

$$f(x) = \sqrt{(a-2)x^2 + ax + b} \quad D_f = [3, +\infty)$$

$$a-2=0 \rightarrow a=2 \Rightarrow \sqrt{2x+b} \quad \begin{matrix} 3 = \sqrt{2 \cdot 3 + b} \\ 3 = \sqrt{6+b} \end{matrix} \quad \underline{x=3}, \quad 4+b=0 \Rightarrow \boxed{b=-4}$$

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$$f(x) = \sqrt{x^2 + 2x + 2 - m^2} \rightarrow x^2 + 2x + 2 - m^2 \geq 0$$

$$\Delta \leq 0 \quad \Delta = 4 - 4(2 - m^2)$$

$$\rightarrow 4m^2 - 4 \leq 0 \quad m^2 \leq 1 \rightarrow -1 \leq m \leq 1$$

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

$$\text{اختلاف کف در دو سر بازه} \Rightarrow 1 - (-1) = \boxed{2}$$

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$$f(x) = \frac{\sqrt{4-x^2}}{[x] + [-x] + 1}$$

$$\begin{matrix} 4-x^2 \geq 0 & x^2 \leq 4 & -2 \leq x \leq 2 & [-2, 2] \\ [x] + [-x] \neq -1 & \rightarrow & x \in \mathbb{Z} & \xrightarrow{\cap} [-2, 2] \end{matrix} \quad D_f$$

$$\Rightarrow \text{اعداد صحیح داخل} \Rightarrow \{-2, -1, 0, 1, 2\}$$

$$\boxed{5}$$

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$$\text{الف) } \sqrt{x^3 + 3x^2} \rightarrow x^2(x+3) \geq 0 \quad \begin{matrix} \downarrow & \downarrow \\ x^2 & x+3 \end{matrix} \quad \begin{matrix} -3 & 0 \\ | & | \\ -\phi & \phi \end{matrix} \quad \boxed{D_f = [-3, +\infty)}$$

$$\text{ب) } \sqrt{\frac{(x^2-1)(x^2-3x^2)}{x^3-1}} \geq 0 \Rightarrow \frac{(x-1)(x+1)(x^2-3x^2)}{x^3-1} \geq 0$$

$$\begin{matrix} -1 & 0 & 1 & 3 \\ | & | & | & | \\ +\phi & -\phi & -\phi & -\phi \end{matrix} \quad \boxed{D_f = (-\infty, -1] \cup [3, +\infty) \cup \{0\}}$$

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$$\text{الف) } y = \sqrt{|x-2|-3} \quad |x-2|-3 \geq 0 \quad |x-2| \geq 3 \Rightarrow \begin{matrix} x-2 \geq 3 & \Rightarrow & x \geq 5 \\ x-2 \leq -3 & \Rightarrow & x \leq -1 \end{matrix}$$

$$\boxed{D_f = (-\infty, -1] \cup [5, +\infty)}$$

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$$\text{ب) } \sqrt{4-12-x} \quad 4-12-x \geq 0 \quad |12-x| \leq 4 \quad -4 \leq 12-x \leq 4$$

$$-4 \leq -x \leq 4 \rightarrow -2 \leq x \leq 4 \quad \boxed{D_f = [-2, 4]}$$

ا) $y = \sqrt{1 - u|u|} \rightarrow 1 - u|u| \geq 0 \quad u|u| - 1 \leq 0 \quad \frac{1}{-1} \Rightarrow D = (-\infty, 1]$

ب) $y = \frac{1}{\sqrt{r - |u - a|} - 1}$ $r - |u - a| \geq 0 \quad |u - a| \leq r \quad -r \leq u - a \leq r$
 $r \leq u \leq r + a \quad [r, r+a]$
 $\sqrt{r - |u - a|} - 1 \neq 0 \quad \sqrt{r - |u - a|} \neq 1 \quad r - |u - a| \neq 1$
 $|u - a| \neq r \rightarrow u - a \neq r \quad u \neq r + a$
 $|u - a| \neq -r \rightarrow u - a \neq -r \quad u \neq -r + a$
 $\Rightarrow D = [r, r+a] - \{r+a, -r+a\}$

ا) $y = \frac{\sin u - 1}{\cos u}$ $\cos u \neq 0$  $D_f = \mathbb{R} - \{K\pi + \frac{\pi}{2}\}$

ب) $y = \frac{\cos u}{r \cos u - 1}$ $r \cos u - 1 \neq 0$
 $\cos u \neq \frac{1}{r}$  $D_f = \mathbb{R} - \{rK\pi \pm \frac{\pi}{r}\}$

ا) $y = \sqrt{r \sin u - 1}$ $r \sin u - 1 \geq 0 \quad \sin u \geq \frac{1}{r}$  $D_f = [rK\pi + \frac{\pi}{4}, rK\pi + \frac{3\pi}{4}]$

ب) $y = \sqrt{1 - r \cos u}$ $\cos u \leq \frac{1}{r}$

 $\Rightarrow D_f = \mathbb{R} - (rK\pi - \frac{\pi}{r}, rK\pi + \frac{\pi}{r})$

$f(u) = \sqrt{\log_{10} \log_{10} (r(u-1))}$ $r(u-1) > 0 \quad u > \frac{1}{r} \quad (\frac{1}{r}, +\infty)$
 $\log_{10} r(u-1) > 0 \quad r(u-1) > 1 \quad u > 1 \quad (1, +\infty)$
 $\log_{10} \log_{10} (r(u-1)) \geq 0 \quad \log_{10} (r(u-1)) \geq 1 \quad r(u-1) \geq 10 \quad u \geq \frac{11}{r}$
 $\downarrow$
 $0 < 10 < 1$
 $\Rightarrow D_f = (1, r]$

ا) $y = \log(r \cos u + 1)$ $r \cos u + 1 > 0 \quad \cos u > -\frac{1}{r}$  $D_f = \mathbb{R} - [rK\pi - \frac{\pi}{r}, rK\pi + \frac{\pi}{r}]$

ب) $y = \sqrt{\log \frac{u-1}{u+1}}$ $\frac{u-1}{u+1} > 0 \quad \frac{1}{-1} \Rightarrow (-\infty, -1) \cup [1, +\infty)$

$\log \frac{u-1}{u+1} \geq 0 \rightarrow \frac{u-1}{u+1} \geq 1 \Rightarrow \frac{u-1 - u-1}{u+1} \geq 0 \rightarrow \frac{-2}{u+1} \geq 0 \quad \frac{-1}{+\frac{1}{2}} \Rightarrow (-\infty, -1)$