

الف) $m = \frac{y_2 - y_1}{x_2 - x_1} \rightarrow m = \frac{-2 - 2}{2 - 4} = -4 \quad y - y_1 = m(x - x_1) \xrightarrow{|2|} y - 2 = -4(x - 4)$
 $y = -4x + 18$
 ب) $2y + 4x = -1 \rightarrow y = -3x - \frac{1}{2} \quad m' = -3 \xrightarrow{|2|} y - 2 = -3(x - 4) \quad y = -3x + 14$
 ج) $x + 3y = 1 \rightarrow y = -\frac{1}{3}x + \frac{1}{3} \quad m' = -\frac{1}{m} = 3 \xrightarrow{|2|} y - 2 = 3(x - 4) \quad y = 3x - 10$
 د) $\tan \frac{\pi}{6} = \sqrt{3} \quad m' = \sqrt{3} \xrightarrow{|2|} y - 2 = \sqrt{3}(x - 4) \quad y = \sqrt{3}x - 4\sqrt{3} + 2$

الف) فاصله دو نقطه $\rightarrow \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2} = \sqrt{(2 - 4)^2 + (1 - 2)^2} = \sqrt{2} = \sqrt{2\omega} = \omega$
 ب) فاصله نقطه از خط $\rightarrow d = \frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}} \rightarrow d = \frac{|3(2) + 4(3) - 3|}{\sqrt{3^2 + 4^2}} = \frac{15}{5} = 3$

الف) $ax + by = \frac{c + c'}{2} \quad 4x + 3y = \frac{11 + 12}{2} \quad 4x + 3y = 11.5 \quad |y = -\frac{4}{3}x + \frac{19}{6}|$
 ب) $d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} \Rightarrow d = \frac{|12 - 11|}{\sqrt{4^2 + 3^2}} = \frac{1}{5}$

مستقیم در خط $3x - 2y = 1 \quad 2x + 3y = 3$
 $\frac{|ax + by - c|}{\sqrt{a^2 + b^2}} = \frac{|a'x + b'y - c'|}{\sqrt{a'^2 + b'^2}} \rightarrow \frac{|2x + 3y - 3|}{\sqrt{2^2 + 3^2}} = \frac{|3x - 2y - 1|}{\sqrt{3^2 + 2^2}}$
 $\rightarrow 2x + 3y - 3 = 3x - 2y - 1 \quad 5y = x + 2 \quad |y = \frac{1}{5}x + \frac{2}{5}|$
 $\rightarrow 2x + 3y - 3 = -3x + 2y + 1 \quad |y = -5x + 4|$

زاویه بین دو خط $y + 3x = 3 \quad y - 2x = 5$
 $\tan \alpha = \frac{|m - m'|}{1 + mm'} \rightarrow m = 2, m' = -3 \quad \frac{|2 - (-3)|}{1 + 2(-3)} = \left| \frac{5}{-5} \right| = 1$
 $\tan \alpha = 1 \quad \alpha = \frac{\pi}{4} = 45^\circ$

الف) $A \begin{vmatrix} 3 \\ -2 \end{vmatrix} B \begin{vmatrix} -5 \\ 1 \end{vmatrix} AB = \sqrt{(1+2)^2 + (-5-3)^2} = \sqrt{100} = 10$	٦
ب) $M = \left(\frac{x_A + x_B}{2}, \frac{y_A + y_B}{2} \right) M \left(\frac{3-5}{2}, \frac{-2+1}{2} \right) M(-1, -\frac{1}{2})$	٧
الف) $\begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -10 & -13 & 1 \end{vmatrix} \xrightarrow{\text{مركز نقل}} \begin{cases} x = \frac{3+(-2)+(-10)}{3} = -3 \\ y = \frac{1+3-13}{3} = -3 \end{cases} M(-3, -3)$	٧
ب) $S = \frac{1}{2} \begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -10 & -13 & 1 \end{vmatrix} \rightarrow \frac{1}{2} (9 - 10 + 22 + 30 + 2 + 39) = 41$	٧
$y = \frac{2x+1}{4x-3}$ الف) $x \sim \text{نسبة} \rightarrow -y = \frac{2x+1}{4x-3} \rightarrow y = \frac{-2x-1}{-4x+3}$ ب) $y \sim \text{نسبة} \rightarrow y = \frac{-2x-1}{-4x+3}$ ج) $(3), (1) \rightarrow x = \frac{2y+1}{4y-3} \quad y(4x-2) = 3x+1 \quad y = \frac{3x+1}{4x-2}$ د) $(4), (2) \rightarrow y = -\frac{3x+1}{4x-2}$	٨
$y = \frac{2x+1}{x-3}$ الف) $\begin{vmatrix} 2 \\ -3 \end{vmatrix} \begin{cases} x' = x-2 & x = x'+2 \\ y' = y+3 & y = y'-3 \end{cases} \quad y'-3 = \frac{2x'+2+1}{x'+2-3} \quad y' = \frac{2x'+5}{x'-1} + 3$ ب) $\begin{vmatrix} 2 \\ 3 \end{vmatrix} \begin{cases} x' = x+3 & x = x'-3 \\ y' = y+2 & y = y'-2 \end{cases} \quad y'-2 = \frac{2x'-6+1}{x'-3-3} \quad y' = \frac{2x'-5}{x'-6} + 2 \quad y' = \frac{2x'-11}{x'-6}$	٩
الف) $\begin{cases} 3x+4y=2 \\ x-5y=1 \end{cases} \xrightarrow{\text{ضرب}} \begin{cases} 3x+4y=2 \\ 3x-15y=3 \end{cases} \rightarrow 19y = -1 \quad y = -\frac{1}{19} \quad x = \frac{14}{19}$ ب) $\alpha = \frac{\begin{vmatrix} 4 & 2 \\ -5 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 1 & -5 \end{vmatrix}} = \frac{4 - (-10)}{-15 - 4} = \frac{14}{-19} = -\frac{14}{19} \quad y = \frac{\begin{vmatrix} 3 & 2 \\ 1 & 1 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 1 & -5 \end{vmatrix}} = \frac{3-2}{-15-4} = -\frac{1}{19}$	١٠