

$A \mid r$ الف) $B \mid r \rightarrow m = \frac{r - (-r)}{r - 5} = -1 \rightarrow y = -x + b \xrightarrow{A(1,2)} 2 = -1 + b \rightarrow b = 3$ $\Rightarrow y = -x + 3$ ب) $3x + 4y = 1 \rightarrow m = m' \rightarrow m = -3 \xrightarrow{(1,2)} y = -3x + 7$ ج) $x + 2y = 1 \rightarrow m = \frac{1}{m'} \rightarrow m = 2 \xrightarrow{(1,2)} y = 2x - 1$ د) $\text{اجتناب از } \frac{y}{x} \rightarrow m = \frac{\tan \frac{\pi}{3}}{\sqrt{3}} \xrightarrow{(1,2)} y = 2 - \sqrt{3}(x - 1)$	۱
$A \mid r$ الف) $B \mid r \rightarrow d = \sqrt{(1-2)^2 + (2-(-1))^2} = \sqrt{1+9} = \sqrt{10} = \sqrt{5} \times 2 = \sqrt{5}$ ب) $3x + 4y = 3 \rightarrow 3x + 4y - 3 = 0 \rightarrow d = \frac{ (3 \times 2) + (4 \times 2) - 3 }{\sqrt{3^2 + 4^2}} = \frac{14 + 8 - 3}{\sqrt{25}} = \frac{19}{5}$ $\Rightarrow \frac{19}{5} = \sqrt{5}$	۲
$3x + 4y = 9$, $5x + 4y = 1$ $\downarrow$ $3x + 4y = 11$ الف) $\text{خط مشترک} \rightarrow 3x + 4y = \frac{11 \times 1}{4} \rightarrow 3x + 4y = 10$ ب) $\text{فاصله} \rightarrow \frac{ -1 - (-11) }{\sqrt{3^2 + 4^2}} = \frac{10}{5} = \sqrt{5}$	۳
$3x + 4y = 3$ $3x - 4y = 1$ حل می ده $\rightarrow \frac{ 3x + 4y - 3 }{\sqrt{3^2 + 4^2}} = \frac{ 3x - 4y - 1 }{\sqrt{9 + 16}} \rightarrow 3x + 4y - 3 = 3x - 4y - 1$ $\swarrow$ $3x + 4y - 3 = 3x - 4y - 1 \rightarrow 8y = 2 \rightarrow y = \frac{1}{4} \rightarrow x = \frac{5}{4}$ $\searrow$ $3x + 4y - 3 = -(3x - 4y - 1) \rightarrow y = -5x + 4$	۴
$y - 3x = 5 \rightarrow m = 3$ $y + 3x = 3 \rightarrow m' = -3$ $\tan \alpha = \left \frac{m - m'}{1 + mm'} \right = \left \frac{3 - (-3)}{1 + (-9)} \right = \left \frac{6}{-8} \right = \frac{3}{4} \rightarrow \alpha = \tan^{-1} \frac{3}{4} \approx 36.87^\circ$	۵

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

الف) $d = \sqrt{(3-(-5))^2 + (-2-4)^2} = \sqrt{9+36} = \boxed{15}$

ب) $x_m = \frac{3+(-5)}{2} = -1$
 $y_m = \frac{-2+4}{2} = +1 \Rightarrow \boxed{M(-1, 1)}$

$$A \begin{vmatrix} 3 \\ 1 \end{vmatrix} \quad B \begin{vmatrix} -2 \\ 3 \end{vmatrix} \quad C \begin{vmatrix} -10 \\ -13 \end{vmatrix}$$

الف) $x_m = \frac{-10+3+(-2)}{3} = -3$
 $y_m = \frac{-13+3+1}{3} = -3 \Rightarrow \boxed{M(-3, -3)}$

ب) $S = \frac{1}{3} \begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -10 & -13 & 1 \end{vmatrix} \Rightarrow S = \frac{1}{3} (9 + 19 - 10 + 10 + 139 + 1) = \frac{1}{3} \times 199 = \boxed{66}$

$$y = \frac{r_{m+1}}{r_m - 3}$$

الف) $-y = \frac{r_{m+1}}{r_m - 3} \Rightarrow \boxed{y = \frac{r_{m+1}}{3 - r_m}}$

ب) $y = \frac{-r_{m+1}}{-r_m - 3} \Rightarrow \boxed{y = \frac{r_{m+1}}{r_m + 3}}$

ج) $x = \frac{r_{m+1}}{r_y - 3} \Rightarrow \boxed{y = \frac{r_{m+1}}{r_m + 3}}$

د) $-x = \frac{-r_{m+1}}{-r_y - 3} \Rightarrow \boxed{y = \frac{1 - r_m}{r_m + 3}}$

$$y = \frac{r_{m+1}}{n - 3}$$

الف) $O(2, 3) \rightarrow \begin{matrix} n' = n + 2 \rightarrow n = n' + 2 \\ y' = y + 3 \rightarrow y = y' - 3 \end{matrix} \Rightarrow y' - 3 = \frac{r_{m+1} + 5}{n' - 1} \Rightarrow \boxed{y' = \frac{5n' + 2}{n' - 1}}$

ب) $O(2, 2) \rightarrow \begin{matrix} n' = n + 2 \rightarrow n = n' + 2 \\ y' = y + 2 \rightarrow y = y' + 2 \end{matrix} \Rightarrow y' + 2 = \frac{r_{m+1} + 4}{n'} \Rightarrow \boxed{y' = \frac{4}{n'}}$

$$\begin{cases} r_m + r_y = 2 \\ n - 5y = 1 \rightarrow r_m - 15y = 2 \end{cases}$$

الف) $19y = -1 \Rightarrow \boxed{y = -\frac{1}{19}}, \quad \boxed{n = 1 + 5(-\frac{1}{19}) = -\frac{16}{19}}$

ب) $x = -\frac{2 + 10}{-15 - 2} = \frac{12}{17} \Rightarrow \boxed{y = \frac{3 - 2}{-15 - 2} = -\frac{1}{17}}$