

نقطه $A \begin{pmatrix} 3 \\ -2 \end{pmatrix}$, $B \begin{pmatrix} 0 \\ 1 \end{pmatrix}$

الف) فاصله دو نقطه ؟
 $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2} = \sqrt{(-3 - 0)^2 + (1 - (-2))^2} = 10$

ب) وسطه نقطه وسطه ؟

$M \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right) = \left(\frac{-3 + 0}{2}, \frac{1 + (-2)}{2} \right) = (-1.5, -0.5)$

$\begin{pmatrix} 3 \\ -2 \end{pmatrix} \quad \begin{pmatrix} 0 \\ 1 \end{pmatrix} \quad \begin{pmatrix} -1.5 \\ -0.5 \end{pmatrix}$

الف) مرکز ثقل ؟
 $\left(\frac{x_1 + x_2 + x_3}{3}, \frac{y_1 + y_2 + y_3}{3} \right) = \left(\frac{-1.5 - 2 + 3}{3}, \frac{-0.5 + 3 + 1}{3} \right) = (-0.5, 1.33)$

ب) مساحت ؟

$S = \frac{1}{2} \begin{vmatrix} -1.5 & -2 & 3 \\ -0.5 & 3 & 1 \\ 1 & 1 & 1 \end{vmatrix} = \frac{1}{2} (99) = 49.5$
 $[-1.5 + (-2) + (-39)] - [9 + (-1.5) + 29] = -99$

ج) $y = \frac{2x + 1}{4x - 3}$

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

الف) قرینه نسبت به x ها

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

ب) قرینه نسبت به y ها

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

ج) قرینه نسبت به نیمه محور xy

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

د) قرینه نسبت به نیمه محور xy

$x' = x - 2 \rightarrow x = x' + 2$
 $y' = y + 3 \rightarrow y = y' - 3$

$\hookrightarrow y' - 3 = \frac{2(x' + 2) + 1}{(x' + 2) - 3} = \frac{2x' + 5}{x' - 1}$

$2x' + 2$

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

ج) $y = \frac{2x + 1}{x - 3}$

الف) صبا به $\begin{pmatrix} 2 \\ -3 \end{pmatrix}$

$x' = x - 3 \rightarrow x = x' + 3$
 $y' = y - 2 \rightarrow y = y' + 2$

$\hookrightarrow y' + 2 = \frac{2(x' + 3) + 1}{(x' + 3) - 3} = \frac{2x' + 7}{x'}$

$y' = \frac{2x' + 7 - 2x'}{x'} \rightarrow y' = \frac{7}{x'}$

ب) صبا به $\begin{pmatrix} 3 \\ 2 \end{pmatrix}$

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

الف) $\begin{cases} 3x + 4y = 2 \\ -3x + 10y = -3 \end{cases}$

$\rightarrow 14y = -1 \quad \begin{cases} y = -\frac{1}{14} \\ x = \frac{14}{19} \end{cases}$

ب) $\rightarrow$

$y = \frac{(3)(1) - (4)(1)}{3(-5) - (4)(1)} = \frac{-1}{-19} = \frac{1}{19}$

$x = \frac{(14)(1) - (-1)(3)}{3(-5) - (14)(1)} = \frac{17}{-19} = -\frac{17}{19}$

معادله خط از 11^2 با شیب 3 :

$$m + 3y = 1 \quad (ع)$$

$$m = -\frac{1}{3} \quad mm' = -1 \rightarrow m' = 3$$

$$y = 3(x-4) + 2 \rightarrow y = 3x - 10$$

$$m = \frac{\Delta y}{\Delta x} = \frac{-2-2}{2-4} = -1$$

$$y - y_0 = m(x - x_0) \rightarrow y = -1(x-4) + 2$$

$$y = -x + 18$$

(ب) با شیب 3 و از نقطه $(4, 2)$ می‌گذرد

$$\frac{\Delta y}{\Delta x} = 3 \rightarrow \tan \theta = m = 3$$

$$y - y_0 = m(x - x_0)$$

$$y = 3(x-4) + 2 \rightarrow y = 3x - 10$$

$$2y + 4x = -1 \quad (ب)$$

$$\frac{-1}{4} = \frac{y}{-4} = -\frac{1}{4}$$

$$y - y_0 = m(x - x_0)$$

$$y = -3(x-4) + 2 \rightarrow y = -3x + 14$$

$$\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(2 - (-1))^2 + (2 - 4)^2} = \sqrt{5}$$

(الف) فاصله از نقطه 11^2 ؟ $\frac{-1}{4}$

$$\frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}} = \frac{|3(4) + 4(2) - 1|}{\sqrt{3^2 + 4^2}} = \frac{10}{5} = 2$$

(ب) فاصله از خط $3x + 4y = 1$ ؟ $3x + 4y = 1$

$$3x + 4y = 1 \quad 3x + 4y = 4$$

$$3x + 4y = 12$$

(الف) معادله خط وسط و موازی $3x + 4y = 1$ ؟ $3x + 4y = 12$

$$\frac{|C - C'|}{\sqrt{a^2 + b^2}} = \frac{|12 - 1|}{\sqrt{3^2 + 4^2}} = \frac{11}{5} = \frac{11}{5}$$

(ب) فاصله این دو خط ؟

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

$$3x - 2y - 1 = 0 \quad 3x + 2y - 3 = 0$$

معادله خط وسط و موازی

$$\frac{|3x - 2y - 1|}{\sqrt{3^2 + (-2)^2}} = \frac{|3x + 2y - 3|}{\sqrt{3^2 + 2^2}} \rightarrow \frac{3x - 2y - 1}{\sqrt{13}} = \frac{3x + 2y - 3}{\sqrt{13}}$$

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

$$3x - 2(\frac{1}{2}) - 1 = 0 \rightarrow 3x - 1 - 1 = 0 \rightarrow 3x = 2 \rightarrow x = \frac{2}{3}$$

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

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

$$m' = -3 \quad m = 2$$

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

$$\tan \alpha = \left| \frac{2 - (-3)}{1 + (2)(-3)} \right| = 1 \rightarrow \alpha = 45^\circ$$