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$$a) y'' - 2x' = 2x - 1 \quad y'' = 2x' + 2x - 1$$

$$\left. \begin{array}{l} y_1'' = 2x_1' + 2x_1 - 1 \\ y_2'' = 2x_2' + 2x_2 - 1 \end{array} \right\} \xrightarrow{y_1 + y_2} y_1'' + y_2'' = 2x_1' + 2x_2' + 2x_1 + 2x_2 - 2 \rightarrow y_1' + y_2' = 2x_1 + 2x_2 - 2$$

$$b) x \cos y = y \cos x \xrightarrow{\frac{d}{dx}} \frac{1}{x} x \cos y = y \cos x \rightarrow \cos y = 0 \rightarrow y = \pi, 2\pi, \dots$$

$$2) \frac{x+y}{x} = \sqrt{xy} \rightarrow x+y = x\sqrt{xy} \rightarrow x+y - x\sqrt{xy} = 0 \rightarrow (\sqrt{x} - \sqrt{y})^2 = 0$$

$$\rightarrow \sqrt{x} = \sqrt{y} \rightarrow x = y$$

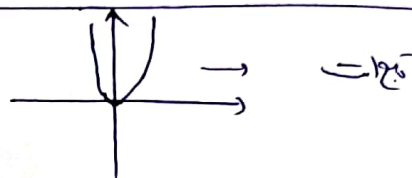
$$3) xy'' + 2x - y' - 2y = 0 \rightarrow x(y'' + 2) - y(y' + 2) = 0 \rightarrow (y' + 2)(x - y) = 0$$

$$\rightarrow x = y \rightarrow \text{تقاطع}$$

$$y' + 2 = 0 \rightarrow y' = -2$$

۲)

$$a) |y| x^2 = r y \begin{cases} y > 0 \rightarrow x^2 = y \\ y < 0 \rightarrow x^2 = -y \rightarrow y = -x^2 \end{cases}$$



$$b) [y] + [x] = 1 \xrightarrow{x=1} [y] = 0 \rightarrow 0 \leq y < 1 \rightarrow \text{تقاطع}$$

۳)

$$f(x) = \begin{cases} x^2 - b & |x-1| \geq 1 \\ a + x & 0 \leq x \leq 1 \end{cases} \rightarrow \begin{cases} x^2 - b \geq 0 & x \geq 1 \\ a + x \leq 0 & 0 \leq x \leq 1 \\ x^2 - b \leq 0 & x \leq -1 \end{cases} \xrightarrow{x=1} \begin{cases} 1 - b \geq 0 \\ a + 1 \leq 0 \\ 1 - b \leq 0 \end{cases} \rightarrow \begin{cases} b \leq 1 \\ a \leq -1 \\ b \geq 1 \end{cases} \rightarrow a + b \leq 1 - 1 = 0$$

$$4) y = \sqrt{a - bx - x^2}$$

$$\frac{b}{-b} + \frac{a}{b} = \frac{a-b}{b}$$

$$\begin{cases} a - b^2 - b^2 = 0 \rightarrow 2b^2 = a \\ a - ab - a^2 = 0 \rightarrow 2b^2 - 2b^2 - 4b^2 = 0 \end{cases}$$

$$\rightarrow -2b^2(2b^2 + b - 1) = 0$$

$$\begin{cases} b = 0 \rightarrow a = 0 \\ b = \frac{1}{2} \rightarrow a = \frac{1}{2} \\ b = -1 \rightarrow a = 1 \end{cases} \rightarrow a + b \leq 1 - 1 = 0$$

$$a) y = \frac{x}{\sqrt{ax^2 + bx + c}}$$

$$ax^2 + bx + c > 0 \xrightarrow{\lim} (-\infty, 2)$$

$$\rightarrow a > 0$$

$$\begin{cases} 2b + c = 0 \rightarrow c = -2b \end{cases}$$

$$|a + c - 3b| = 0 \rightarrow -2b + 3b = b \rightarrow -2(-b) = 2b$$

$$b(0) = 0 \rightarrow \text{تقاطع}$$

٤) $y = \sqrt{\frac{x^2 + 1}{x + b} + a}$ $\xrightarrow{\text{دالة}} (x) \rightarrow +\infty$
 $\hookrightarrow \sqrt{\frac{(x^2 + a)x + b + 1}{x + b}}$ $\xrightarrow{\text{نقطة 2}} a = -1$
 $x + b \xrightarrow{x \rightarrow -1} -1 + b = 0 \rightarrow b = 1$

٧) $y = \sqrt{x^3 - 1}$ $x^3 - 1 \geq 0 \rightarrow x(x^2 - 1) \geq 0 \rightarrow x(x - 1)(x + 1) \geq 0$
 $\frac{-1 \ 0 \ 1}{- \ + \ - \ + \ -}$ $\rightarrow$ دالة $[-1, 0] \cup [1, +\infty)$

ب) $y = \frac{1}{\sqrt{x - 1}}$ $\rightarrow |x - 1| > 0 \rightarrow |x| > 1 \rightarrow x < -1$ دالة $(-\infty, -1) \cup (1, +\infty)$
 $x > 1$

٨) $y = \sqrt{\frac{1}{|x| - [x]}}$ $\rightarrow |x| - [x] \neq 0 \rightarrow |x| \neq [x] \rightarrow$ $\frac{2}{\text{مباين 2}}$
 $\xrightarrow{\text{دالة}} (-\infty, 0)$ $\frac{2}{\text{مضرب 2}}$

ب) $\sqrt{x} + \sqrt{y} = 9$ $\rightarrow x \geq 0$
 $9 - \sqrt{x} \geq 0 \rightarrow 9 \geq \sqrt{x} \rightarrow 11 \geq x$ دالة $[0, 11]$

٩) $y = \frac{1}{\sqrt{[x - \frac{1}{x}] + [x + \frac{x}{x}]}}$ $[x - \frac{1}{x}] + [x + \frac{x}{x}] > 0 \xrightarrow{\text{دور 2}} [x - \frac{1}{x}] + 1 + [x + \frac{x}{x}] > 1$
 $\rightarrow 2[x + \frac{x}{x}] > 1 \rightarrow [x + \frac{x}{x}] > \frac{1}{2} \rightarrow x + \frac{x}{x} \geq 1 \rightarrow x \geq \frac{1}{x} \rightarrow x \geq \frac{1}{x}$
 $\xrightarrow{\text{دالة}} [\frac{1}{x}, +\infty)$

١٥) $y = \sqrt{1 - \log(x - a)}$ $x - a > 0 \rightarrow x > a \rightarrow x > \frac{a}{x}$
 $\hookrightarrow 1 - \log(x - a) \geq 0 \rightarrow 1 \geq \log(x - a) \rightarrow 10 \geq x - a$
 $\xrightarrow{\text{دالة}} (\frac{a}{x}, \frac{10 + a}{x}] = (b, c]$ $\xrightarrow{\text{دالة}} \frac{10 + a}{x} \geq x$
 $c - b = \frac{10 + a}{x} - \frac{a}{x} = \frac{10}{x} = d$ $\hookrightarrow b = \frac{a}{x}$