

$A \mid r$ الف) $B \mid -r \rightarrow m = \frac{r - (-r)}{r - 5} = -1 \rightarrow y = -x + b \xrightarrow{A(f,r)} r = -1 + b \rightarrow b = 1$ $\Rightarrow y = -x + 1$ ب) خطی: $3x + 4y = 1 \rightarrow m = m' \rightarrow m = -3 \xrightarrow{(f,r)} y = -3x + 1$ ج) عمودی: $x + 3y = 1 \rightarrow m = \frac{1}{m'} \rightarrow m = 3 \xrightarrow{(f,r)} y = 3x - 1$ د) جهت‌دار: $\rightarrow m = \frac{\tan \frac{\pi}{4}}{\sqrt{3}} \xrightarrow{(x,y)} y = x + \sqrt{3}(x - 1)$	۱
$A \mid r$ الف) $B \mid -1 \rightarrow d = \sqrt{(1-r)^2 + (r-(-1))^2} = \sqrt{14+9} = \sqrt{23} = \sqrt{23}$ ب) $3x + 4y = 3 \rightarrow 3x + 4y - 3 = 0 \rightarrow d = \frac{ (3 \times 2) + (4 \times 2) - 3 }{\sqrt{3^2 + 4^2}} = \frac{14 + 12 - 3}{\sqrt{25}} = \frac{23}{5}$ $\Rightarrow \frac{1}{5} = \sqrt{23}$	۲
$3x + 4y = 9$, $5x + 4y = 1$ $\downarrow$ $3x + 4y = 11$ الف) خط‌های موازی $\rightarrow 3x + 4y = \frac{11 \times 9}{1} \rightarrow 3x + 4y = 99$ ب) عمودی: $\rightarrow \frac{ -1 - (-11) }{\sqrt{3^2 + 4^2}} = \frac{10}{5} = \sqrt{\frac{10}{5}}$	۳
$3x + 4y = 3$ $3x - 4y = 1$ موازی: $\rightarrow \frac{ 3x + 4y - 3 }{\sqrt{3^2 + 4^2}} = \frac{ 3x - 4y - 1 }{\sqrt{9 + 16}} \rightarrow 3x + 4y - 3 = 3x - 4y - 1$ $\rightarrow 3x + 4y - 3 = 3x - 4y - 1 \rightarrow 8y = 2 \rightarrow y = \frac{1}{4} \rightarrow y = \frac{x}{8} + \frac{1}{4}$ $\rightarrow 3x + 4y - 3 = -3x + 4y + 1 \rightarrow y = -5x + 1$	۴
$y - 3x = 5 \rightarrow m = 3$ $y + 3x = 3 \rightarrow m' = -3$ $\tan \alpha = \left \frac{m - m'}{1 + mm'} \right = \left \frac{3 - (-3)}{1 + (-9)} \right = \left \frac{6}{-8} \right = \frac{3}{4} \rightarrow \alpha = 45^\circ \leq 135^\circ$	۵

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

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

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

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

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

ب) $S = \frac{1}{3} \begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -10 & -13 & 1 \end{vmatrix} \rightarrow S = \frac{1}{3} (9 + 19 - 10 + 10 + 13 + 1) = \frac{1}{3} \times 42 = 14$

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

الف) $-y = \frac{r_{m+1}}{r_m - r} \rightarrow y = \frac{r_{m+1}}{r - r_m}$

ب) $y = \frac{-r_{m+1}}{-r_m - r} \rightarrow y = \frac{r_{m+1}}{r_m + r}$

ج) $x = \frac{r_{y+1}}{r_y - r} \rightarrow y = \frac{r_{m+1}}{r_m + r}$

د) $-x = \frac{-r_{y+1}}{-r_y - r} \rightarrow y = \frac{1-r_m}{r_m + r}$

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

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

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

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

الف) $19y = -1 \rightarrow y = -\frac{1}{19}, \quad n = 1 + 5(-\frac{1}{19}) = -\frac{4}{19}$

ب) $x = -\frac{4 + 10}{-15 - 2} = \frac{14}{17}, \quad y = \frac{3 - 2}{-15 - 2} = -\frac{1}{17}$