

الف) $y = \sqrt{|x-r| - r}$ $|x-r| - r \geq 0$ $|x-r| \geq r$ 5

$D_f = (-\infty, -1] \cup [\omega, +\infty)$ $x-r \geq r$ $x-r \leq -r$
 $(x \geq \omega)$ $(x \leq -1)$

ب) $y = \sqrt{r - |x-r|}$ $r - |x-r| \geq 0$ $|x-r| \leq r$
 $D_f = [-1, 1]$ $(-1 \leq x \leq 1)$ $-r \leq x-r \leq r$ $|x-r| \leq r$

الف) $y = \sqrt{-x|x|}$ $-x|x| \geq 0$ $x|x| \leq 0$ 6

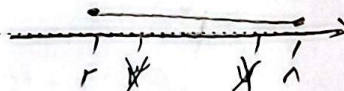
if $\mathbb{R}^+ \rightarrow x|x| \geq 0$ $D_f = (-\infty, 0]$

if $0 \rightarrow x|x| = 0$ ✓

if $\mathbb{R}^- \rightarrow x|x| \leq 0$ ✓

ب) $y = \frac{1}{\sqrt{r - |x-\omega|} - 1}$ $r - |x-\omega| \geq 0 \rightarrow |x-\omega| \leq r \rightarrow r \leq x \leq 1$

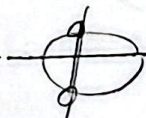
$\sqrt{r - |x-\omega|} - 1 \neq 0 \rightarrow \sqrt{r - |x-\omega|} \neq 1 \rightarrow |x-\omega| \neq r$ $x-\omega \rightarrow r$
 $D_f = [r, \omega) \cup (\omega, r]$ $\rightarrow x \neq r$
 $\rightarrow x \neq \omega$



الف) $y = \frac{-\sin^r x - 1}{\cos x}$ $\sin^r x + \cos^r x = 1$ 7
 $\sin^r x - 1 = -\cos^r x$

$\cos x \neq 0$

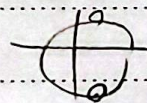
$\rightarrow \frac{\pi}{2} + k\pi$



$D_f = \mathbb{R} - \left\{ \frac{\pi}{2} + k\pi \right\}$

ب) $\frac{\cos x}{r \cos x - 1}$ $r \cos x - 1 \neq 0 \rightarrow \cos x \neq \frac{1}{r} \rightarrow \cos x = \frac{1}{r}$
 $\rightarrow \frac{\pi}{r} + k\pi$

$D_f = \mathbb{R} - \left\{ \frac{\pi}{r} + k\pi \right\}$



$$y = \frac{x+r}{|x+1| - (x+r)}$$

$$|x+1| - (x+r) \neq 0$$

$$|x+1| \neq |x+r| \Rightarrow |x+1| = |x+r|$$

$$D_f = \mathbb{R} - \sum_{x=-\frac{r}{2}}^{\frac{r}{2}} x$$

$$x+1 = x+r \Rightarrow x = r \quad (1)$$

$$y = \sqrt{|x+1| - (x+r)}$$

$$|x+1| = -(x+r) \quad (2)$$

$$|x+1| - (x+r) \geq 0$$

$$|x+1| = -x-r \Rightarrow x = -\frac{r}{2}$$

$$|x+1| \geq |x+r|$$

$$(x+1)^2 \geq (x+r)^2$$

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

$$(1-r)(x+\frac{r}{2}) \geq 0$$

$$D_f = (-\infty, -\frac{r}{2}] \cup [r, +\infty) \quad (3)$$

$$\begin{array}{c|c|c} x & -\frac{r}{2} & r \\ \hline & + & - \end{array}$$

$$f(x) = \sqrt{\log_{\omega} \log_{\omega} (x-1)}$$

$$x-1 > 0 \Rightarrow x > 1$$

$$\log_{\omega} (x-1) \geq 0$$

$$1 - \log_{\omega} (x-1) \geq 1$$

$$\log_{\omega} (x-1) \geq 0 \Rightarrow x-1 \geq 1 \Rightarrow x \geq 2$$

$$D_f = [1, r]$$

$$1 < x \leq r$$

$$x \geq r \Rightarrow x \geq r$$

$$y = \log_{10} (x \cos x + 1)$$

$$x \cos x + 1 > 0$$

$$\cos x > -\frac{1}{x} \quad D_f = (x \cos x - \frac{\pi}{2}, x \cos x + \frac{\pi}{2})$$

$$y = \log_{\frac{x-1}{x+1}}$$

$$\log_{\frac{x-1}{x+1}} \geq 1 \Rightarrow x \neq -1$$

$$\frac{x-1}{x+1} - 1 > 0 \Rightarrow \frac{x-1-x-1}{x+1} > 0$$

$$\frac{-2}{x+1} > 0$$

$$x+1 < 0 \Rightarrow x < -1$$

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

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

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$$\begin{cases} \text{در } x=r \text{ مقدار مینیمم} \\ (a-r)(a-r)^2 + a(a-r) + b = 0 \\ (a-r)^3 - 9(a-r)^2 + 10(a-r) = 0 \end{cases}$$

$$-9(a-r) = a \Rightarrow 9a = 1r \Rightarrow a = \frac{1r}{9}$$

$$b = 9(a-r) \Rightarrow 9\left(\frac{1r}{9} - r\right) = b \Rightarrow b = 9\left(-\frac{8r}{9}\right) \Rightarrow b = -8r$$

$$f(x) = \sqrt{x^2 + rx + r - mr} \quad D_f = \mathbb{R}$$

2

$$x^2 + rx + r - mr \geq 0$$

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

$$\text{در } x=-1 \text{ مقدار مینیمم} = 0$$

$$1 - m \geq 0 \Rightarrow -1 \leq m \leq 1$$

$$1 - (-1) = 2$$

$$f(x) = \sqrt{x - x^2} \quad D_f = [0, 1]$$

$$x - x^2 \geq 0$$

$$x^2 \leq x \Rightarrow -1 \leq x \leq 1$$

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$$x \in [-1, 1]$$

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

$$(-1) + 1 = 0$$

$$[0] + [-0] + 1 = 1$$

$$\text{if } x \in \mathbb{Z} \Rightarrow \underline{[x]} = x$$

$$[-x] = -x$$

$$\Rightarrow [x] + [-x] + 1 = x - x + 1 = 1$$

این را در صورتی که قبلاً قبول می‌کردیم

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$$\text{if } y = \sqrt{x^2 + rx + r}$$

$$x^2 + rx + r \geq 0$$

$$x^2(x+r) \geq 0$$

$$x \mid \begin{array}{cc} -r & 0 \\ \hline + & + \end{array}$$

$$D_f = [-r, +\infty)$$

$$(x+1)(x-1)$$

$$(x-1) \cdot (x^2 - r) \Rightarrow x^2(x-1)$$

$$x^2 - 1 \rightarrow (x-1)(x+1)$$

$$\rightarrow 1$$

$$+0.125$$

$$x \mid \begin{array}{ccc} -1 & 0 & r \\ \hline - & + & - \end{array}$$

$$D_f = [-1, 0] \cup [r, +\infty)$$