

سوال ۱

الف) $|f, \omega| \rightarrow m = \frac{\Delta y}{\Delta x} = \frac{4+4}{4-4} = -4, y = ax + b \xrightarrow{a=-4} y = -4x + b$
 $(4, 4) \rightarrow 4 = -4(4) + b \rightarrow b = 18$
 $y = -4x + 18$

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ب) $|f, 2y+4x=-1| \rightarrow$ وقتی ۲ خط موازی اند $\rightarrow m = \frac{-4}{2} = -2, y = ax + b \xrightarrow{a=-2} y = -2x + b$
 $(4, 2) \rightarrow 2 = -2(4) + b \rightarrow b = 14$
 $y = -2x + 14$

ج) $|f, x+3y=1| \rightarrow$ وقتی ۲ خط موازی اند که موازی نیستند $\rightarrow m \times \frac{-1}{3} = -1 \rightarrow m = 3, y = ax + b \xrightarrow{a=3} y = 3x + b$
 $(4, 2) \rightarrow 2 = 3(4) + b \rightarrow b = -10$
 $y = 3x - 10$

د) $|f, \tan \frac{\pi}{4}| \rightarrow$ وقتی با جهت مثبت محور ها زاویه سبب زاویه است $\rightarrow m = \tan \frac{\pi}{4} = \tan 45^\circ = \sqrt{3}, y = ax + b \xrightarrow{a=\sqrt{3}} y = \sqrt{3}x + b$
 $(4, 2) \rightarrow 2 = 4\sqrt{3} + b \rightarrow b = 2 - 4\sqrt{3}$
 $y = \sqrt{3}x + 2 - 4\sqrt{3}$

سوال ۲

الف) $A|f, B|f \rightarrow AB = \sqrt{\Delta x^2 + \Delta y^2} \rightarrow \sqrt{(2+1)^2 + (3-4)^2} = \sqrt{5} = \omega$

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ب) $A|f, 3x+4y=3 \rightarrow d = \frac{|ax+by+c|}{\sqrt{a^2+b^2}} = \frac{|3(2)+4(3)-3|}{\sqrt{3^2+4^2}} = \frac{15}{5} = 3$

سوال ۳

الف) $2x+3y=4, 4x+9y=11 \rightarrow$ برای این معادلات خطی موازی بودن $\rightarrow ax+by+c = a'x+b'y+c' = 0$
 $2x+3y=4 \xrightarrow{\times 2} 4x+6y=8$
 $4x+9y=11$
 $\xrightarrow{-}$ $4x+9y=11$
 $4x+6y=8$
 $3y=3 \rightarrow y=1$
 $4x+9(1)=11 \rightarrow 4x=2 \rightarrow x=\frac{1}{2}$
 $d = \frac{|c-c'|}{\sqrt{a^2+b^2}} = \frac{|11-8|}{\sqrt{4^2+9^2}} = \frac{3}{5} = \frac{3}{5}$

سوال ۴

$3x-2y=1, 2x+3y=3$
 $\frac{|ax+by-c|}{\sqrt{a^2+b^2}} = \frac{|a'x+b'y-c'|}{\sqrt{a'^2+b'^2}}$
 $\frac{|3x-2y-1|}{\sqrt{3^2+(-2)^2}} = \frac{|2x+3y-3|}{\sqrt{2^2+3^2}} \rightarrow |3x-2y-1| = |2x+3y-3|$
 $\rightarrow \begin{cases} 3x-2y-1 = 2x+3y-3 \rightarrow x-5y=-2 \\ 3x-2y-1 = -(2x+3y-3) \rightarrow 5x+y=4 \end{cases}$

سوال ۵

$g+3x=3, g-2x=4$

$\rightarrow m = -3, m = 2$

$\tan \alpha = \left| \frac{m-m'}{1+mm'} \right| = \left| \frac{-3-2}{1+6} \right| = \left| \frac{-5}{7} \right| = \frac{5}{7}$

$\tan \alpha = 1$
 $\alpha = \frac{\pi}{4} = 45^\circ$

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الف) $A \begin{vmatrix} 3 & -5 \\ -2 & 4 \end{vmatrix}$ $AB = \sqrt{(3+0)^2 + (-2-4)^2} = \sqrt{49+36} = 10$

