

$$24) f(x) = \sqrt{\frac{x-1}{x}} = \sqrt{\frac{(x-1)^2 - x^2}{x^2 - x}} = \sqrt{\frac{-2x+1}{x^2-x}} \Rightarrow \frac{0}{\frac{1}{2}} - \frac{0}{\frac{1}{2}} + \frac{1}{\frac{1}{2}} =$$

135

$$\Rightarrow D_f = (-\infty, 0) \cup (0, 1)$$

$$25) f(x) = \frac{\frac{1}{x} - \frac{1}{x}}{\frac{x+1}{x} - \frac{1}{x+1}}$$

$$\left. \begin{array}{l} \frac{x+1}{x} = \frac{1}{x+1} \Rightarrow x = -\frac{1}{2} \\ b = -\frac{1}{2}, -1 \end{array} \right\}$$

$$D_f = \mathbb{R} - \left\{ -\frac{1}{2}, -1 \right\}$$

$$26) f(x) = \sqrt{(x^2+1)(x^2-1)} \Rightarrow x = -1 \text{ و } 1$$

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

$$27) \sqrt{x+1} + \sqrt{y+1} = 2 \Rightarrow (\sqrt{x+1})^2 + (\sqrt{y+1})^2 = 2^2 \Rightarrow x+1 + y+1 = 4 \Rightarrow x+y = 2$$

118

$$\Rightarrow \sqrt{y+1} = 2 - \sqrt{x+1} \rightarrow \text{باید هوای داشته باشد!} \rightarrow \sqrt{x+1} \leq 2 \rightarrow x-1 \leq 1 \rightarrow x \leq 2$$

$$D_f = [1, 2]$$

$$28) \frac{f(x)}{g(x)} = \frac{x^2-1}{x^2+1} \Rightarrow \frac{x^2-1}{x^2+1} = 0 \Rightarrow x^2-1 = 0 \Rightarrow x = \pm 1$$

$$\frac{x^2-1}{x^2+1} = 0 \Rightarrow x = \pm 1$$

$$29) f(x) = \frac{x^2-1}{x^2+1} \Rightarrow \frac{x^2-1}{x^2+1} = 0 \Rightarrow x^2-1 = 0 \Rightarrow x = \pm 1$$

$$\frac{x^2-1}{x^2+1} = 0 \Rightarrow x = \pm 1$$

$$30) f(x) = \frac{x^2-1}{x^2+1} \Rightarrow \frac{x^2-1}{x^2+1} = 0 \Rightarrow x^2-1 = 0 \Rightarrow x = \pm 1$$

$$\frac{x^2-1}{x^2+1} = 0 \Rightarrow x = \pm 1$$

راه حل سوال ۳ تا ۵ مفید نیست! واضح تر بپرسید!

$$f(x) = x^r - rx$$

$$f\left(\sin\frac{\pi}{r} + i\cos\frac{\pi}{r}\right) = f\left(\sqrt{\frac{r}{r}} + i\right)$$

$$\Rightarrow r\left(\sqrt{\frac{r}{r}} + i\right)^r - r\left(\sqrt{\frac{r}{r}} + i\right) = r\left(1 + \frac{r}{r} + \sqrt{r}\right) \cdot r - r\sqrt{r} = r + \frac{r}{r} + r\sqrt{r} - r - \frac{1}{r} \quad \text{[]}$$

$$f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{2a}{a-1}}{\frac{2}{a-1}} = a$$

$$f(f(a)) \in \mathbb{Z} \Rightarrow a \in \mathbb{Z} - \{1\}$$

$$a \neq 1 \leftarrow \frac{a+1}{a-1} = 1 \Rightarrow a+1 = a-1 \rightarrow \emptyset \cup \emptyset$$

