

المعادلة هي: $Ax + By + C = 0$

$$\text{أ)} m = \frac{y_1 - y_2}{x_1 - x_2} \rightarrow m = \frac{r - (-r)}{\epsilon - \omega} = -\epsilon \quad y - y_0 = m(x - x_0) \rightarrow y - r = -\epsilon(x - \epsilon)$$

$$\rightarrow y = -\epsilon x + 1\epsilon$$

$$\text{ب)} rx + \epsilon y = -1 \rightarrow y = -\frac{r}{\epsilon}x - \frac{1}{\epsilon} \rightarrow m = -\frac{r}{\epsilon} \quad y - y_0 = m(x - x_0) \rightarrow y - r = -\frac{r}{\epsilon}(x - \epsilon)$$

$$\rightarrow y = -\frac{r}{\epsilon}x + 1\epsilon$$

$$\text{ج)} x + ry = 1 \rightarrow y = -\frac{1}{r}x + \frac{1}{r} \rightarrow m = -\frac{1}{r} \rightarrow m' = r \quad y - y_0 = m(x - x_0) \rightarrow y - r = r(x - \epsilon)$$

$$\rightarrow y = rx - 1\epsilon$$

$$\text{د)} m \tan \frac{\pi}{4} = \sqrt{r} \rightarrow y - y_0 = m(x - x_0) \rightarrow y - r = \sqrt{r}(x - \epsilon) \rightarrow y = \sqrt{r}x - \epsilon\sqrt{r} + r$$

$$\text{أ)} |AB| = \sqrt{(y_1 - y_2)^2 + (x_1 - x_2)^2} \rightarrow \sqrt{(r - (-r))^2 + (-1 - \epsilon)^2} = \sqrt{4r^2 + 1} = \sqrt{4r^2 + 1}$$

$$\text{ب)} d = \frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}} \rightarrow \frac{|r + r\epsilon - r|}{\sqrt{r^2 + \epsilon^2}} = \frac{1\omega}{\omega} = r$$

$$\text{أ)} (rx + ry = \epsilon) \times r \rightarrow \begin{cases} \epsilon x + \epsilon y = 1\epsilon \\ \epsilon x + \epsilon y = 1\epsilon \end{cases} \quad ax + by = \frac{c + c'}{r} \rightarrow \epsilon x + \epsilon y = 1\epsilon \rightarrow rx + ry = \omega = r$$

$$\text{ب)} d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} \rightarrow \frac{|1\epsilon - 1\epsilon|}{\sqrt{r^2 + r^2}} = \frac{\epsilon}{\sqrt{2}r}$$

$$\frac{|ax + by - c|}{\sqrt{a^2 + b^2}} = \frac{|a'x + b'y - c'|}{\sqrt{(a')^2 + (b')^2}} \rightarrow \frac{|rx - ry - 1|}{\sqrt{r^2 + \epsilon^2}} = \frac{|rx + ry - r|}{\sqrt{\epsilon^2 + r^2}} \rightarrow |rx - ry - 1| = |rx + ry - r|$$

$$rx - ry - 1 = rx + ry - r \rightarrow \boxed{x - \omega y = -r}$$

$$rx - ry - 1 = -rx - ry + r \rightarrow \boxed{\omega x + y = \epsilon}$$

$$y + rx = r \rightarrow m = -r \quad y - rx = \omega \rightarrow m' = r \quad \tan \theta = \left| \frac{m - m'}{1 + mm'} \right|$$

$$\rightarrow \tan \theta = \left| \frac{-r - r}{1 + (-r)} \right| \rightarrow \tan \theta = 1 \rightarrow \theta = \frac{\pi}{4}$$

$$\text{أ)} |AB| = \sqrt{(y_1 - y_2)^2 + (x_1 - x_2)^2} \rightarrow \sqrt{r^2 + \epsilon^2} = \sqrt{1\omega} = 1\omega$$

$$\text{ب)} m = \frac{\frac{x_1 + x_2}{r}}{\frac{y_1 + y_2}{r}} \rightarrow x_m = \frac{r - \omega}{r} = -1 \quad y_m = \frac{\epsilon - r}{r} = 1 \quad M(-1, 1)$$

$$\text{الف) } x_n = \frac{x_1 + x_2 + x_3}{3} \rightarrow \frac{r - r - 1}{3} = -\frac{r}{3} \quad y_n = \frac{y_1 + y_2 + y_3}{3} \rightarrow \frac{1 + r - 1}{3} = -\frac{r}{3}$$

$n(-\frac{r}{3}, -\frac{r}{3})$

$$\text{ب) } \frac{1}{r} \begin{vmatrix} r & 1 & 1 \\ -r & r & 1 \\ -1 & -1 & 1 \end{vmatrix} = \frac{1}{r} (r - 1 + r^2 + r^2 + r^2 + r) = \frac{1}{r} \times 4r = 4$$

$$\text{الف) } y \rightarrow y \quad y = \frac{rx+1}{\epsilon n - r} \rightarrow y = \frac{rx_{n+1}}{\epsilon n - r}$$

$$\text{ب) } x \rightarrow x \quad y = \frac{-rx+1}{-\epsilon n - r}$$

$$\text{ج) } x \rightarrow y \quad y \rightarrow x \quad x = \frac{ry+1}{\epsilon y - r} \rightarrow y = \frac{rx_{n+1}}{\epsilon n - r}$$

$$\text{د) } x \rightarrow y \quad y \rightarrow x \quad x = \frac{-ry+1}{-\epsilon y - r} \rightarrow y = \frac{1 - rx}{\epsilon n + r}$$

$$\text{الف) } x' = x - a \rightarrow x = x' + a \rightarrow x = x' + r$$

$$y' = y - b \rightarrow y = y' + b \rightarrow y = y' - r$$

$$\Rightarrow (y' - r) = \frac{r(x' + r) + 1}{(x' + r) - r} \rightarrow y' = \frac{rx' + r^2 + 1}{x' - 1}$$

$$\text{ب) } x' = x + r \rightarrow x = x' - r$$

$$y' = y + r \rightarrow y = y' - r \Rightarrow (y' - r) = \frac{r(x' - r) + 1}{(x' - r) - r} \rightarrow y' = \frac{\epsilon x' - 1}{x' - r}$$

$$\text{الف) } \begin{cases} rx + \epsilon y = r \\ x - \omega y = 1 \end{cases} \xrightarrow{x(-r)} \begin{cases} rx + \epsilon y = r \\ -rx + \omega y = -r \end{cases}$$

$$\Rightarrow 19y = 1 \rightarrow y = -\frac{1}{19} \rightarrow x = \frac{1\epsilon}{19}$$

$$\text{ب) } x = \frac{\begin{vmatrix} b & c \\ b' & c' \end{vmatrix}}{\begin{vmatrix} a & b \\ a' & b' \end{vmatrix}} = \frac{\begin{vmatrix} \epsilon & r \\ -\omega & 1 \end{vmatrix}}{\begin{vmatrix} r & \epsilon \\ 1 & -\omega \end{vmatrix}} = \frac{1\epsilon}{-19} = -\frac{1\epsilon}{19}$$

$$y = \frac{\begin{vmatrix} a & c \\ a' & c' \end{vmatrix}}{\begin{vmatrix} a & b \\ a' & b' \end{vmatrix}} = \frac{\begin{vmatrix} r & r \\ 1 & 1 \end{vmatrix}}{\begin{vmatrix} r & \epsilon \\ 1 & -\omega \end{vmatrix}} = \frac{1}{-19}$$

s.a.m