

۱ الف) $\frac{y}{x} \rightarrow y = ax + b$ و $\frac{y}{-x} \rightarrow -y = ax + b \rightarrow \frac{-y}{-x} = ax + b \rightarrow a = -1$ و $b = 11 \rightarrow y = -x + 11$ (۵) ب) $7y + 4x = -1 \rightarrow \frac{y}{x} = -\frac{4}{7} = -\frac{3}{4} \rightarrow \frac{y}{x} = -\frac{3}{4} \rightarrow y = -\frac{3}{4}x$ $\frac{y}{x} = -\frac{3}{4} \rightarrow y = -\frac{3}{4}x + b$ $b = 11 \rightarrow y = -\frac{3}{4}x + 11$ (۱) ج) $\frac{y}{x} = \tan \theta \rightarrow \frac{y}{x} = -\frac{1}{2} \rightarrow \frac{y}{x} = 3 \rightarrow \frac{y}{x} = 3 \rightarrow y = 3x + b$ $b = -10 \rightarrow y = 3x - 10$ (۲) د) $\frac{y}{x} = \tan \theta = \tan 45^\circ = \sqrt{3} \rightarrow \frac{y}{x} = \sqrt{3} \rightarrow y = \sqrt{3}x + b$ $b = 2 - 4\sqrt{3} \rightarrow y = \sqrt{3}x + 2 - 4\sqrt{3}$ (۳)	
۲ الف) $\text{فاصله} = \sqrt{(\Delta x)^2 + (\Delta y)^2} = \sqrt{\left(\frac{\sqrt{4}-3}{4}\right)^2 + \left(\frac{-1-2}{-2}\right)^2} = \sqrt{4+9} = 5$ (۵) ب) $\text{فاصله} = \frac{ 9+12-3 }{\sqrt{9+14}} = \frac{18}{5} = 3.6$ (۱)	
۳ الف) $\frac{y}{x} + \frac{y}{y} = 1 \Rightarrow \frac{y}{x} + 1 = 1 \Rightarrow \frac{y}{x} = 0 \Rightarrow y = 0$ $\Rightarrow ax + by = \frac{c+c'}{2} \Rightarrow 7x + 4y = 10 \rightarrow 7x + 4y = 10$ (۵) ب) $\text{فاصله} = \frac{ c-c' }{\sqrt{a^2+b^2}} = \frac{ 10-11 }{\sqrt{49+16}} = \frac{1}{5} = \frac{1}{5}$ $= \frac{1}{5}$ $= \frac{1}{5}$ $= \frac{1}{5}$ $= \frac{1}{5}$ $= \frac{1}{5}$ (۱)	
۴ الف) $\frac{ x_2 + y_2 - 3 }{\sqrt{1+1}} = \frac{ x_2 - y_2 - 1 }{\sqrt{1+1}} \Rightarrow x_2 + y_2 - 3 = x_2 - y_2 - 1$ (۵) ب) $x_2 + y_2 - 3 = x_2 - y_2 - 1 \rightarrow x - 2y + 2 = 0$ ج) $x_2 + y_2 - 3 = -x_2 - y_2 + 1 \rightarrow 2x + 2y - 4 = 0 \rightarrow x + y - 2 = 0$	
۵ الف) $\frac{ m - m' }{ 1 + mm' } = \tan \alpha \Rightarrow \left \frac{1+3}{1-9} \right$ ب) $m = \frac{2}{1} \Rightarrow y - 2x = 0$ $m' = -3 \Rightarrow y + 3x = 3$ ج) $\frac{ 1+3 }{ 1-9 } = 1 \Rightarrow \alpha = \frac{\pi}{4}$ (۵)	

$$\text{فاصله} = \sqrt{(dx)^2 + (dy)^2} = \sqrt{(4)^2 + (-1)^2} = \sqrt{16+1} = 1.$$

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$$\begin{aligned} m/x &= \frac{-5+3}{2} = -1 \\ y &= \frac{3-2}{2} = 1 \end{aligned} \Rightarrow m \text{ نقطه} / -1$$

