

الف) $\left| \frac{p}{r} \right|_{-r}^{\infty} \rightarrow m = \frac{-r-p}{\omega-f} = \frac{-r}{f} = -\frac{r}{f}$
 $y = ax + b \rightarrow y = -\frac{r}{f}x + b \rightarrow p = -\frac{r}{f} + b$
 $b = 1 \rightarrow y = -\frac{r}{f}x + 1$

ب) $ky + 4ax - 1 \rightarrow m = \frac{b}{a} = \frac{-4}{r} = -\frac{4}{r}$
 $-\frac{r}{f}x + b = -\frac{4}{r}x + b \rightarrow b = 1$
 $y = -\frac{r}{f}x + 1$

ج) $x + ky = 1 \rightarrow \frac{-b}{a} = m = \frac{-1}{r} \rightarrow m = \frac{1}{r}$
 $ky + b = 1 + b = r \rightarrow b = r - 1$
 $y = \frac{r-1}{r}x$

د) $m = \tan \frac{\pi}{4} = \sqrt{r} \rightarrow \sqrt{r}x + b \rightarrow$
 $\sqrt{r}x + b = r \rightarrow b = r - \sqrt{r}$
 $y = \sqrt{r}x + \frac{r-\sqrt{r}}{\sqrt{r}}$

ه) $\left| \frac{p}{r} \right|_v^1 \rightarrow \sqrt{(y_1 - y_p)^2 + (x_1 - x_p)^2}$
 $(1-p)^2 + (-1-p)^2 = 19 + 9 = 28$
 $\sqrt{28} = \boxed{2\sqrt{7}}$

ز) $rx + ty = r \left| \frac{p}{r} \right|$
 $\text{تب} : \frac{|ax_A + by_A + c|}{\sqrt{a^2 + b^2}} = \frac{|4+12-r|}{\sqrt{4+14}}$
 $\frac{10}{5} = r$

الف) $4x + y = 1$ و $px + ry = 9$ موازی
 $ax + by + \frac{c+c'}{r} = 0 \rightarrow 4x + y + \frac{-1}{r} = 0$
 $4x + y = 1 \rightarrow px + ry = 1 \rightarrow px + ry = 9$

ب) فاصله (دفاپانس) $\frac{|c-c'|}{\sqrt{a^2+b^2}} = \frac{|12-1|}{\sqrt{4+4}}$
 $\frac{r}{\sqrt{12}} \times \frac{\sqrt{12}}{\sqrt{12}} = \frac{r\sqrt{12}}{12}$

$px - ry = 1$ و $px + ry = r \rightarrow \frac{|ax_A + by_A + c|}{\sqrt{a^2 + b^2}} = \frac{|ax_B + by_B + c'|}{\sqrt{a'^2 + b'^2}}$
 $\frac{|px - ry - 1|}{\sqrt{r^2}} = \frac{|px + ry - r|}{\sqrt{r^2}} \rightarrow |px - ry - 1| = |px + ry - r|$
 $px - ry - 1 = px + ry - r \rightarrow 2x = r - 1$
 $r - px - ry = 0 \rightarrow x - y = -\frac{r-1}{2} \rightarrow y - x = \frac{r-1}{2}$

$y + px = r$ و $y - px = d \rightarrow m = \tan \alpha \rightarrow \tan \alpha = \left| \frac{m-m'}{1-mm'} \right|$
 $m = -\frac{r}{p}$ و $m = 1$
 $\left| \frac{1 + \frac{r}{p}}{1 - \frac{r}{p}} \right| = 1 \rightarrow \tan \alpha = 1 \rightarrow \alpha = 45^\circ = \frac{\pi}{4}$

الف) $\begin{vmatrix} 1 & -1 \\ 1 & 1 \end{vmatrix} \begin{vmatrix} A & B \\ -1 & 1 \end{vmatrix} \rightarrow \sqrt{(\Delta y)^2 + (\Delta x)^2}$
 $(-1-1)^2 + (1+1)^2 = 2^2 + 2^2 = 100$
 $\sqrt{100} = 10$

ب) $\frac{y_A + y_B}{2} = y', \quad \frac{x_A + x_B}{2} = x'$
 $\frac{1-0}{2} = -1, \quad \frac{-1+1}{2} = 1$
 $M \begin{vmatrix} -1 \\ 1 \end{vmatrix}$
 $\downarrow$
 $\log \frac{1}{-1}$

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الف) $\begin{vmatrix} -1 & -1 & 1 \\ 1 & 1 & 1 \end{vmatrix} \begin{vmatrix} x_A & x_B & x_C \\ y_A & y_B & y_C \end{vmatrix}$
 $\begin{vmatrix} x_A + x_B + x_C \\ y_A + y_B + y_C \end{vmatrix} = \begin{vmatrix} 1-1-1 \\ -1+1+1 \end{vmatrix} = \begin{vmatrix} -1 \\ 1 \end{vmatrix} = 1$
 $G \begin{vmatrix} -1 \\ 1 \end{vmatrix}$

ب) $\frac{1}{2} \begin{vmatrix} -1 & -1 & 1 \\ 1 & 1 & 1 \end{vmatrix} = -1 - 1 - 1 = -3$
 $\frac{94}{2} = 47$

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الف) $y = \frac{px+1}{qx-r} \rightarrow$ $y = \frac{px+1}{qx-r}$
 $-y = \frac{px+1}{qx-r} \rightarrow y = \frac{px+1}{r-qx}$

ب) $y = \frac{px+1}{qx-r} \rightarrow$ $y = \frac{px+1}{qx-r}$
 $y = \frac{px+1}{qx-r} \rightarrow y = \frac{px+1}{qx-r}$

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ج) $y = \frac{px+1}{qx-r} \rightarrow$ $y = \frac{px+1}{qx-r}$
 $qx = \frac{px+1}{y-r} \rightarrow y = \frac{px+1}{qx-r}$

د) $y = \frac{px+1}{qx-r} \rightarrow$ $y = \frac{px+1}{qx-r}$
 $-y = \frac{px+1}{qx-r} \rightarrow y = \frac{px+1}{qx-r}$

الف) $y = \frac{px+1}{qx-r} \rightarrow$ $y = \frac{px+1}{qx-r}$
 $y' = y + r$
 $y' - r = \frac{px+1}{qx-r} \rightarrow y' = \frac{px+1}{qx-r} + r$

ب) $y = \frac{px+1}{qx-r} \rightarrow$ $y = \frac{px+1}{qx-r}$
 $y' = y - r$
 $y' + r = \frac{px+1}{qx-r} \rightarrow y' = \frac{px+1}{qx-r} - r$

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الف) $px+qy = r$
 $(x-y=1) \quad x-r$
 $px+qy = r \rightarrow y = \frac{r-px}{q}, \quad x = \frac{r}{q}$
 $-rx+10y = -r$

ب) $px+qy = r$
 $x-y=1 \rightarrow \begin{vmatrix} p & q \\ 1 & -1 \end{vmatrix} = -p-q$
 $y = \frac{px+1}{qx-r} \rightarrow y = \frac{px+1}{qx-r}$

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