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ب) $m \left(\frac{x_1+x_2}{2}, \frac{y_1+y_2}{2} \right) = \left(\frac{3-5}{2}, \frac{-2+4}{2} \right) = (-1, 1)$

الف) $\begin{vmatrix} 1 & 2 & -3 \\ 2 & 1 & -1 \\ 3 & -1 & 1 \end{vmatrix}$ $x_0 = \frac{x_1+x_2+x_3}{3} \rightarrow \frac{3-2-1}{3} = -\frac{2}{3}$
 $y_0 = \frac{y_1+y_2+y_3}{3} \rightarrow \frac{1+2-1}{3} = \frac{2}{3} \Rightarrow (-\frac{2}{3}, \frac{2}{3})$

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ب) $S = \frac{1}{4} \begin{vmatrix} x_1 & y_1 & 1 \\ x_2 & y_2 & 1 \\ x_3 & y_3 & 1 \end{vmatrix} = \frac{1}{4} \begin{vmatrix} 3 & 1 & 1 \\ -2 & 2 & 1 \\ -1 & -1 & 1 \end{vmatrix} = \frac{1}{4} (9+2-10+3+1-1) = \frac{1}{4} (1) = \frac{1}{4}$

$y = \frac{2x+1}{x-2}$
 الف) $\pm$ فرق $\rightarrow -y = \frac{2x+1}{x-2} \Rightarrow y = \frac{2x+1}{2-x}$ $\rightarrow y = \frac{-2x-1}{-2+x} \xrightarrow{\frac{y}{y}} y = \frac{-2x-1}{-2+x}$
 ب) $\pm$ فرق $\rightarrow x = \frac{2y+1}{y-2} \rightarrow y = \frac{-2x-1}{2-x} \xrightarrow{\frac{y}{y}} y = \frac{-2x-1}{2-x}$ $\rightarrow -x = \frac{-2y+1}{-2y-2} \rightarrow y = \frac{2x-1}{-2x-2} \xrightarrow{\frac{y}{y}} y = \frac{-2x+1}{2x+2}$

$y = \frac{2x+1}{x-2}$
 الف) $\begin{cases} x' = x - 2 \\ y' = y + 2 \end{cases} \rightarrow \begin{cases} x = x' + 2 \\ y = y' - 2 \end{cases} \rightarrow y = \frac{2x+1}{x-2}$
 $y' - 2 = \frac{2x'+4}{x'-1} \rightarrow y' = \frac{2x'+4}{x'-1} + 2 = \frac{2x'+4+2x'-2}{x'-1} = \frac{4x'+2}{x'-1}$
 ب) $\begin{cases} x' = x - 2 \\ y' = y - 2 \end{cases} \rightarrow \begin{cases} x = x' + 2 \\ y = y' + 2 \end{cases} \rightarrow y = \frac{2x+1}{x-2}$
 $y' + 2 = \frac{2x'+4}{x'-1} \rightarrow y' = \frac{2x'+4}{x'-1} - 2 = \frac{2x'+4-2x'-2}{x'-1} = \frac{2}{x'-1}$
 $y' = \frac{2}{x'}$

$\begin{cases} 3x+4y=2 \\ x-2y=1 \end{cases}$
 الف) $\rightarrow \begin{cases} 3x+4y=2 \\ x-2y=1 \end{cases} \xrightarrow{\times 2} \begin{cases} 3x+4y=2 \\ 2x-4y=2 \end{cases}$
 $\underline{19y = -1}$
 $y = -\frac{1}{19}, x = \frac{14}{19}$

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ب) $\rightarrow x = -\frac{(4)(1) - (3)(-2)}{(3)(-2) - (4)(1)} = \frac{-4+6}{-6-4} = \frac{2}{-10} = -\frac{1}{5}$
 $y = \frac{(3)(1) - (1)(2)}{(3)(-2) - (4)(1)} = \frac{3-2}{-6-4} = \frac{1}{-10} = -\frac{1}{10}$