

$$\begin{vmatrix} 1 & 4 \\ 2 & -1 \end{vmatrix} \Rightarrow m = \frac{y_2 - y_1}{x_2 - x_1} \Rightarrow \frac{4}{-1-2} \text{ (الف)}$$

$$y - y_0 = m(x - x_0) \Rightarrow y + 2 = -4(x - 5)$$

$$\boxed{y = -4x + 18}$$

$$m + 3y = 1 \Rightarrow y = -\frac{m}{3} + \frac{1}{3} \Rightarrow m = -\frac{1}{3} \text{ (ب)}$$

$$\Rightarrow m = \frac{1}{3}$$

$$y - 2 = \frac{1}{3}(x - 4) \Rightarrow \boxed{y = \frac{1}{3}x - 1}$$

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

$$\Rightarrow m = -2$$

$$y - y_0 = m(x - x_0) \Rightarrow y - 2 = -2(x - 4)$$

$$\boxed{y = -2x + 10}$$

$$m = \tan \alpha \Rightarrow m = \tan\left(\frac{\pi}{4}\right) = \sqrt{3} \text{ (ج)}$$

$$y - 2 = \sqrt{3}(x - 4) \Rightarrow \boxed{y = \sqrt{3}x - 4\sqrt{3} + 2}$$

$$\text{الف} \quad \begin{vmatrix} 1 & 2 \\ 3 & -1 \end{vmatrix} \quad \text{فاصله} = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2}$$

$$\Rightarrow d = \sqrt{(3-2)^2 + (-1-1)^2} = \boxed{2}$$

$$3x + 4y = 3 \Rightarrow 3x + 4y - 3 = 0 \text{ (ب)}$$

$$d = \frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}}$$

$$\Rightarrow d = \frac{|4+12-3|}{\sqrt{3^2+4^2}} = \frac{13}{5} = \boxed{\frac{13}{5}}$$

$$\begin{cases} 2x + 3y = 4 \\ 3x + 4y = 1 \end{cases} \Rightarrow \frac{4}{2} = \frac{1}{3} \neq \frac{1}{4} \checkmark \text{ (خط موازی) / غیر متقاطع}$$

$$\begin{cases} am + by = \frac{c+c'}{2} \\ 2x + 4y = 12 \\ 3x + 4y = 1 \end{cases} \Rightarrow \begin{cases} 2x + 4y = 12 \\ 3x + 4y = 1 \end{cases} \Rightarrow \boxed{2x + 4y = 1}$$

$$\begin{cases} 2x + 4y = 12 \\ 3x + 4y = 1 \end{cases}$$

$$\text{فاصله} = \frac{|c - c'|}{\sqrt{a^2 + b^2}} \Rightarrow \frac{|12 - 1|}{\sqrt{2^2 + 4^2}} = \frac{11}{\sqrt{20}} = \frac{11}{2\sqrt{5}} = \boxed{\frac{11}{2\sqrt{5}}}$$

$$3x - 2y = 1, 2x + 3y = 3$$

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

$$|3x - 2y - 1| = |2x + 3y - 3| \Rightarrow \textcircled{1} 3x - 2y - 1 = -2x - 3y + 3 \Rightarrow \boxed{5x + y = 4}$$

$$\textcircled{2} 3x - 2y - 1 = 2x + 3y - 3 \Rightarrow \boxed{x - 5y = -2}$$

$$y + 2x = 3 \text{ و } y - 2x = 5 \Rightarrow y = -2x + 3 \Rightarrow m = -2 / y = 2x + 5 \Rightarrow m = 2$$

$$\tan \alpha = \left| \frac{m \cdot m'}{1 + m m'} \right| \Rightarrow \tan \alpha = \left| \frac{2 \cdot (-2)}{1 + (-4)} \right| = +1 \Rightarrow \alpha = 45^\circ$$

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

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

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

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

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

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

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

$$G \begin{vmatrix} -\frac{2}{3} \\ 1 \end{vmatrix}$$

(ب)

$$\begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -1 & -1 & 1 \end{vmatrix} \Rightarrow 3(4 - 1 \cdot 1 + 3) + 3(1 - 4 + 1) = 9 - 3 = 6$$

$$\Rightarrow \boxed{S = 6A}$$

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

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

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

(الف) $x' = x - 2$ $y' = y + 3$

$$x' = x - 2 \Rightarrow x = x' + 2$$

$$y' = y + 3 \Rightarrow y = y' - 3$$

$$y' = \frac{2x' + 1}{2x' - 1} + 3 \Rightarrow y' = \frac{2x' + 1 + 6x' - 3}{2x' - 1} = \frac{8x' - 2}{2x' - 1}$$

(ب) $x' = x - 2$ $y' = y + 3$

$$y' = \frac{2x' + 1}{2x' - 1} + 3 \Rightarrow y' = \frac{2x' + 1 + 6x' - 3}{2x' - 1} = \frac{8x' - 2}{2x' - 1}$$

(الف) $x = \frac{14}{19}$ $y = \frac{14}{19}$

(ب) $x = \frac{14}{19}$ $y = \frac{14}{19}$