(ب) ۶

$$\begin{aligned} G/x &= \frac{3-2-1}{3} = -3 \\ y &= \frac{3+1-1 \cdot 3}{3} = -3 \end{aligned}$$

الف) مرکز ثقل را G در نظر گرفته:

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$$\frac{1}{3} x \begin{vmatrix} 3 & 1 & 1 \\ -2 & 3 & 1 \\ -1 & -3 & 1 \end{vmatrix} = \frac{1}{3} \left(\begin{vmatrix} 3 & 1 \\ 3 & 1 \end{vmatrix} + \begin{vmatrix} -1 & 1 \\ 1 & -1 \end{vmatrix} + \begin{vmatrix} -2 & 1 \\ -1 & -3 \end{vmatrix} - \begin{vmatrix} -2 & 3 \\ -1 & -3 \end{vmatrix} - \begin{vmatrix} 3 & 1 \\ -1 & -3 \end{vmatrix} - \begin{vmatrix} 3 & 1 \\ -2 & 1 \end{vmatrix} \right) = \frac{1}{3} (0 + 0 + 5 - 0 - 8 - 1) = \frac{1}{3} (-4)$$

(ب)

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$$+y = \frac{-2x+1}{-5x-3}$$

(ب) x متغیر مستقل:

$$-y = \frac{2x+1}{5x-3}$$

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

(۲) جای x و y عوض شود:

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$$\begin{aligned} -x &= \frac{-2y+1}{-5y-3} \rightarrow 5xy + 3x = -2y+1 \rightarrow y(5x+2) = 1-3x \\ \rightarrow y &= \frac{1-3x}{5x+2} \end{aligned}$$

(۳) جای x و y عوض و قیاس شود:

$$\begin{aligned} x' &= x - 2 \rightarrow x = x' + 2 \\ y' &= y + 3 \rightarrow y = y' - 3 \Rightarrow y' - 3 = \frac{x' + 2}{x' - 3} = \frac{2(x' + 2) + 1}{x' + 2 - 3} = \frac{x' + 5}{x' - 1} \Rightarrow y' = \frac{x' + 5}{x' - 1} + 3 \\ \rightarrow y' &= \frac{x' + 5 + 3x' - 3}{x' - 1} = \frac{4x' + 2}{x' - 1} \Rightarrow y' = \frac{4x' + 2}{x' - 1} \end{aligned}$$

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$$\begin{aligned} x' &= x - 3 \rightarrow x = x' + 3 \\ y' &= y - 2 \rightarrow y = y' + 2 \Rightarrow y' + 2 = \frac{x' + 3}{x' + 3 - 2} = \frac{x' + 3}{x' + 1} - 2 = y' \Rightarrow y' = \frac{x' + 3 - 2x' - 2}{x' + 1} = \frac{1 - x'}{x' + 1} \\ \Rightarrow y' &= \frac{1 - x'}{x' + 1} \end{aligned}$$

$$2x + 5y = 2 \rightarrow 2x + 5y = 2$$

$$\begin{aligned} 2-5y &= 1 \xrightarrow{\times (-1)} -2+5y = -1 \rightarrow 19y = -1 \Rightarrow y = -\frac{1}{19} \text{ و } x = \frac{14}{19} \end{aligned}$$

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$$\begin{aligned} x &= -\frac{\begin{vmatrix} 14 & 2 \\ -5 & 1 \end{vmatrix}}{\begin{vmatrix} 2 & 5 \\ 1 & -5 \end{vmatrix}} = -\frac{14 - (-10)}{-10 - 5} = \frac{14}{19} \\ y &= \frac{\begin{vmatrix} 2 & 2 \\ 1 & 1 \end{vmatrix}}{\begin{vmatrix} 2 & 5 \\ 1 & -5 \end{vmatrix}} = \frac{2 - 2}{-10 - 5} = -\frac{1}{19} \end{aligned}$$

(ب)

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