

الف) $\text{شیب} = \frac{\Delta y}{\Delta x} = \frac{2 - (-2)}{8 - 0} = -\frac{1}{2}$ $y = -\frac{1}{2}x + 1$
 $y = -\frac{1}{2}x + b \Rightarrow 2 = -1 + b \Rightarrow b = 3$

ب) $2y + 3x = -1 \Rightarrow y = -\frac{3}{2}x - \frac{1}{2} \Rightarrow \text{شیب} = -\frac{3}{2}$
 $\Rightarrow y = -\frac{3}{2}x + b \Rightarrow 2 = -3 + b \Rightarrow b = 5 \Rightarrow y = -\frac{3}{2}x + 5$

ج) $x + 3y = 1 \Rightarrow y = -\frac{1}{3}x + \frac{1}{3} \Rightarrow \text{شیب} = -\frac{1}{3}$
 $y = -\frac{1}{3}x + b \Rightarrow 2 = -\frac{2}{3} + b \Rightarrow b = \frac{8}{3} \Rightarrow y = -\frac{1}{3}x + \frac{8}{3}$

د) $\text{شیب} = \sqrt{3} \quad \frac{\pi}{3} = 60^\circ \quad \tan 60^\circ = \sqrt{3} \quad y = \sqrt{3}x + b \Rightarrow 2 = 4\sqrt{3} + b$
 $b = 2 - 4\sqrt{3} \Rightarrow y = \sqrt{3}x + 2 - 4\sqrt{3}$

الف) $|AB| = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2} = \sqrt{(\frac{1}{2} - \frac{1}{2})^2 + (-\frac{1}{2} - \frac{1}{2})^2} = \sqrt{1} = 1$

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

$d = \frac{|3(2) + 4(2) - 12|}{\sqrt{3^2 + 4^2}} = \frac{|12 + 8 - 12|}{5} = \frac{8}{5}$

الف) $2(2x + 3y = 6) = 4x + 6y = 12 \quad 4x + 6y = 12$

$ax + by = \frac{c + c'}{r} \Rightarrow 4x + 6y = \frac{12 + 12}{r} = 10 \Rightarrow 4x + 6y = 10$

$\Rightarrow 6y = 10 - 4x \Rightarrow y = \frac{5}{3} - \frac{2}{3}x \Rightarrow y = -\frac{2}{3}x + \frac{5}{3}$

ب) $d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|12 - 12|}{\sqrt{4^2 + 6^2}} = \frac{0}{\sqrt{52}} = 0$

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

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

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

$3x - 2y - 1 = 2x + 3y - 3 \Rightarrow x - 5y = -2$

$3x - 2y - 1 = -2x - 3y + 3 \Rightarrow 5x + y = 4$

$\tan \alpha = \frac{m - m'}{1 + mm'}$

$y - 2x = 0 \quad y + 3x = 3$

$y = 2x + 0 \Rightarrow m = 2$

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

$\tan \alpha = \left| \frac{2 - (-3)}{1 + (-6)} \right| = 1$

$\tan \alpha = 1 \Rightarrow \alpha = \frac{\pi}{4} = 45^\circ$

$$|AB| = \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2} = \sqrt{(4 - (-1))^2 + (-5 - 3)^2} = \sqrt{25 + 64} = \sqrt{89} = 10$$

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

الف) مركز ثقل

$$x_G = \frac{-10 - 2 + 3}{3} = -3$$

$$y_G = \frac{-13 + 3 + 1}{3} = -3$$

$$\begin{bmatrix} -3 \\ -3 \end{bmatrix}$$

$$b) S = \frac{1}{2} \left| \begin{vmatrix} -10 & -2 & 3 \\ -13 & 3 & 1 \\ 1 & 1 & 1 \end{vmatrix} \right| = \frac{1}{2} (-20 - 29 - (9 + 13 - 10)) = \frac{1}{2} (-76) = -38 \rightarrow 38$$

$$y \rightarrow -y$$

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

$$x \rightarrow -x$$

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

$$\begin{cases} x \rightarrow y \\ y \rightarrow x \end{cases} \Rightarrow x = \frac{2y+1}{y-2} \Rightarrow xy - 2x = 2y+1 \Rightarrow$$

$$\Rightarrow xy - 2y = 1+2x \Rightarrow xy(2x-1) = 1+2x \Rightarrow$$

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

$$\begin{cases} x \rightarrow -y \\ y \rightarrow -x \end{cases} \Rightarrow -x = \frac{-2y+1}{-y-2} \Rightarrow xy + 2x = -2y+1$$

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

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

(رأى شوال 9 در صفی بعد)

$$\begin{cases} 3x+5y=2 \\ x-5y=1 \end{cases} \Rightarrow \begin{cases} 3x+5y=2 \\ -3x+15y=-3 \end{cases}$$

$$\Rightarrow 3x - \frac{5}{19} = 2 \Rightarrow 3x = \frac{39}{19} \Rightarrow x = \frac{13}{19}$$

$$\begin{cases} 3x+5y=2 \\ x-5y=1 \end{cases} \Rightarrow x = -\frac{5(-10)}{-10-5} = \frac{50}{-15} = -\frac{10}{3}$$

$$\begin{cases} n' = n - r \\ y' = y - (-r) = y + r \end{cases} \Rightarrow \begin{cases} n = n' + r \\ y = y' - r \end{cases}$$

(الف)

$$y' - r = \frac{rn' + d}{n' + r} \Rightarrow y' = \frac{rn' + d}{n' - 1} + \frac{r(n' - 1)}{1(n' - 1)} \Rightarrow$$

$$y' = \frac{rn' + d + rn' - r}{n' - 1} = \boxed{\frac{d n' + r}{n' - 1}}$$

$$\begin{cases} n' = n - r \\ y' = y - r \end{cases} \Rightarrow \begin{cases} y = y' + r \\ n = n' + r \end{cases}$$

(ب)

$$y' + r = \frac{rn' + y + 1}{n' + r - r} \Rightarrow y' = \frac{rn' + v}{n'} - r \Rightarrow$$

$$y' = \frac{rn' + v - \cancel{rn'}}{n'} = \boxed{\frac{v}{n'}}$$