

$$f(x) = \sqrt{(a-r)x^2 + ax + b}$$

$$(a-r)x^2 + ax + b \geq 0$$

$$(a-r)(r)^2 + a(r) + b = 0$$

$$9(a-r) + 3a + b = 0$$

$$9a - 18 + 3a + b = 0 \Rightarrow 12a + b - 18 = 0 \Rightarrow b = 18 - 12a$$

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

$$2) \Delta \leq 0 \Rightarrow b^2 - 4ac \leq 0 \Rightarrow 4m^2 - 4 \leq 0 \Rightarrow m^2 - 1 \leq 0 \Rightarrow m^2 \leq 1 \Rightarrow -1 \leq m \leq 1$$

$$\left. \begin{array}{l} m_{\max} = 1 \\ m_{\min} = -1 \end{array} \right\} 1 - (-1) = 2$$

$$1) f - x^2 \geq 0 \Rightarrow x^2 \leq f \Rightarrow -\sqrt{f} \leq x \leq \sqrt{f} \Rightarrow \text{if } x \in \mathbb{Z} \Rightarrow x = \{-2, -1, 0, 1, 2\}$$

$$2) [x] + [-x] + 1 \neq 0 \Rightarrow \text{برای هر عدد غیر صحیح} \Rightarrow x = -2, -1, 0, 1, 2 \Rightarrow \text{عدد صحیح}$$

$\rightarrow x \in \mathbb{Z} \checkmark$
 $\rightarrow x \notin \mathbb{Z} \times$

$$الف) g = \sqrt{x^3 + 3x^2} \Rightarrow x^3 + 3x^2 \geq 0 \Rightarrow x^2(x+3) \geq 0$$

$\downarrow$
 $x+3 \geq 0 \Rightarrow x \geq -3 \Rightarrow D_f = [-3, +\infty)$

$$ب) g = \sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}} \Rightarrow \frac{x^2(x-1)(x+1)(x-3)}{(x-1)(x^2+x+1)} \geq 0 \Rightarrow \begin{array}{cccc} -1 & 0 & 1 & 3 \\ + & \phi & - & \phi & - & \phi & + \end{array}$$

$\downarrow$
 $\Delta \leq 0$

$$D_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$$

$$الف) g = \sqrt{|x-2| - 3} \Rightarrow |x-2| - 3 \geq 0 \Rightarrow |x-2| \geq 3 \Rightarrow x-2 \geq 3, x-2 \leq -3$$

$$D = (-\infty, -1] \cup [5, +\infty) \quad \leftarrow x \geq 5, x \leq -1$$

$$ب) \sqrt{f - |2-x|} \Rightarrow$$

$$f - |2-x| \geq 0 \Rightarrow |2-x| \leq f \Rightarrow |x-2| \leq f \Rightarrow -f \leq x-2 \leq f \Rightarrow -2 \leq x \leq 2$$

$$D = [-2, 2]$$

$$\text{ii) } y = \sqrt{1-x|x|} \Rightarrow 1-x|x| \geq 0 \Rightarrow -x|x| \geq -1 \Rightarrow x|x| \leq 1 \quad -4$$

$$[-1, 1] \cup (-\infty, 1] \Rightarrow (-\infty, 1] = Df$$

$$\begin{cases} x > 0, x^2 \leq 1 \Rightarrow -1 \leq x \leq 1 \\ x < 0, -x^2 \leq 1 \end{cases}$$

$$\text{iii) } r - |x-2| \geq 0 \Rightarrow |x-2| \leq r \Rightarrow -r \leq x-2 \leq r \Rightarrow r \leq x \leq 2+r$$

$$\sqrt{r-|x-2|} - 1 \neq 0 \Rightarrow \sqrt{r-|x-2|} \neq 1 \Rightarrow r-|x-2| \neq 1 \Rightarrow |x-2| \neq r \Rightarrow x \neq 2 \pm r$$

$$\therefore Df = [r, 2+r) \cup (2-r, 2+r) \cup (2+r, \infty)$$

$$\text{iv) } y = \frac{\sin^2 x - 1}{\cos x} \Rightarrow \cos x \neq 0 \quad \odot \quad Df = \mathbb{R} - \{k\pi + \frac{\pi}{2}\} \quad -V$$

$$\text{v) } y = \frac{\cos x}{r \cos x - 1} \Rightarrow r \cos x - 1 = 0 \Rightarrow r \cos x = 1 \Rightarrow \cos x = \frac{1}{r} \Rightarrow \odot$$

$$Df = \mathbb{R} - \left\{rk\pi - \frac{\pi}{r}, rk\pi + \frac{\pi}{r}\right\}$$

$$\text{vi) } y = \frac{x+r}{|rx+1| - |x+r|} \Rightarrow |rx+1| - |x+r| \neq 0 \Rightarrow |rx+1| \neq |x+r| \quad -A$$

$$(rx+1)^2 = (x+r)^2 \Rightarrow rx^2 - rx + 1 = 0$$

$$Df = \mathbb{R} - \left\{-\frac{r}{r}, r\right\} \leftarrow \begin{cases} \Rightarrow rx^2 - rx - r^2 = 0 \Rightarrow (x-r)(x+r) \end{cases} \begin{matrix} +r \\ -r \end{matrix}$$

$$\text{vii) } y = \sqrt{|rx+1| - |x+r|} \Rightarrow |rx+1| \geq |x+r| \Rightarrow (rx+1)^2 \geq (x+r)^2$$

$$\Rightarrow rx^2 - rx - 1 \geq 0 \Rightarrow (x-r)(x+r) \begin{matrix} +r \\ -r \end{matrix} \begin{matrix} -\frac{r}{r} \\ +\frac{r}{r} \end{matrix} \Rightarrow Df = (-\infty, -\frac{r}{r}] \cup [r, +\infty)$$

$$f(x) = \sqrt{\log \log \frac{(r-1)}{x}} \Rightarrow \log \log \frac{(r-1)}{x} > 0 \Rightarrow \log \frac{(r-1)}{x} > 1 \Rightarrow \frac{(r-1)}{x} > e \Rightarrow x < \frac{r-1}{e} \quad -9$$

$$\text{viii) } \log \log \frac{(r-1)}{x} > 0 \Rightarrow \log \frac{(r-1)}{x} > 0 \Rightarrow \frac{(r-1)}{x} > 1 \Rightarrow r-1 > x \Rightarrow x < r-1$$

$$\text{ix) } \log \log \frac{(r-1)}{x} \geq 0 \Rightarrow \log \frac{(r-1)}{x} \leq 1 \Rightarrow \frac{(r-1)}{x} \leq e \Rightarrow r-1 \leq ex \Rightarrow x \geq \frac{r-1}{e}$$

$$\text{viii) and ix) } \Rightarrow Df = \left(\frac{r-1}{e}, r-1\right) \quad x \leq r$$

$$\text{x) } y = \log(r \cos x + 1) \Rightarrow r \cos x + 1 > 0 \Rightarrow r \cos x > -1 \Rightarrow \cos x > -\frac{1}{r} \quad -10$$

$$\odot \Rightarrow Df = \left(rk\pi - \frac{r\pi}{r}, rk\pi + \frac{r\pi}{r}\right)$$

$$\text{xi) } y = \sqrt{\log \frac{x-1}{x+1}} \Rightarrow \frac{x-1}{x+1} \geq 1 \Rightarrow \frac{x-1-x-1}{x+1} \geq 0 \Rightarrow \frac{-r}{x+1} \geq 0$$

$$\Rightarrow x+1 < 0 \Rightarrow x < -1 \Rightarrow Df = (-\infty, -1)$$