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$$f(x) = \sqrt{(a-1)x^2 + ax + b} \quad [x, +\infty)$$

$$x = x_0 \text{ جہاں } f(x) \text{ کا } \min \text{ ہے} / x = x_0 \text{ پر } (a-1)x_0^2 + ax_0 + b - (a-1)x_0^2 + ax_0 + b = 0$$

$$b = -9a + 11 - 4a \rightarrow b = -13a + 11$$

$$(f(x)) \text{ کا } \min \text{ جہاں } f(x) \text{ کا } \min \text{ ہے} \rightarrow \text{Condition } a-1=0 \rightarrow a=1$$

$$-13a + 11 \xrightarrow{a=1} -13 + 11 = -2 \rightarrow b = -2$$

$$f(x) = \sqrt{x^2 + 4x + 4 - m^2} \rightarrow \sqrt{x^2 + 4x + 1 + 1 - m^2} \rightarrow (x+1)^2 + 1 - m^2$$

$$(x+1)^2 + 1 - m^2 \geq 0 \rightarrow (x+1)^2 + 1 \geq m^2$$

$$x = -1 \rightarrow 0 + 1 \geq m^2 \rightarrow 1 \geq m^2 \rightarrow 1 \geq m \geq -1 \rightarrow \begin{cases} m_{\max} = 1 \\ m_{\min} = -1 \end{cases}$$

$$m_{\max} - m_{\min} = 1 - (-1) = 2$$

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$$f(x) = \sqrt{4 - x^2} \rightarrow 4 - x^2 \geq 0 \rightarrow -2 \leq x \leq 2 \text{ (I)}$$

$$[x] + [-x] + 1 \rightarrow [x] + [-x] + 1 \neq 0 \rightarrow [x] + [-x] \neq -1$$

$$[x] + [-x] \neq -1 \rightarrow \begin{cases} 0 & x \in \mathbb{Z} \\ -1 & x \notin \mathbb{Z} \end{cases}$$

$$x \in \mathbb{Z} \text{ (II)}$$

$$(x \neq 0, x \neq 1)$$

$$(I \cap II) \rightarrow \begin{array}{c} \bullet \text{---} \bullet \\ -2 \quad 2 \end{array} \rightarrow [-2, 2] \rightarrow -2, -1, 0, 1, 2$$

$$(iii) y = \sqrt{x^4 + 4x^2} \rightarrow x^4 + 4x^2 \geq 0 \rightarrow x^2(x^2 + 4) \geq 0 \rightarrow x^2 \geq 0$$

$$D_f = \mathbb{R} \leftarrow 0 \leq x^2$$

$$(II), x \geq -2$$

$$(I \cap II) \rightarrow D_f = [-2, +\infty)$$

$$(I)$$

$$(iv) y = \sqrt{\frac{x^4 - 1}{x^2 - 1}}$$

$$x^4 - 1 = (x-1)(x+1)$$

$$x^4 - 1 = x^2(x^2 - 1)$$

$$\frac{x^2(x+1)(x-1)}{x^2(x^2-1)}$$

$$\rightarrow \frac{(x+1)(x-1)}{x^2+x-1}$$

$$\rightarrow x \neq 1$$

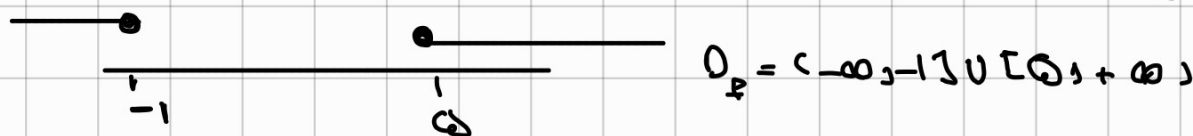
$$x^2 + x + 1 > 0 \rightarrow \Delta < 0$$

$$(x+1)(x-1)(x^2-1) \geq 0 \rightarrow 1, 0, 2$$

$$\begin{array}{c|ccc} + & - & 0 & + \\ \hline & - & 0 & + \end{array}$$

$$D_f = (-\infty, -1] \cup \{0\} \cup [2, +\infty)$$

الف: $y = \sqrt{|x-1|-x}$ $|x-1|-x \geq 0 \rightarrow |x-1| \geq x \rightarrow x-1 \leq -x \rightarrow x \leq -1$
 $|x-1|-x \geq 0 \rightarrow x-1 \geq x \rightarrow x \geq 0$