$$f(x) = x^r - rx$$

$$f(g(a)) = -r$$

$$\Rightarrow x^r - rx + r = 0 \Rightarrow x = r \quad \text{[]}$$

$$g(x) = \sqrt{x^r - 1}$$

$$g(x) = r$$

$$\Rightarrow \sqrt{x^r - 1} = r \Rightarrow x^r - 1 = r \Rightarrow x^r = r + 1 \Rightarrow x = \pm \sqrt[r]{r+1}$$

$$\Rightarrow a = \pm \sqrt[r]{r+1}$$

$$f(x+r) = x^r - rx + r$$

$$f(r) \times f(-r) = ? \quad \text{[]}$$

$$f(r) = 1 - r + r = r$$

$$f(-r) = r^r + r + r = 2r$$

$$f(\cos x + i \sin x) = \cos^r x$$

$$f(r, \omega)$$

$$\cos x = t$$

$$r t^r + \omega t - r/\omega = 0 \Rightarrow t = \frac{-\omega \pm \sqrt{\omega^2 + 4r\omega}}{2} = \frac{-1 \pm \sqrt{1+4r}}{2}, \frac{r}{\omega} \rightarrow \emptyset \cup \emptyset$$

$$\Rightarrow \cos x = \frac{1}{r} \Rightarrow x = \frac{\pi}{r} \in \left[0, \frac{\pi}{r}\right] \rightarrow \text{[]}$$

$$\cos^r \frac{\pi}{r} = \left(\sqrt[r]{r}\right)^r = r$$

۲-ب) $\sqrt{x-1} + \sqrt{y+1} = 3$, $\sqrt{y+1} = 3 - \sqrt{x-1} \rightarrow 3 - \sqrt{x-1} \geq 0 \rightarrow \sqrt{x-1} \leq 3 \rightarrow x \leq 10$ I

$\downarrow$
 $x-1 \geq 0 \rightarrow x \geq 1$ I

$I, II \rightarrow 1 \leq x \leq 10 \rightarrow Df = [1, 10]$

۳- $\log_e \frac{x^2 - x - 2}{x^2 + 1} \rightarrow x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) > 0$ $\frac{-1 \pm \sqrt{1+8}}{2} \rightarrow x > 2 \text{ or } x < -1$ I

$\sqrt{x^2 - 1} + 1 \rightarrow$ مجموعه مثبت است $\rightarrow \sqrt{x^2 - 1} \rightarrow x^2 - 1 \geq 0 \rightarrow x \geq 1 \text{ or } x \leq -1$ II

$I, II \rightarrow x < -1 \text{ or } x > 2 \rightarrow Df = (-\infty, -1) \cup (2, +\infty)$

۴- -2 و b باید ریشه‌های عبارت زیر را تشکیل بدهند: $x^2 - 2(a) - (-2)^2 = 0 \rightarrow a = -\frac{1}{4}$ -2a - 1 = 0

$f(x) = \sqrt{3 - \frac{x}{4} - x^2} \rightarrow -x^2 - \frac{x}{4} + \frac{3}{4} = 0 \rightarrow x = \left(\frac{1}{4} \pm \sqrt{\frac{1}{16} + 12} \right) \times -\frac{1}{4}$ for $x = -2$
 $\rightarrow x = \frac{3}{4} \rightarrow b = \frac{3}{4}$

$a + b = -\frac{1}{4} + \frac{3}{4} = \frac{1}{2}$

$f(x) - x = \begin{cases} 3x - 2 - x & x \geq 1 \\ 3x + 3 - x & x < 1 \end{cases} = \begin{cases} 2x - 2 & x \geq 1 \\ x + 3 & x < 1 \end{cases}$ -5

$f(x) - x \geq 0 \rightarrow \begin{cases} 2x - 2 \geq 0 \rightarrow x \geq 1 \checkmark \\ x + 3 \geq 0 \xrightarrow{x < 1} -3 \leq x < 1 \checkmark \end{cases}$

$\rightarrow Df = [-3, +\infty)$

باید به دقت نیز مشخص است!

