

الف) $m \leq \frac{\Delta y}{\Delta x} \leq \frac{y_2 - y_1}{x_2 - x_1} \leq \frac{-2 - 2}{0 - 4} \leq -1$ $y \leq -x + b \mid \begin{matrix} 1 \\ 4 \end{matrix} \Rightarrow 2 \leq -1 + b \Rightarrow b \leq 1$

$y \leq -x + 1$
ب) $2y + 3x \leq -1 \Rightarrow m \leq m' \leq \frac{-y}{x} \leq -3$ $y \leq -3x + b \mid \begin{matrix} 1 \\ 4 \end{matrix} \Rightarrow 2 \leq -12 + b \Rightarrow b \leq 14$

ج) $\tan \alpha \leq m \leq \tan \frac{\pi}{4} \leq \sqrt{3} \leq m$ $y \leq \sqrt{3}x + 1$
 $\sqrt{3}x + b \leq y \mid \begin{matrix} 1 \\ 4 \end{matrix} \Rightarrow 4\sqrt{3} + b \leq 2 \Rightarrow b \leq 2 - 4\sqrt{3}$
 $x + 2y \leq 1 \Rightarrow m \leq \frac{-1}{2} \leq \frac{-1}{2} = x(m' \leq 2)$
 $y \leq -\frac{1}{2}x + b \mid \begin{matrix} 1 \\ 4 \end{matrix} \Rightarrow 2 \leq -\frac{1}{2} + b \Rightarrow b \leq \frac{5}{2}$

الف) $\Rightarrow \sqrt{(y_2 - y_1)^2 + (x_2 - x_1)^2} = \sqrt{(2 - 2)^2 + (0 - 4)^2} = \sqrt{16} = 4$

ب) $3x + 4y - 12 \leq 0$
فاصله نقطه از خط $\frac{|ax + by + c|}{\sqrt{a^2 + b^2}} \Rightarrow \frac{|3(2) + 4(2) - 12|}{\sqrt{9 + 16}} = \frac{10}{5} = 2$

الف) $\begin{cases} 2x + 3y = 4 \\ 2x + 3y = 6 \end{cases} \Rightarrow$ معادله خط موازی
 $ax + by = \frac{c + c'}{2}$
 $2x + 3y = 5$

فاصله دو خط موازی $\Rightarrow \frac{|c' - c|}{\sqrt{a^2 + b^2}} = \frac{|6 - 4|}{\sqrt{4 + 9}} = \frac{2}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$

فاصله خطوط موازی $\Rightarrow \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{|a'x + b'y + c'|}{\sqrt{(a')^2 + (b')^2}} \Rightarrow$
 $\frac{|2x - 3y - 1|}{\sqrt{4 + 9}} = \frac{|2x + 3y - 1|}{\sqrt{4 + 9}}$
 $\Rightarrow |2x - 3y - 1| = |2x + 3y - 1|$
 $\begin{cases} 2x - 3y - 1 = 2x + 3y - 1 \Rightarrow -6y = 0 \Rightarrow y = 0 \\ 2x - 3y - 1 = -(2x + 3y - 1) \Rightarrow 4x = 0 \Rightarrow x = 0 \end{cases}$

زاویه بین دو خط $\Rightarrow \tan \alpha = \left| \frac{m - m'}{1 + mm'} \right| = \left| \frac{-3 - 2}{1 + (-6)} \right| = \left| \frac{-5}{-5} \right| = 1 \Rightarrow \tan \alpha = 1 \Rightarrow \alpha = 45^\circ = \frac{\pi}{4}$

$y + 3x \leq 3$ و $y - 2x \leq 0$
 $m \leq -3$ و $m' \leq 2$

الف) دو نقطه را بدین صورت

$$\sqrt{(2-1)^2 + (2-1)^2} = \sqrt{(1-1)^2 + (-1-1)^2} \quad (10)$$

الف)

ب)

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نقطه

$$y = \frac{y_1 + y_2}{2} \Rightarrow \left(\frac{1-1}{2}, \frac{1-1}{2} \right) \Rightarrow \begin{pmatrix} 0 \\ 0 \end{pmatrix}$$

میانگین شیب

$$y' = \frac{y_1 + y_2 + y_3}{3} \Rightarrow \left(\frac{-2+1+1}{3}, \frac{-1+1+1}{3} \right) \Rightarrow \begin{pmatrix} 0 \\ 1 \end{pmatrix}$$

الف)

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$$\frac{1}{r} \begin{vmatrix} -10 & -2 & 1 \\ -12 & 1 & 1 \\ 1 & 1 & 1 \end{vmatrix} = \frac{1}{r} \left[-10 + (-12) + (-2) - (1 + (-12) + 12) \right] = \frac{1}{r} \times 9 \quad (18)$$

$$y' = -y \Rightarrow -y = \frac{2x+1}{5n-2}$$

الف)

$$n' = -n \Rightarrow y = \frac{-2n+1}{-5n-2} = \frac{2n-1}{5n+2} \Rightarrow y = \frac{2n-1}{5n+2}$$

ب)

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$$n' = y \Rightarrow n = \frac{2y+1}{5y-2} \Rightarrow y = \frac{2n+1}{5n-2}$$

الف)

$$n' = -y \Rightarrow -n = \frac{-2y+1}{-5y-2} \Rightarrow y = \frac{-2n+1}{-5n-2}$$

الف)

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$$\begin{cases} n' + 2 = n \\ y' - 2 = y \end{cases} \Rightarrow y = \frac{2n+1}{n-2} \Rightarrow y' - 2 = \frac{2(n'+2)+1}{n'+2-2} \Rightarrow y' = \frac{2n'+5}{n'-1}$$

$$\begin{cases} n' + 2 = n \\ y' + 2 = y \end{cases} \Rightarrow y' + 2 = \frac{2(n'+2)+1}{n'+2-2} \Rightarrow y' = \frac{2n'+5}{n'-1}$$

الف)

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$$\begin{cases} 2x + 4y = 2 \\ x - 4y = 1 \end{cases} \xrightarrow{\times 4} \begin{cases} 2x + 4y = 2 \\ -4x + 16y = -4 \end{cases} \Rightarrow \begin{cases} y = \frac{1}{19} \\ x = \frac{1}{19} \end{cases}$$

$$\begin{cases} 2x + 4y = 2 \\ x - 4y = 1 \end{cases} \Rightarrow x = -\frac{\begin{vmatrix} 2 & 4 \\ 1 & -4 \end{vmatrix}}{\begin{vmatrix} 2 & 4 \\ 1 & -4 \end{vmatrix}} = -\frac{16-4}{-10-4} = \frac{12}{19} \Rightarrow y = \frac{\begin{vmatrix} 2 & 2 \\ 1 & -1 \end{vmatrix}}{\begin{vmatrix} 2 & 4 \\ 1 & -4 \end{vmatrix}} = \frac{2-2}{-10-4} = \frac{0}{19}$$