

الف) $\begin{vmatrix} 1 & 0 \\ 2 & -1 \end{vmatrix} \rightarrow m = \frac{0y}{0x} = \frac{2+2}{-1-0} = -4$ و $y = ax + b \xrightarrow{(4,2)} y = -4x + b$
 $\xrightarrow{(4,2)} 2 = -4(4) + b \rightarrow b = 18$
 $y = -4x + 18$

ب) $\begin{vmatrix} 1 & 2 \\ 2 & 1 \end{vmatrix} \rightarrow$ وقتی ضرایب موازی اند $\rightarrow m = \frac{2-2}{2-1} = 0$ و $y = ax + b \xrightarrow{(4,2)} y = 0x + b$
 $\xrightarrow{(4,2)} 2 = 0 + b \rightarrow b = 2$
 $y = 2$

ج) $\begin{vmatrix} 1 & 3 \\ 2 & 1 \end{vmatrix} \rightarrow$ وقتی ضرایب عمود بر هم باشند $\rightarrow m = \frac{-1}{3}$ و $y = ax + b \xrightarrow{(4,2)} y = -\frac{1}{3}x + b$
 $\xrightarrow{(4,2)} 2 = -\frac{1}{3}(4) + b \rightarrow b = \frac{10}{3}$
 $y = -\frac{1}{3}x + \frac{10}{3}$

د) $\begin{vmatrix} 1 & \tan \frac{\pi}{3} \\ 2 & 1 \end{vmatrix} \rightarrow$ وقتی باصبع و اشاره زاویه برابر باشد $\rightarrow m = \tan \frac{\pi}{3} = \tan 60^\circ = \sqrt{3}$ و $y = ax + b \xrightarrow{(4,2)} y = \sqrt{3}x + b$
 $\xrightarrow{(4,2)} 2 = \sqrt{3}(4) + b \rightarrow b = 2 - 4\sqrt{3}$
 $y = \sqrt{3}x + 2 - 4\sqrt{3}$

الف) $A \begin{vmatrix} 1 & 1 \\ 2 & 1 \end{vmatrix} B \begin{vmatrix} 1 & 1 \\ 2 & 1 \end{vmatrix} \rightarrow AB = \sqrt{\Delta u^2 + \Delta y^2} = \sqrt{(2-1)^2 + (1-1)^2} = \sqrt{1+0} = 1$

ب) $A \begin{vmatrix} 1 & 2 \\ 2 & 1 \end{vmatrix} \rightarrow d = \frac{|ax+by+c|}{\sqrt{a^2+b^2}} = \frac{|3(2)+4(1)-10|}{\sqrt{3^2+4^2}} = \frac{10}{5} = 2$

ج) $\frac{|ax+by+c|}{\sqrt{a^2+b^2}} = \frac{|a'x+b'y+c'|}{\sqrt{a'^2+b'^2}} \cdot \frac{|x_0-y_0-1|}{\sqrt{3^2+(-1)^2}} = \frac{|x_0+y_0-3|}{\sqrt{20}} \rightarrow |x_0-y_0-1| = |x_0+y_0-3|$

$\begin{cases} x_0 - y_0 - 1 = x_0 + y_0 - 3 \rightarrow x - y = -2 \\ x_0 - y_0 - 1 = -x_0 - y_0 + 3 + 2x_0 + y_0 + 2 \rightarrow x + y = 6 \end{cases}$

$y + 2x = 3$ و $y - 2x = 0$
 $\hookrightarrow m = -2$ و $m = 2$
 $\tan \alpha = \left| \frac{m-m'}{1+mm'} \right| = \left| \frac{-2-2}{1+(-4)} \right| = \left| \frac{-4}{-3} \right| = \left| \frac{4}{3} \right| = 1$

$\tan \alpha = 1$
 $\alpha = \frac{\pi}{4} \in (0, \frac{\pi}{2})$

الف) $AB = \sqrt{(3-0)^2 + (-1-4)^2} = \sqrt{10} = 1$

ب) $m \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right) = \left(\frac{3+0}{2}, \frac{-1+4}{2} \right) = (1.5, 1.5)$

الف) $x_G = \frac{x_1+x_2+x_3}{3} \rightarrow \frac{3-2-1}{3} = -\frac{2}{3}$
 $y_G = \frac{y_1+y_2+y_3}{3} = \frac{1+3-3}{3} = \frac{1}{3}$
 $\Rightarrow (-\frac{2}{3}, \frac{1}{3})$

د) $S = \frac{1}{3} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} \rightarrow \frac{1}{3} \begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -1 & -3 & 1 \end{vmatrix} \rightarrow \frac{1}{3} (9+2-1+3+3-9) = 1$

$$1) -y = \frac{r_{n+1}}{r_n - r} \Rightarrow y = \frac{r_{n+1}}{r - r_n} \rightarrow y = \frac{r_{n+1}}{-r_n - r} \xrightarrow{L} y = \frac{r_{n+1}}{r_n + r}$$

$$2) x = \frac{r_{n+1}}{r_n - r} \rightarrow y = \frac{-r_{n+1}}{r - r_n} \xrightarrow{L} y = \frac{r_{n+1}}{r_n - r} \rightarrow -x = \frac{-r_{n+1}}{-r_n - r} \rightarrow y = \frac{r_{n+1}}{-r_n - r} \xrightarrow{L} y = \frac{r_{n+1}}{r_n + r}$$

$$1) \begin{cases} x' = n - r \\ y' = y + r \end{cases} \rightarrow \begin{cases} n = n' + r \\ y = y' - r \end{cases} \rightarrow y = \frac{r_{n+1}}{n - r} \\ y' - r = \frac{r_{n'+1}}{n' - 1} \rightarrow y' = \frac{r_{n'+1}}{n' - 1} + r \\ y' = \frac{r_{n'+1} + r_{n' - 1}}{n' - 1} = \frac{r_{n'+1} + r}{n' - 1}$$

$$2) \begin{cases} x' = n - r \\ y' = y - r \end{cases} \rightarrow \begin{cases} n = n' + r \\ y = y' + r \end{cases} \rightarrow y = \frac{r_{n+1}}{n - r} \\ y' + r = \frac{r_{n'+1}}{n'} \rightarrow y' = \frac{r_{n'+1}}{n'} - r \rightarrow y' = \frac{r_{n'+1} - r_{n'}}{n'}$$

$$y' = \frac{r}{n'}$$

$$الف) \begin{cases} 3x + 4y = 2 \\ x - 5y = 1 \end{cases} \rightarrow \begin{cases} 3x + 4y = 2 \\ -3x + 15y = -3 \end{cases} \\ 19y = -1 \\ y = -\frac{1}{19}, x = \frac{14}{19}$$

$$ب) \rightarrow x = \frac{-(4)(1) - (3)(-5)}{(3)(5) - (4)(1)} = \frac{-4 + 15}{15 - 4} = \frac{11}{11} = 1$$

$$y = \frac{(3)(1) - (1)(2)}{(3)(5) - (4)(1)} = \frac{3 - 2}{15 - 4} = \frac{1}{11}$$