

الف) $\begin{vmatrix} 1 & 4 \\ 2 & -1 \end{vmatrix} \Rightarrow m = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow \frac{4}{-1-2} = -\frac{4}{3}$
 $y - y_0 = m(x - x_0) \Rightarrow y + 2 = -\frac{4}{3}(x - 5)$
 $y = -\frac{4}{3}x + 18$

ب) $m + 3y = 1 \Rightarrow y = -\frac{m}{3} + \frac{1}{3} \Rightarrow m = -\frac{1}{3}$
 $\Rightarrow m = -\frac{1}{3}$
 $y - 2 = -\frac{1}{3}(x - 4) \Rightarrow y = -\frac{1}{3}x + \frac{10}{3}$

ب) $2y + 4x = -1 \Rightarrow 2y = -4x - 1 \Rightarrow y = -2x - \frac{1}{2}$
 $\Rightarrow m = -2$
 $y - y_0 = m(x - x_0) \Rightarrow y - 2 = -2(x - 4)$
 $y = -2x + 10$

ج) $m = \tan \alpha \Rightarrow m = \tan(\frac{\pi}{3}) = \sqrt{3}$
 $y - 2 = \sqrt{3}(x - 4) \Rightarrow y = \sqrt{3}x - 4\sqrt{3} + 2$

الف) $\begin{vmatrix} 1 & 2 \\ 2 & -1 \end{vmatrix}$
 $d = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$
 $\Rightarrow d = \sqrt{(2 - (-1))^2 + (1 - 2)^2} = \sqrt{5}$

الف) $3x + 4y = 3 \Rightarrow 3x + 4y - 3 = 0$
 $d = \frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}}$
 $\Rightarrow d = \frac{|4 + 12 - 3|}{\sqrt{3^2 + 4^2}} = \frac{13}{5}$

ب) $2x + 3y = 4 \Rightarrow \frac{4}{2} = \frac{4}{2} \neq \frac{1}{2}$ (خط موازی)
 $3x + 4y = 1$
 $\Rightarrow am + by = \frac{c + c'}{r}$
 $2x + 3y = 12$
 $3x + 4y = 1$
 $\Rightarrow 2x + 3y = 1$

ب) $3x + 4y = 12$
 $3x + 4y = 1$
 $d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} \Rightarrow \frac{|12 - 1|}{\sqrt{3^2 + 4^2}} = \frac{11}{5}$
 $= \frac{11}{5} = \frac{2\sqrt{13}}{13}$

الف) $3x - 2y = 1, 2x + 3y = 3$
 $\frac{|ax + by - c|}{\sqrt{a^2 + b^2}} = \frac{|a'x + b'y - c'|}{\sqrt{(a')^2 + (b')^2}} \Rightarrow \frac{|3x - 2y - 1|}{\sqrt{3^2 + (-2)^2}} = \frac{|2x + 3y - 3|}{\sqrt{2^2 + 3^2}}$
 $|3x - 2y - 1| = |2x + 3y - 3| \Rightarrow \textcircled{1} 3x - 2y - 1 = -2x - 3y + 3 \Rightarrow \boxed{5x + y = 4}$
 $\textcircled{2} 3x - 2y - 1 = 2x + 3y - 3 \Rightarrow \boxed{x - 5y = -2}$

الف) $y + 2x = 3$ و $y - 2x = 5 \Rightarrow y = -2x + 3 \Rightarrow m = -2 / y = 2x + 5 \Rightarrow m = 2$
 $\tan \alpha = \left| \frac{m - m'}{1 + mm'} \right| \Rightarrow \tan \alpha = \left| \frac{2 - (-2)}{1 + (-4)} \right| = +1 \Rightarrow \alpha = 45^\circ$
 زاویه حاده بین دو خط 45° است و زاویه بزرگ بین دو خط 135° است

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

$$d = \sqrt{(y_B - y_A)^2 + (x_B - x_A)^2}$$

$$= \sqrt{(2 + 2)^2 + (-5 - 3)^2} = \boxed{10}$$

(الف) M

$$x_m = \frac{x_A + m x_B}{2} \Rightarrow x_m = \frac{-5 + 2}{2} = -1$$

$$y_m = \frac{y_A + m y_B}{2} \Rightarrow y_m = \frac{2 - 2}{2} = 0$$

$$M \begin{vmatrix} -1 \\ 0 \end{vmatrix}$$

(ب) G $\begin{vmatrix} 3 & -2 & -1 \\ 1 & 3 & -1 \end{vmatrix}$

$$x_G = \frac{x_A + x_B + x_C}{3} \Rightarrow x_G = \frac{3 - 2 - 1}{3} = 0$$

$$y_G = \frac{y_A + y_B + y_C}{3} \Rightarrow y_G = \frac{1 + 3 - 1}{3} = 1$$

$$G \begin{vmatrix} 0 \\ 1 \end{vmatrix}$$

(ب) $\begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -1 & -1 & 1 \end{vmatrix}$

$$\Rightarrow 3(1 - 1) - 1(1 - 1) + 1(2 - 1) = 1$$

$$\Rightarrow S = 4A$$

(الف) $y = \frac{2n+1}{2n-3}$ $\Rightarrow y = \frac{2n+1}{2n-3}$ $\Rightarrow y = \frac{2n+1}{2n-3}$

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(الف) $\begin{cases} 3x + 2y = 1 \\ x - 2y = 1 \end{cases} \Rightarrow \begin{cases} 3x + 2y = 1 \\ -3x + 4y = 2 \end{cases}$

$$19y = 3 \Rightarrow y = \frac{3}{19}$$

$$x = \frac{14}{19}$$

(الف) $\begin{vmatrix} b & c \\ b' & c' \end{vmatrix} \begin{vmatrix} a & c \\ a' & c' \end{vmatrix} \begin{vmatrix} a & b \\ a' & b' \end{vmatrix}$

$$x = -\frac{\begin{vmatrix} b & c \\ b' & c' \end{vmatrix}}{\begin{vmatrix} a & b \\ a' & b' \end{vmatrix}} \quad y = \frac{\begin{vmatrix} a & c \\ a' & c' \end{vmatrix}}{\begin{vmatrix} a & b \\ a' & b' \end{vmatrix}}$$

$$x = -\frac{3 + 10}{-10 - 3} = \frac{13}{13}$$

$$y = \frac{3 - 2}{-10 - 3} = -\frac{1}{13}$$