

الف) $y_1^r - r x^r = r x - 1$ $y_1^r = r x^r + r x - 1$ $y_2^r = r x^r + r x - 1$ $\Rightarrow y_1^r = y_2^r \rightarrow y_1 = y_2$ جمع مستقیم

ب) $x \cos y = y \cos x$ $\xrightarrow{x=y} \frac{\pi}{r} \cos y = y \cos \frac{\pi}{r} \rightarrow \frac{\pi}{r} \cos y = 0 \rightarrow \cos y = 0$ $\checkmark$ جمع مستقیم $y = \pm \frac{\pi}{r}$

ج) $x + y = 2\sqrt{xy} \rightarrow x + y - 2\sqrt{xy} = 0 \xrightarrow{\text{مربع}} (\sqrt{x} - \sqrt{y})^2 = 0 \rightarrow \sqrt{x} = \sqrt{y} \rightarrow x = y$ جمع مستقیم

د) $x y^r + r x - y^r - r y = 0$ $y^r(x - y) + r(x - y) = 0 \rightarrow (x - y)(y^r + r) = 0 \rightarrow x - y = 0$ جمع مستقیم

$x = y$ جمع مستقیم

$f(x) \begin{cases} r x^r - b & ; |x-1| \geq r \\ a + r x & ; -r \leq x \leq 1 \end{cases}$ $\begin{cases} x-1 \geq r \rightarrow x \geq r+1 \\ x-1 \leq -r \rightarrow x \leq -r-1 \end{cases}$ (1, r+1) (r)

15 $r x^r - b = a + r x$ $r x^r - r x = a + b$ $a + r(-1) = r(-1)^r + b \rightarrow a + b = r$ $\leftarrow$ است $x = -1$

20 $-x^r - b x + a$ $\rightarrow -x^r - b x + a \geq 0$ $x^r + b x - a \leq 0$ $\xrightarrow{S} a + b = -b \rightarrow r b + a = -b \rightarrow b = -\frac{a}{r}$ $\xrightarrow{P} a b = -a \rightarrow b = -1$ $\xrightarrow{a, r} a + b = 1$ $\checkmark$

25 $y = \frac{r}{\sqrt{a x^r + b x + c}}$ $\xrightarrow{\text{مربع}} b x + c = 0$ $C = -r b$ (r) (r) $\checkmark$ $a = 0$ $\rightarrow x^r + b x - a \leq 0$ $\rightarrow r a + C = r |b| \rightarrow -r b + r b = 0$ $\checkmark$ $b < 0$ $\leftarrow$ $\checkmark$

30 الف) $f(x) = r \sqrt{\frac{1}{|x| - [x]}}$ $\rightarrow |x| - [x] \neq 0$ $|x| \neq [x] \rightarrow x \in (z^+, \infty)$ (r) (r) $\checkmark$

ب) $f(x) = \sqrt{x} + \sqrt{y} = 9$

I. $x \geq 0$ II. $\sqrt{y} = 9 - \sqrt{x} \rightarrow 9 - \sqrt{x} \geq 0 \rightarrow \sqrt{x} \leq 9 \rightarrow x \leq 81$
 $I \cap II = [0, 81]$

الف) $f(x) = \sqrt{\log^{x-1} x}$ I. $x-1 > 0 \rightarrow x > 1 \rightarrow x > \frac{1}{x}$

II. $x > 0 \rightarrow x \neq 1$

III. $\log^{x-1} x \geq 0 \rightarrow (x-1) \geq 0 \rightarrow x-1 > 1 \rightarrow x > 2 \rightarrow x > \frac{2}{x}$
 $\rightarrow x < 1 \rightarrow x-1 < 1 \rightarrow x-1 < 2 \rightarrow x < 3 \rightarrow x < \frac{3}{x}$

$(\frac{1}{3}, \frac{2}{3}] \cup (1, +\infty)$

$\rightarrow f(x) = \log \frac{1}{4 + \sqrt{|x|} - |x|} \rightarrow 4 + \sqrt{|x|} - |x| > 0 \rightarrow \sqrt{|x|} = t \rightarrow t^2 - t + 4 > 0$
 $\frac{-r}{-b+d} \rightarrow -2 < t < 2 \rightarrow -2 < \sqrt{|x|} < 2$
 $\sqrt{|x|} < 2 \rightarrow |x| < 4 \rightarrow -4 < x < 4$

$\sqrt{\frac{ax+r}{a+b} + a} \geq \frac{ax+r}{a+b} + a$

$a = -3$ (بسیار صاف باید از این ببرد)

$b = -2$ (بسیار مفروض است)

$|f(x) - x + 1| \rightarrow f(x) - x + 1 \geq 0 \rightarrow f(x) \geq x - 1 \rightarrow x \geq \frac{1}{x} \rightarrow x-1 \geq x-1$

$f(x) \begin{cases} x-1 & [x] > 1 \rightarrow x \geq 1 \\ x+2 & [x] \leq 1 \rightarrow x < 1 \end{cases}$

$I \cup II = (-\frac{1}{2}, +\infty)$

II $(-\frac{1}{2}, 1)$

$y = \frac{r^2 x^2 + 4rx^2 + 4x + 1}{(rx^2 + 4x + 1)^2} = \frac{r^2 (x^2 + 1) + 4x}{(rx^2 + 1)^2} = \frac{r^2 (x+1)^2}{(rx+1)^2} \cdot \frac{r}{rx+1}$

$rx+1 \neq 0 \rightarrow rx \neq -1 \rightarrow x \neq -\frac{1}{r} \rightarrow D, R = \mathbb{R} - \{-\frac{1}{r}\}$

$y = \sqrt{1 - \log^{(x-a)} x} \rightarrow 1 - \log^{(x-a)} x \geq 0 \rightarrow \log^{(x-a)} x \leq 1$

$x-a > 0 \rightarrow x > a \rightarrow x > \frac{a}{x}$

$x-a \leq 1 \rightarrow x \leq 1+a$

$(\frac{a}{x} < x \leq 1 + \frac{a}{x})$

$C-b = 1 + \frac{a}{x} - \frac{a}{x} = 1$

$x \leq \frac{1+a}{x} \rightarrow x \leq 1 + \frac{a}{x}$