

الف) $\begin{vmatrix} 4 & 5 \\ 2 & -2 \end{vmatrix} \quad y = ax + b \quad a = \frac{\Delta y}{\Delta x} = -4 \Rightarrow y = -4x + b \quad \begin{matrix} x=4: y=2 \\ x=4: y=2 \end{matrix} \Rightarrow b = 18$
 $\Rightarrow$ معادله: $y = -4x + 18$ ✓

ب) $C \neq C' \quad y = y' \quad x = x' \Rightarrow 2y + 4x = b \quad \begin{matrix} x=4: y=2 \\ x=4: y=2 \end{matrix} \Rightarrow b = 18$ / معادله: $y = -2x + 14$ ✓

ج) $\frac{y}{x} = -\frac{1}{3} \Rightarrow a' = 3 \Rightarrow y = 3x + b \quad \begin{matrix} x=4: y=2 \\ x=4: y=2 \end{matrix} \Rightarrow b = -10$ / معادله: $y = 3x - 10$ ✓

د) $\frac{R}{r} = 90^\circ / \tan 90^\circ = \frac{|m' - m|}{1 + mm'} = \frac{m'}{1} = \sqrt{3} \Rightarrow y = \sqrt{3}x + b \quad \begin{matrix} x=4: y=2 \\ x=4: y=2 \end{matrix} \Rightarrow b = 2 - 4\sqrt{3}$ / معادله: $y = \sqrt{3}x - 4\sqrt{3} + 2$ ✓

الف) $\sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(-3)^2 + (4)^2} = \sqrt{25} = 5$ ✓

ب) $\frac{|ax_0 + by_0 + c|}{\sqrt{a^2 + b^2}} = \frac{9 + 12 - 3}{\sqrt{25}} = 3$ ✓

الف) $ax + by + c \quad 4x + 4y = 8 \rightarrow 2x + 2y = 4$
 $\frac{ax + by + c}{r} \Rightarrow$ معادله: $2x + 2y + \frac{c+c'}{r} = 2x + 2y - 5 = 0$ ✓

ب) $\frac{|c' - c|}{\sqrt{a'^2 + b'^2}} = \frac{-4 + 4}{\sqrt{4 + 4}} = \frac{r}{\sqrt{13}} = \frac{r\sqrt{13}}{13}$ ✓

$\frac{|ax + by - c|}{\sqrt{a^2 + b^2}} = \frac{|a'x + b'y + c|}{\sqrt{a'^2 + b'^2}} \quad \frac{|2x - 2y - 1|}{\sqrt{4 + 4}} = \frac{|2x + 2y - 3|}{\sqrt{4 + 4}}$

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

② $-2x + 2y + 1 = 2x + 2y - 3 \Rightarrow 4x - 2y - 4 = 0 \Rightarrow 2x - y - 2 = 0$ ✓

$\tan \alpha = \frac{|m' - m|}{1 + mm'} \Rightarrow \tan \alpha = \frac{2 - (-2)}{1 - 4} = \frac{4}{-3} = -\frac{4}{3}$

$\Rightarrow \alpha = 135^\circ$ زاویه باز

د) $\alpha = 45^\circ$ ✓ زاویه تند

الف) $\sqrt{(1)^2 + (-4)^2} = \sqrt{100} = 10$ ✓
 $(x_2 - x_1)^2$ $(y_2 - y_1)^2$

ب) $\begin{vmatrix} a & \frac{q+c}{r} \\ b & \frac{b+d}{r} \end{vmatrix} \begin{vmatrix} c \\ d \end{vmatrix} \Rightarrow x_s = \frac{-a+d}{r} = -1$
 $y_s = \frac{-r+c}{r} = 1 \Rightarrow \begin{vmatrix} -1 \\ 1 \end{vmatrix}$ ✓

الف) $x_G = \frac{x_1 + x_2 + x_3}{3}$ $y_G = \frac{y_1 + y_2 + y_3}{3}$ $x_G = \frac{-9}{3} = -3$
 $G: \begin{vmatrix} -3 \\ -3 \end{vmatrix}$ ✓ $y_G = \frac{-9}{3} = -3$

AB معادله: $3x + 4y = 11$
 ب) $A: \begin{vmatrix} 3 \\ 1 \end{vmatrix}$ $B: \begin{vmatrix} -2 \\ 3 \end{vmatrix}$ $C: \begin{vmatrix} -10 \\ -13 \end{vmatrix}$ $AB = \sqrt{(0)^2 + (2)^2} = \sqrt{4}$ $\frac{C}{AB} = \frac{|-10 - 4 + 11|}{\sqrt{4}} = \frac{9}{2}$
 مساحت: $\frac{1}{2} \times \sqrt{4} \times \frac{9}{2} = 9$ ✓

الف) y فرض می شود: $-y = \frac{3x+1}{4x-3}$ $\Rightarrow 4xy + 2y = -3x+1$
 $\Rightarrow y(4x+2) = -3x+1$
 ب) x فرض می شود: $y = \frac{-3x+1}{-4x-3}$ $\Rightarrow y = \frac{-3x+1}{4x+3}$ ✓

$y = \frac{3x+1}{4x-3}$ ✓

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

الف) $\begin{cases} x' = x-2 \\ y' = y+3 \end{cases} \Rightarrow \begin{cases} x = x'+2 \\ y = y'-3 \end{cases} \Rightarrow y'-3 = \frac{2(x'+2)+1}{(x'+2)-3} : y' = \frac{2x'+5}{x'-1} + 3$
 $\Rightarrow y' = \frac{2x'+11}{x'-1}$ ✓

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

الف) $\begin{cases} 3x+4y=2 \\ 3x-10y=3 \end{cases} \Rightarrow x = \frac{14}{19}, y = -\frac{1}{19}$ ✓

ب) $\begin{cases} ax+by=c \\ a'x+b'y=c' \end{cases} x = -\frac{bc'-cb'}{ab'-ba'} \Rightarrow x = -\frac{12+30}{-20} = \frac{14}{5}$
 $y = \frac{ac'-ca'}{ab'-ba'} \Rightarrow y = \frac{9-9}{-20} = 0$ ✓