frac{1}{2})} \right| = \left| \frac{-\frac{5}{6}}{1 - \frac{1}{6}} \right| = \left| \frac{-\frac{5}{6}}{\frac{5}{6}} \right| = 1 \Rightarrow \tan \alpha = 1$

$\Rightarrow \tan 45^\circ = 1 \Rightarrow \alpha = 45^\circ$

A $\begin{vmatrix} 3 \\ -2 \end{vmatrix}$ B $\begin{vmatrix} -5 \\ 4 \end{vmatrix}$

الف) $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(3 - (-5))^2 + (-2 - 4)^2} = \sqrt{8^2 + (-6)^2} = \sqrt{64 + 36} = \sqrt{100} = 10$

ب) $m = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \left(\frac{3 + (-5)}{2}, \frac{-2 + 4}{2} \right) = \left(-1, 1 \right)$

$$\begin{vmatrix} -10 & -2 \\ -13 & 3 \end{vmatrix} \begin{vmatrix} 3 \\ 1 \end{vmatrix} \rightarrow \text{سه رأس متعلق}$$

$$\text{الف) مَرْتَبَعِيَّ شَكْل} \Rightarrow z_G = \frac{z_1 + z_2 + z_3}{3} \Rightarrow z_G = \frac{-10 - 2 + 3}{3} = \frac{-9}{3} = -3 \quad (-3, -3)$$

$$y_G = \frac{y_1 + y_2 + y_3}{3} \Rightarrow y_G = \frac{-13 + 3 + 1}{3} = \frac{-9}{3} = -3$$

$$\text{ب) مساحت این مثلث} \Rightarrow S = \frac{1}{2} \begin{vmatrix} z_1 & y_1 & 1 \\ z_2 & y_2 & 1 \\ z_3 & y_3 & 1 \end{vmatrix} = \frac{1}{2} \begin{vmatrix} -10 & -13 & 1 \\ -2 & 3 & 1 \\ 3 & 1 & 1 \end{vmatrix} = \frac{1}{2} (-10 \cdot 3 \cdot 1 - 2 \cdot 9 - 1 \cdot 16 + 10) = \frac{94}{2} = 47$$

$$y = \frac{2x+1}{x-3} \quad -1$$

$$\text{الف) } -y = \frac{2x+1}{x-3} \Rightarrow y = \frac{-2x-1}{x-3}$$

$$\text{ب) } y = \frac{-2x+1}{-x-3} \Rightarrow y = \frac{2x-1}{x+3}$$

$$\text{ج) } x = \frac{2y+1}{y-3} \Rightarrow (x-3)(y-3) = 2y+1 \Rightarrow xy - 3y - 3x + 9 = 2y+1 \Rightarrow y(x-2) = 3x+1 \Rightarrow y = \frac{3x+1}{x-2}$$

$$\text{د) } -x = \frac{-2y+1}{-y-3} \Rightarrow (x+3)(-y-3) = -2y+1 \Rightarrow -xy - 3x - 3y - 9 = -2y+1 \Rightarrow y(x+2) = -3x-10 \Rightarrow y = \frac{-3x-10}{x+2}$$

$$y = \frac{2x+1}{x-3}$$

$$\text{الف) } \begin{cases} x' = x-2 \rightarrow x = x'+2 \\ y' = y+3 \rightarrow y = y'-3 \end{cases} \xrightarrow{\text{جایگزینی}} y'-3 = \frac{2(x'+2)+1}{x'+2-3} \Rightarrow y' = \frac{2x'+5}{x'-1} + 3 \Rightarrow y' = \frac{2x'+8}{x'-1}$$

$$\text{ب) } \begin{cases} x' = x-3 \rightarrow x = x'+3 \\ y' = y-2 \rightarrow y = y'+2 \end{cases} \xrightarrow{\text{جایگزینی}} y'+2 = \frac{2(x'+3)+1}{x'+3-3} \Rightarrow y' = \frac{2x'+7}{x'} - 2 \Rightarrow y' = \frac{2x'+5}{x'}$$

$$\begin{cases} 3x+4y=2 \\ x-5y=1 \end{cases}$$

$$\text{الف) روش حذفی} \rightarrow \begin{cases} 3x+4y=2 \\ x-5y=1 \times (-3) \end{cases} \rightarrow \begin{cases} 3x+4y=2 \\ -3x+15y=-3 \end{cases} \Rightarrow 19y = -1 \Rightarrow y = \left(-\frac{1}{19}\right), x = \left(\frac{18}{19}\right)$$

$$\text{روش دترمینان} \rightarrow x = -\frac{\begin{vmatrix} 4 & 2 \\ -5 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 1 & -5 \end{vmatrix}} = -\frac{4 - (-10)}{-15 - 4} = -\frac{14}{-19} = \frac{14}{19}$$

$$y = \frac{\begin{vmatrix} 3 & 1 \\ 1 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 1 & -5 \end{vmatrix}} = \frac{3 - 1}{-15 - 4} = \frac{2}{-19} = -\frac{2}{19}$$