

* نقطه $\frac{4}{5}$ عبور از نقطه $(-2, 1)$ $\rightarrow m = \frac{\Delta y}{\Delta x} = \frac{1 - (-2)}{-2 - 5} = -\frac{3}{7}$ $\xrightarrow{\text{نقطه } (4, 2)}$ $y = -\frac{3}{7}x + b \rightarrow b = 1\frac{1}{7}$
 $\Rightarrow y = -\frac{3}{7}x + 1\frac{1}{7}$

ب) موازی $\rightarrow 2y + 4x = -1 \rightarrow m = -\frac{a}{b} = -\frac{4}{2} = -2$ $\xrightarrow{\text{نقطه } (4, 2)}$ $y = -2x + b \rightarrow b = 14$
 $\Rightarrow y = -2x + 14$

ج) عمود $\rightarrow x + 3y = 1 \rightarrow m = -\frac{1}{3}$ $\xrightarrow{\text{نقطه } (4, 2)}$ $y = \frac{1}{3}x + b \rightarrow b = -10$
 $\Rightarrow y = \frac{1}{3}x - 10$

د) زاویه $\alpha = \frac{\pi}{3} = 60^\circ$ شیب $m = \tan \alpha = \sqrt{3}$ $\xrightarrow{\text{نقطه } (4, 2)}$ $y = \sqrt{3}x + b \rightarrow b = -4\sqrt{3}$
 $\Rightarrow y = \sqrt{3}x - 4\sqrt{3}$

* $\frac{2}{3}$ الف) فاصله $\frac{2}{3}$ و $\frac{1}{2}$ $\rightarrow \text{فاصله} = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{(2 - (-1))^2 + (3 - \frac{1}{2})^2} = \sqrt{3^2 + \frac{25}{4}} = \sqrt{\frac{36 + 25}{4}} = \sqrt{\frac{61}{4}} = \frac{\sqrt{61}}{2}$

ب) فاصله $\frac{2}{3}$ $\rightarrow \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{|3(2) + 4(3) - 3|}{\sqrt{9 + 16}} = \frac{15}{5} = 3$

* $2x + 3y = 4$ $\rightarrow 2x + 3y - 4 = 0$
 * $4x + 3y = 1$ $\rightarrow 4x + 3y - 1 = 0$

الف) معادله خط موازی $\rightarrow ax + by + \frac{c + c'}{2} \Rightarrow 2x + 3y + \frac{(-4) + (-1)}{2} \Rightarrow 2x + 3y - \frac{5}{2} = 0$
 $\Rightarrow 4x + 6y - 5 = 0$

ب) فاصله خط موازی $\rightarrow \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|-4 - (-1)|}{\sqrt{4 + 9}} = \frac{3}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$

* $\begin{cases} 2x + 3y = 3 \\ 3x - 2y = 1 \end{cases} \rightarrow \begin{cases} 2x + 3y - 3 = 0 \\ 3x - 2y - 1 = 0 \end{cases}$

فاصله از خط موازی $\rightarrow \frac{|3x - 2y - 1|}{\sqrt{13}} = \frac{|2x + 3y - 3|}{\sqrt{13}} \Rightarrow \begin{cases} \oplus \rightarrow 3x - 2y - 1 = 2x + 3y - 3 \\ \rightarrow x - 5y + 2 = 0 \\ \ominus \rightarrow 3x - 2y - 1 = -(2x + 3y - 3) \\ \rightarrow 5x + y - 4 = 0 \end{cases}$

فاصله بین دو خط $\rightarrow \tan \alpha = \left| \frac{m - m'}{1 + mm'} \right|$

$\Rightarrow \begin{cases} y = 2x + 5 \rightarrow m = 2 \\ y = -3x + 3 \rightarrow m' = -3 \end{cases} \rightarrow \tan \alpha = \left| \frac{2 - (-3)}{1 + (-6)} \right| = \left| \frac{5}{-5} \right| = 1$

