

الف) $\begin{cases} x-2 \\ -2 \end{cases} \Rightarrow a = \frac{\Delta y}{\Delta x} = \frac{2-(-2)}{4-2} = 2 \quad y = 2x + b \Rightarrow 2 = -4 + b \Rightarrow b = 6 \Rightarrow y = 2x + 6$

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

$y = -2x + b \Rightarrow 2 = -4 + b \Rightarrow b = 6 \Rightarrow y = -2x + 6$

ج) $x + 3y = 1 \Rightarrow y = -\frac{1}{3}x + \frac{1}{3} \Rightarrow a = -\frac{1}{3} \Rightarrow y = -\frac{1}{3}x + b \Rightarrow b = \frac{1}{3} \Rightarrow y = -\frac{1}{3}x + \frac{1}{3}$

د) $\frac{\pi}{4} = 45^\circ \Rightarrow \tan 45^\circ = 1 = a \Rightarrow y = x + b \Rightarrow b = 2 - 1 = 1 \Rightarrow y = x + 1$

الف) $|AB| = \sqrt{(\Delta y)^2 + (\Delta x)^2} \Rightarrow \sqrt{(2-1)^2 + (-1-2)^2} = \sqrt{10} = \sqrt{10}$

$3x + 4y = 3 \Rightarrow 3x + 4y - 3 = 0$

ب) $d = \frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}} = \frac{|3(2) + 4(-1) - 3|}{\sqrt{3^2 + 4^2}} = \frac{|6 - 4 - 3|}{5} = \frac{1}{5}$

$2 \times (2x + 3y = 4) = 4x + 6y = 8 \quad 4x + 4y = 4$

الف) $ax + by = \frac{c+c'}{2} \Rightarrow 4x + 4y = \frac{8+4}{2} \Rightarrow 4x + 4y = 6 \Rightarrow y = -x + \frac{3}{2}$

ب) $d = \frac{|c-c'|}{\sqrt{a^2 + b^2}} \Rightarrow \frac{|8-4|}{\sqrt{16+16}} = \frac{4}{\sqrt{32}} = \frac{4}{4\sqrt{2}} = \frac{1}{\sqrt{2}}$

$3x - 2y = 1 \Rightarrow 3x + 3y = 3$

$\frac{|ax + by - c|}{\sqrt{a^2 + b^2}} = \frac{|a'x + b'y - c'|}{\sqrt{(a')^2 + (b')^2}} \Rightarrow \frac{|3x - 2y - 1|}{\sqrt{9+4}} = \frac{|3x + 3y - 3|}{\sqrt{9+9}} \Rightarrow$

$|3x - 2y - 1| = |3x + 3y - 3| \Rightarrow \begin{cases} 3x - 2y - 1 = 3x + 3y - 3 \Rightarrow -5y = -2 \Rightarrow y = \frac{2}{5} \\ 3x - 2y - 1 = -(3x + 3y - 3) \Rightarrow 6x + y = 4 \end{cases}$

$\tan \alpha = \left| \frac{m - m'}{1 + mm'} \right| \Rightarrow \begin{cases} y - 2x = 2 \Rightarrow y = 2x + 2 \Rightarrow m = 2 \\ y + 4x = 3 \Rightarrow y = -4x + 3 \Rightarrow m' = -4 \end{cases}$

$\tan \alpha = \left| \frac{2 - (-4)}{1 + (-8)} \right| = 1 \Rightarrow \tan \alpha = 1 \Rightarrow \alpha = \frac{\pi}{4} = 45^\circ$

$$|AB| = \sqrt{(\Delta y)^2 + (\Delta x)^2} \Rightarrow \sqrt{(4-(-2))^2 + (-5-3)^2} = \sqrt{100} = 10 \quad \text{(الف)}$$

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

$$\text{(الف)} \Rightarrow \begin{aligned} x_G &= \frac{-10-2+3}{3} = -3 \\ y_G &= \frac{-13+3+1}{3} = -3 \end{aligned} \quad \text{نقطه ثقل} = \begin{pmatrix} -3 \\ -3 \end{pmatrix}$$

$$\text{(ب)} \quad S = \frac{1}{6} \begin{vmatrix} -10 & -13 & 1 \\ -2 & 3 & 1 \\ 3 & 1 & 1 \end{vmatrix} \Rightarrow -30 - 39 - 1 - (3 + 10 - 15) \Rightarrow \frac{-94}{6} = -\frac{47}{3}$$

$$\text{(الف)} \quad y \rightarrow -y$$

$$-y = \frac{2x+1}{4x-3}$$

$$\text{(ج)} \quad \begin{cases} x \rightarrow y \\ y \rightarrow x \end{cases}$$

$$\begin{cases} x \rightarrow -y \\ y \rightarrow -x \end{cases}$$

$$-x = \frac{-2y+1}{-4y-3} \Rightarrow 4xy+3x = -2y+1$$

$$\text{(ب)} \quad x \rightarrow -x$$

$$y = \frac{-2x+1}{-4x-3}$$

$$x = \frac{2y+1}{4y-3} \Rightarrow 4xy - 3x = 2y+1$$

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

$$\div 2 \Rightarrow y = \frac{1+3x}{4x-2}$$

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

$$\div 2 \Rightarrow y = \frac{1-2x}{4x+2}$$

$$y = \frac{2x+1}{x-3} \quad \begin{cases} x' = x-3 \\ y' = y+3 \end{cases} \Rightarrow \begin{cases} x = x'+3 \\ y = y'-3 \end{cases} \Rightarrow y'-3 = \frac{2x'+6}{x'+3-3} \Rightarrow y' = \frac{2x'+6}{x'-1}$$

$$\text{(ب)} \quad \begin{cases} x' = x-3 \\ y' = y-3 \end{cases} \Rightarrow \begin{cases} x = x'+3 \\ y = y'+3 \end{cases} \Rightarrow y'+3 = \frac{2x'+6}{x'+3-3} \Rightarrow y' = \frac{2x'+6}{x'-1}$$

$$\text{(الف)} \quad \begin{cases} 3x+4y=2 \\ -2(x-5y)=1 \end{cases} \Rightarrow \begin{cases} 3x+4y=2 \\ -2x+10y=1 \end{cases} \rightarrow 14y = -1 \rightarrow y = -\frac{1}{14}$$

$$\Rightarrow 3x+4\left(-\frac{1}{14}\right)=2 \Rightarrow 3x-\frac{2}{7}=2 \Rightarrow 3x=\frac{16}{7} \Rightarrow x=\frac{16}{21}$$

$$\text{(ب)} \quad \begin{cases} 3x+4y=2 \\ x-5y=1 \end{cases} \quad x = -\frac{4-(-10)}{-15-3} = \frac{14}{18} = \frac{7}{9} \quad y = \frac{3-2}{-15-3} = \frac{1}{-18} = -\frac{1}{18}$$