

$$m = \frac{-2-2}{5-4} = -4 \Rightarrow y-2 = -4(x-4) \Rightarrow y = -4x+18 \quad \underline{y+4x=18} \quad (\text{الف})$$

$$m = \frac{-9}{6} = \frac{-3}{2} = -1.5 \Rightarrow y-2 = -1.5(x-4) \Rightarrow y = -1.5x+8 \Rightarrow \underline{y+1.5x=8} \quad (\text{ب})$$

$$m = -\left(\frac{-6}{2}\right) = -(-3) = 3 \Rightarrow y-2 = 3(x-4) \Rightarrow y = 3x-10 \quad \underline{y-3x=-10} \quad (\text{ج})$$

$$m = \tan \alpha = \tan\left(\frac{\pi}{3}\right) = \sqrt{3} \Rightarrow y-2 = \sqrt{3}(x-4) \Rightarrow \underline{y = \sqrt{3}x - 4\sqrt{3} + 2} \quad (\text{د})$$

$$d = \sqrt{(x_1-x_2)^2 + (y_1-y_2)^2} \Rightarrow \sqrt{(2-1)^2 + (3-7)^2} = \sqrt{1+16} = \sqrt{17} = \underline{\underline{5}} \quad (\text{الف})$$

$$d = \frac{|ax+by+c|}{\sqrt{a^2+b^2}} \Rightarrow \frac{|3(2)+4(3)-1|}{\sqrt{3^2+4^2}} = \frac{15}{5} = \underline{\underline{3}} \quad (\text{ب})$$

$$2x+3y=4 \xrightarrow{\times 2} 4x+6y=8 \rightarrow \frac{C+C'}{2} = C''$$

$$\Rightarrow 4x+6y = \frac{8+4}{2} \Rightarrow \underline{4x+6y=6}$$

$$\frac{|C+C'|}{\sqrt{a^2+b^2}} \Rightarrow \frac{|8+4|}{\sqrt{4^2+6^2}} = \frac{12}{5} = \frac{12}{5} \xrightarrow{\times \frac{\sqrt{13}}{13}} \frac{12\sqrt{13}}{13} \quad (\text{ب})$$

$$\frac{|3x-2y-1|}{\sqrt{3^2+2^2}} = \frac{|2x+3y-3|}{\sqrt{2^2+3^2}} \Rightarrow |3x-2y-1| = |2x+3y-3|$$

$$\xrightarrow{+} 3x-2y-1 = 2x+3y-3 \Rightarrow 5y = x+2 \Rightarrow \underline{y = \frac{1}{5}x + 0.4}$$

$$\xrightarrow{-} 3x-2y-1 = -2x-3y+3 \Rightarrow 5x+y=4 \Rightarrow \underline{y = 4-5x}$$

$$y-2x=5 \Rightarrow m_1 = \frac{-(-2)}{1} = 2, \quad y+3x=3 \Rightarrow m_2 = \frac{-3}{1} = -3$$

$$\tan \theta = \left| \frac{m_2 - m_1}{1 + m_1 m_2} \right| \Rightarrow \left| \frac{-3 - 2}{1 + (-3)(2)} \right| = \left| \frac{-5}{-5} \right| = 1 \Rightarrow \theta = 45^\circ$$

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} \Rightarrow \sqrt{(3 - (-5))^2 + (-2 - 4)^2} = \sqrt{8^2 + (-6)^2} = \sqrt{100} = \boxed{10} \quad (\text{الف})$$

$$\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right) \Rightarrow \left(\frac{3 + (-5)}{2}, \frac{-2 + 4}{2}\right) = \underline{\underline{(-1, 1)}} \quad (\text{ب})$$

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$$\text{مركز ثقل} = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3}\right) \Rightarrow \left(\frac{3 + (-2) + 10}{3}, \frac{1 + 3 + 13}{3}\right) = \underline{\underline{(-3, -3)}} \quad (\text{الف})$$

$$S = \frac{1}{4} \times \begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -10 & -13 & 1 \end{vmatrix} = \frac{1}{4} \times 96 = \boxed{24} \quad (\text{ب})$$

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$$x \rightarrow -x \Rightarrow y = \frac{-2x+1}{-4x-3} \quad (\text{ب}) \quad y \rightarrow -y \Rightarrow -y = \frac{2x+1}{4x-3} \quad (\text{الف})$$

$$\begin{cases} x \rightarrow -y \rightarrow -x = \frac{-2y+1}{-4y-3} \\ y \rightarrow -x \rightarrow -y = \frac{2x+1}{4x-3} \end{cases} \quad (\text{ج}) \quad \begin{cases} x \rightarrow y \Rightarrow y = \frac{2x+1}{4x-3} \\ y \rightarrow x \Rightarrow x = \frac{2y+1}{4y-3} \end{cases} \quad (\text{د})$$

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$$\begin{cases} x' = x-2 \Rightarrow x = x'+2 \\ y' = y+3 \Rightarrow y = y'-3 \end{cases} \Rightarrow y'-3 = \frac{2(x'+2)+1}{x'+2-3} \Rightarrow y' = \frac{2x'+5}{x'-1} + 3 \quad (\text{الف})$$

$$\Rightarrow y' = \frac{2x'+7}{x'-1} \quad (\text{ب})$$

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$$\begin{cases} 3x+4y=2 \\ x-5y=1 \end{cases} \Rightarrow \begin{cases} 3x+4y=2 \\ -3x+15y=-3 \end{cases} \Rightarrow 19y=-1 \Rightarrow y = \underline{\underline{-\frac{1}{19}}} \quad (\text{الف})$$

$$x = -\frac{\begin{vmatrix} 1 & 4 \\ 1 & -5 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 1 & -5 \end{vmatrix}} = -\frac{14}{-19} = \underline{\underline{\frac{14}{19}}} \quad (\text{ب})$$

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