$\Rightarrow \tan \alpha = 1 \rightarrow \alpha = 45^\circ$

* $\begin{cases} A & | & 3 \\ & & -2 \\ B & | & -5 \\ & & 4 \end{cases}$

الف) B و A فاصلہ کی دونوں نقطہ = ؟ $\rightarrow \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{(3 - (-5))^2 + (-2 - 4)^2} = \sqrt{16 + 36} = 10$

ب) خطی نقطہ وسط = ؟ $\rightarrow \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \left(\frac{3 + (-5)}{2}, \frac{-2 + 4}{2} \right) = (-1, 1)$

* $\begin{cases} (3, 1) \\ (-2, 3) \\ (-10, -13) \end{cases}$ اس کے مرکز = ؟ $\rightarrow O = \left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right) = \left(\frac{3 - 2 - 10}{3}, \frac{1 + 3 - 13}{3} \right) = (-3, -3)$

الف) مرکز ثقل = ؟
ب) مساحت = ؟ $\rightarrow S = \frac{1}{2} \begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -10 & -13 & 1 \end{vmatrix} = \frac{1}{2} (9 + 24 - 10 + 10 + 13 + 2) = \frac{1}{2} \times 44 = 22$

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

الف) x قریب نسبت $\rightarrow$ $y = \frac{2x+1}{4x-3}$

ب) y قریب نسبت $\rightarrow$ $x = \frac{2y+1}{4y-3}$

ج) x و y دونوں قریب نسبت $\rightarrow$ $-x = \frac{2y+1}{4y-3}$

د) x و y دونوں قریب نسبت $\rightarrow$ $-x = \frac{2y+1}{4y-3}$

* $y = \frac{2x+1}{4x-3} \rightarrow \frac{\alpha}{\beta} \rightarrow \begin{cases} x' = x - \alpha \\ y' = y - \beta \end{cases}$

الف) $\rightarrow \frac{2}{-3}$

$\Rightarrow y = \frac{2x+1}{4x-3} \xrightarrow{\text{let } (2, -3)} \begin{cases} x' = x - 2 \\ y' = y + 3 \end{cases} \rightarrow \begin{cases} x = x' + 2 \\ y = y' - 3 \end{cases} \rightarrow y' - 3 = \frac{2(x' + 2) + 1}{4(x' + 2) - 3} = \frac{2x' + 5}{4x' + 5}$

ب) $\rightarrow \frac{3}{2} \xrightarrow{(3, 2)} \begin{cases} x' = x - 3 \\ y' = y - 2 \end{cases} \rightarrow \begin{cases} x = x' + 3 \\ y = y' + 2 \end{cases} \Rightarrow y' + 2 = \frac{2(x' + 3) + 1}{4(x' + 3) - 3} = \frac{2x' + 7}{4x' + 9} \Rightarrow y' = \frac{2x' + 7}{4x' + 9} - 2 = \frac{2x' - 11}{4x' + 9}$

$\Rightarrow y' + 2 = \frac{2(x' + 3) + 1}{4(x' + 3) - 3} \Rightarrow y' = \frac{2x' + 7}{4x' + 9} - 2 = \frac{2x' - 11}{4x' + 9}$

$\begin{cases} 3x + 4y = 2 \\ x - 5y = 1 \end{cases}$

الف) حل $\rightarrow \begin{cases} 3x + 4y = 2 \\ x - 5y = 1 \end{cases} \rightarrow \begin{cases} 3x + 4y = 2 \\ x - 5y = 1 \end{cases} \rightarrow \begin{cases} 3x + 4y = 2 \\ -3x + 15y = -3 \end{cases} \rightarrow \begin{cases} 3x + 4y = 2 \\ 19y = -1 \end{cases} \rightarrow \begin{cases} y = -\frac{1}{19} \\ x = +\frac{14}{19} \end{cases}$

ب) حل $\rightarrow x = -\frac{14}{-19} = \frac{14}{19}, y = \frac{-1}{-19} = \frac{1}{19}$

$\rightarrow x = -\frac{\text{دترمینان } y \text{ و عدد ثابت}}{\text{دترمینان ضرایب}}$ $y = \frac{\text{دترمینان } x \text{ و عدد ثابت}}{\text{دترمینان ضرایب}}$