

الف) $a = \frac{-2-2}{5-2} = -4 \rightarrow y = -4x + b \rightarrow -2 = -4(5) + b, b = 18 \rightarrow y = -4x + 18$

ب) $a = \frac{-4}{-1} = 4, y = -\frac{4}{-1}x + b \rightarrow 2 = -\frac{4}{-1}(4) + b, b = 14 \rightarrow y = 4x + 14$

ج) $a = \frac{3}{1} = 3, y = 3x + b \rightarrow 2 = 3(1) + b, b = -1 \rightarrow y = 3x - 1$
 $\text{پس } a = \frac{1}{3}$

د) $a = \tan \frac{\pi}{4} = 1, y = x + b \rightarrow 2 = 1(1) + b, b = 1 \rightarrow y = x + 1$

الف) $d = \sqrt{(5x)^2 + (5y)^2} = \sqrt{13^2 + 4^2} = \sqrt{165} = 5$

ب) $d = \frac{|ax + by + c|}{\sqrt{a^2 + b^2}} = \frac{4 + 12 - 3}{\sqrt{9 + 14}} = \frac{13}{5} = 2.6$

الف) $ax + by = \frac{c+c'}{2}$ و ضرب مساویان باشند $\rightarrow 4x + 4y = 8, 4x + 4y = 12 \rightarrow \frac{8-12}{4} = -1, 4x + 4y = 10$

$4y = 10 - 4x \rightarrow y = -\frac{1}{2}x + \frac{5}{2}$

ب) $d = \frac{|c-c'|}{\sqrt{a^2 + b^2}}$ و ضرب مساویان باشند $\rightarrow 4x + 4y = 8, 4x + 4y = 12 \rightarrow \frac{|8-12|}{\sqrt{14+14}} = \frac{4}{\sqrt{28}} = \frac{2}{\sqrt{7}}$

$\frac{|ax + by - c|}{\sqrt{a^2 + b^2}} = \frac{|a'x + b'y - c'|}{\sqrt{(a')^2 + (b')^2}} \rightarrow \frac{|3x - 2y - 1|}{\sqrt{9+4}} = \frac{|12x + 3y - 3|}{\sqrt{14+9}}$

$3x - 2y - 1 = 12x + 3y - 3 \rightarrow x - 5y + 2 = 0, 5y = 2 + x, y = \frac{x}{5} + \frac{2}{5}$

$3x - 2y - 1 = -12x - 3y + 3 \rightarrow 15x + y - 4 = 0, y = -15x + 4$

$y + 3x = 3 \rightarrow a = -3, y - 2x = 5 \rightarrow a = 2$

$\tan \alpha = \left| \frac{a - a'}{1 + aa'} \right| \rightarrow \left| \frac{-2}{1-6} \right| = 1 \Rightarrow \alpha = 45^\circ = \frac{\pi}{4} + k\pi$

الف) $|AB| = \sqrt{(1)^2 + (4)^2} = \sqrt{17} = 10$

ب) $x = \frac{x_1 + x_2}{2} = \frac{-2}{2} = -1$, $y = \frac{y_1 + y_2}{2} = \frac{2}{2} = 1 \rightarrow M(-1, 1)$

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الف) $x_G = \frac{x_1 + x_2 + x_3}{3} = \frac{-9}{3} = -3$, $y_G = \frac{y_1 + y_2 + y_3}{3} = \frac{-9}{3} = -3 \rightarrow (-3, -3)$

ب) $S = \frac{1}{6} \begin{vmatrix} 3 & 1 & 1 \\ -2 & 10 & 1 \\ -10 & -13 & 1 \end{vmatrix} = \frac{1}{6} (3 \times 10 \times 1) + (1 \times 1 \times -10) + (-2 \times -13 \times 1) - (3 \times -10 \times 1) - (1 \times -2 \times 1) - (-1 \times 3 \times 10)$
 $= 9 - 10 + 26 + 30 + 2 + 30 = 94 \xrightarrow{\div 6} 15 \frac{4}{3}$

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

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

ج) $x = \frac{2y+1}{y-3} \Rightarrow 4y-3x = 2y+1$, $4y-2y = 1+3x$, $y(2-2) = 1+3x \Rightarrow y = \frac{2x+1}{x-2}$

د) $-x = \frac{-2y+1}{-y-3} \Rightarrow 4y+3x = -2y+1$, $y(4+2) = 1-3x \Rightarrow y = \frac{1-3x}{2}$

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الف) $x' = x-2$, $y' = y+3 \Rightarrow x = x'+2$, $y = y'-3$

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

ب) $x' = x-3$, $y' = y-2 \Rightarrow x = x'+3$, $y = y'+2$

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

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الف) $\begin{cases} 3x+4y=2 \\ x-2y=1 \end{cases} \xrightarrow{x-3} -3x+4y=1 \Rightarrow 19y=1, y=\frac{1}{19} \Rightarrow x+\frac{2}{19}=1, x=\frac{17}{19}$

ب) $x = -\frac{\begin{vmatrix} 4 & 2 \\ 1 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 1 & -2 \end{vmatrix}} = -\frac{4-2}{-6-4} = -\frac{2}{-10} = \frac{1}{5}$, $y = \frac{\begin{vmatrix} 3 & 1 \\ 1 & -2 \end{vmatrix}}{\begin{vmatrix} 3 & 4 \\ 1 & -2 \end{vmatrix}} = \frac{3-1}{-10-4} = -\frac{2}{14} = -\frac{1}{7}$

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