ج: $y = \sqrt{x-|x-1|}$ $x-|x-1| \geq 0 \rightarrow x \geq |x-1| \rightarrow |x-1| = |x-1|$

$$|x-1| \leq x \rightarrow -x \leq x-1 \leq x \rightarrow -1 \leq x \leq 1$$

$$D_f = [-1, 1]$$

الف: $y = \sqrt{1-|x|}$ $1-|x| \geq 0$

I: $x < 0 \rightarrow |x| = -x \rightarrow 1-x \geq 0 \rightarrow 1+x \geq 0 \rightarrow (-\infty, 0)$

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II: $x \geq 0 \rightarrow |x| = x \rightarrow 1-x \geq 0 \rightarrow 1-x \geq 0 \rightarrow 1 \geq x \rightarrow x \leq 1$

$$I \cup II \rightarrow (-\infty, 0) \cup [0, 1]$$

$$[0, 1] \leftarrow 0 \leq x \leq 1 \leftarrow x \geq 0$$



ج: $y = \frac{1}{\sqrt{x^2-|x-1|-1}}$

الف: $x^2-|x-1|-1 \geq 0 \rightarrow |x-1| \leq x^2 \rightarrow 1 \leq x \leq 1$

ب: $\sqrt{x^2-|x-1|-1} \neq 0 \rightarrow x^2-|x-1|-1 \neq 0 \rightarrow |x-1| \neq x^2 \rightarrow x \neq 1, x \neq -1$

$$D_f = [1, 2) \cup (2, 3) \cup (3, 4]$$

الف: $y = \frac{\sin x - 1}{\cos x}$ $\cos x \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2}, k \in \mathbb{Z}$

$$D_f = \{x \mid \frac{\pi}{2} + k\pi, k \in \mathbb{Z}\}$$

ج: $y = \frac{\cos x}{\cos x - 1}$ $\cos x - 1 \neq 0 \rightarrow \cos x \neq 1 \rightarrow x \neq 2k\pi, k \in \mathbb{Z}$

$$D_f = \{x \mid 2k\pi, k \in \mathbb{Z}\}$$

$\lim_{n \rightarrow \infty} \frac{n+1}{|n+1| - |n+1|} \rightarrow |n+1| - |n+1| \neq 0 \rightarrow n+1 = n+1 \rightarrow n=0$ 1
 $\hookrightarrow n+1 = -(n+1) \rightarrow n = -\frac{n}{2}$

$$D_F = \mathbb{R} - \left\{ -\frac{F}{2} \right\}$$

$\hookrightarrow y = \sqrt{|n+1| - |n+1|} \rightarrow |n+1| - |n+1| > 0 \rightarrow (n+1)^2 > (n+1)^2$
 $n^2 + n + 1 \geq n^2 + 4n + 4 \rightarrow 3n^2 - 3n - 1 > 0 \rightarrow (3n+1)(n-1) > 0 \rightarrow \begin{cases} n \leq -\frac{1}{3} \\ n \geq 1 \end{cases}$
 $D_F = (-\infty, -\frac{1}{3}] \cup [1, +\infty)$

$f(x) = \sqrt{\log_{0.1} \log_{0.1} (x-1)}$ 9
 $\frac{1}{x} < 1 \rightarrow \log_{\frac{1}{x}} > 0 \rightarrow \log_{\frac{1}{x}} > 0 \rightarrow \log_{\frac{1}{x}} > 0$
 $0 < \log_{\frac{1}{x}} < 1 \rightarrow 1 < x-1 < 10 \rightarrow 1 < x < 11$

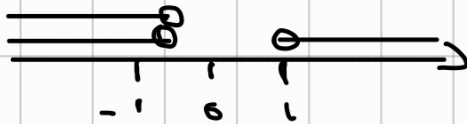
$$D_F = (1, 11)$$

$\lim_{n \rightarrow \infty} \log (x \cos n + 1)$ $x \cos n + 1 > 0 \rightarrow x \cos n > -1 \rightarrow$ 10

$$\{x \mid x \in \left(-KM - \frac{1}{K}, -KM + \frac{1}{K} \right) \mid K \in \mathbb{Z} \}$$

$\hookrightarrow y = \sqrt{\log \frac{x-1}{x+1}} \rightarrow \textcircled{1} \frac{x-1}{x+1} > 0 \mid x < -1 \text{ or } x > 1$
 $\textcircled{2} \log \frac{x-1}{x+1} > 0 \rightarrow \frac{x-1}{x+1} > 1 \rightarrow \frac{x-1}{x+1} - 1 > 0 \rightarrow \frac{-2}{x+1} > 0 \rightarrow x < -1$

① ∩ ②


 $D_F = (-\infty, -1)$

