

از هم

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۱۹،۵

پایه دوازدهم

سوال ۱) الف)
$$\begin{cases} 4a + b = 1 \\ 5a + b = -2 \end{cases} \Rightarrow \begin{cases} -4a - b = -1 \\ 5a + b = -2 \end{cases} \Rightarrow \begin{cases} a = 0.1 \\ b = 1 \end{cases} \Rightarrow y = 1$$

ب)
$$y + 4x + 1 = 0 \Rightarrow m = \frac{-4}{1} = -4 \Rightarrow 4(-3) + b = 1 \Rightarrow b = 13 \Rightarrow y = -4x + 13$$

ج)
$$x + 3y - 1 = 0 \Rightarrow m = \frac{-1}{3} \Rightarrow 4(3) + b = 1 \Rightarrow b = -11 \Rightarrow y = -\frac{1}{3}x + \frac{11}{3}$$

د)
$$\theta = 45^\circ \Rightarrow \tan 45^\circ = 1 = m \Rightarrow 4(1) + b = 1 \Rightarrow b = -3 \Rightarrow y = x - 3$$

سوال ۲) الف)
$$d = \sqrt{(1)^2 + (-3)^2} = \sqrt{10}$$

ب)
$$4x + 3y - 1 = 0 \Rightarrow d = \frac{|4(1) + 3(-3) - 1|}{\sqrt{16 + 9}} = \frac{|-5|}{5} = 1$$

سوال ۳) معادله خط را به فرم $ax + by + c = 0$ درآوریم: $4x + 3y = 5$

معادله خط دیگر: $4x + 3y = 1$

فاصله بین خطوط:
$$d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|-5 - (-1)|}{\sqrt{16 + 9}} = \frac{4}{5}$$

سوال ۴)
$$4x + 3y - 1 = 0$$

$$4x - 3y - 1 = 0$$

فاصله بین خطوط:
$$d = \frac{|c - c'|}{\sqrt{a^2 + b^2}} = \frac{|-1 - (-1)|}{\sqrt{16 + 9}} = 0$$

خطوط موازی نیستند.

سؤال (5)

$$y + 12 - 1 = 0 \quad m_1 = -12$$

$$y - 12 - 5 = 0 \quad m_2 = 12$$

$$\tan \theta = \frac{|m_1 - m_2|}{|1 + m_1 m_2|} \Rightarrow \tan \theta = \left| \frac{-12 - 12}{1 - 144} \right|$$

$$\Rightarrow \left| \frac{-24}{-143} \right| = 1 \quad \tan \theta = 1 \Rightarrow \theta = 45^\circ$$

سؤال (6)

الف) $A \begin{vmatrix} 12 \\ -1 \end{vmatrix} \quad B \begin{vmatrix} -5 \\ 1 \end{vmatrix} \quad AB = \sqrt{(12)^2 + (-1)^2} = 13$

ب) $M: \frac{x_A + 2x_B}{1} = -1, \frac{y_A + y_B}{1} = 1 \Rightarrow M: (-1, 1)$

سؤال (7)

الف) مركز ثقل: $M \Rightarrow x_M = \frac{12 + (-10) + (-2)}{3} = -\frac{10}{3}$

$y_M = \frac{1 + (-12) + 12}{3} = \frac{1}{3} \quad M: (-\frac{10}{3}, \frac{1}{3})$

ب) $S = \frac{1}{12} \left[\frac{1}{2} (y_B - y_C) + \frac{1}{2} (y_C - y_A) + \frac{1}{2} (y_A - y_B) \right]$

$\Rightarrow S = \frac{1}{12} \left[\frac{1}{2} (-12 - 12) + \frac{1}{2} (12 - 12) + \frac{1}{2} (12 - 12) \right] = 0$

سؤال (8)

الف) $y = \frac{12 + 1}{12 - 12}$

ب) $y = -\frac{12 + 1}{12 - 12} \Rightarrow y = \frac{-12 - 1}{12 - 12}$

ج) $y = \frac{-12 + 1}{-12 - 12}$

سؤال (9)

ج) $x = \frac{12y + 1}{12y - 12} \Rightarrow x(12y - 12) = 12y + 1$

$\Rightarrow 12xy - 12y = 12y + 1 \Rightarrow 12y(12x - 1) = 12y + 1 \Rightarrow 12y = \frac{12y + 1}{12x - 1} \Rightarrow y = \frac{12x + 1}{12x - 1}$

د) $-x = \frac{-12y + 1}{-12y - 12} \Rightarrow -x(-12y - 12) = -12y + 1$

$\Rightarrow 12xy + 12x = -12y + 1 \Rightarrow 12y(12x + 1) = -12x + 1$

$\Rightarrow 12y = \frac{-12x + 1}{12x + 1} \Rightarrow y = \frac{-12x + 1}{12x + 1}$

سؤال ٩

$$y = \frac{x+1}{x-1} \quad \text{الف) } \begin{cases} x' = x-1 \\ y' = y+1 \end{cases} \Rightarrow \begin{cases} x = x'+1 \\ y = y'-1 \end{cases}$$

$$y'-1 = \frac{x'+1+1}{x'+1-1} \Rightarrow y = \frac{x'+2+1}{x'-1} + 1 \Rightarrow \frac{x'+3}{x'-1} + \frac{1(x'-1)}{x'-1} \quad \text{٥}$$

$$\Rightarrow y' = \frac{2x'+2}{x'-1} \quad \text{ب) } \begin{cases} x' = x-1 \\ y' = y-1 \end{cases} \Rightarrow \begin{cases} x = x'+1 \\ y = y'+1 \end{cases}$$

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

$$\text{الف) } \begin{cases} 12 + 14y = 1 \\ x - 12y = 1 \end{cases} \Rightarrow \begin{cases} 12x + 14y = 1 \\ -12x + 12y = -1 \end{cases} \Rightarrow \begin{cases} 19y = -1 & y = \frac{-1}{19} \\ x = \frac{14}{19} \end{cases}$$

سؤال ١٠
٥

ب) $\begin{cases} Kx + Ky = r \\ x - dy = 1 \end{cases}$ (1. سوال)

$$x = - \frac{\begin{vmatrix} K & r \\ -d & 1 \end{vmatrix}}{\begin{vmatrix} K & K \\ 1 & -d \end{vmatrix}} = - \frac{K - (-1.0)}{-1d - (K)} = \boxed{\frac{1K}{19}}$$

$$y = \frac{\begin{vmatrix} K & r \\ 1 & 1 \end{vmatrix}}{\begin{vmatrix} K & K \\ 1 & -d \end{vmatrix}} = \frac{K - r}{-1d - K} = \boxed{\frac{-1}{19}}$$