

نام خانوادگی نوشته شود است منتهی خطیها و مرتود!

$$f\left(\frac{\sqrt{r}}{r}+1\right) = r\left(\frac{\sqrt{r}}{r}+1\right)^2 - f\left(\frac{\sqrt{r}}{r}+1\right)$$

$$r\left(\frac{r}{r}+1+\sqrt{r}\right) = \frac{r}{r}+2+\cancel{r\sqrt{r}}-\sqrt{r}-\epsilon = \frac{r}{r}-r-\frac{1}{r} \quad \text{D}$$

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$$f(a) = \frac{a+1}{a-1} \quad f(1) = 0 \quad f(-1) = 1$$

$$f\left(\frac{a+1}{a-1}\right) = \frac{\frac{a+1}{a-1}+1}{\frac{a+1}{a-1}-1} = a \Rightarrow \frac{a+1+a-1}{a-1} = \frac{2a}{a-1} = a \quad a \neq 1$$

$$D = \mathbb{R} - \{1\}$$

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$$x^2 - rx = -\epsilon$$

$$x^2 - \epsilon x + r$$

$$(x-r)^2 = 0$$

$$x = r$$

$$\sqrt{x^2+1} = r \quad \sqrt{r^2-1} =$$

$$x^2 - 1 = \epsilon$$

$$x^2 = \epsilon$$

$$x = \pm \sqrt{\epsilon}$$

$$x = 0/\sqrt{\epsilon}$$

$$a = \pm \sqrt{\epsilon}$$

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$$x+r = -r$$

$$x = -r$$

$$f(-r) = 3r + 3r + r = 7r$$

$$f(r) \times f(-r) = \cancel{r} \times 7r = 7rf$$

$$x+r = r$$

$$x = 1$$

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

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$$r \cos^2 + \omega \cos = r, \omega$$

$$\cos = t$$

$$1t^2 + 10t - 1 = 0$$

$$t = \frac{-10 \pm \sqrt{100 + 4}}{2} \Rightarrow t = \frac{-10 \pm 10}{2}$$

$$t = \frac{-10 \pm 10}{2}$$

$$\begin{cases} t = \frac{1}{2} \rightarrow \cos = \frac{1}{2} \\ t = -\frac{1}{2} \rightarrow \cos = -\frac{1}{2} \end{cases}$$

$$\sin^2 = 1 - \cos^2 = 1 - \frac{1}{4} = \frac{3}{4}$$

$$\tan^2 = \frac{\sin^2}{\cos^2} = \frac{3}{1} = 3$$

$$f(r, \omega) = 3$$

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الف ۱) $\frac{x-1}{x} - \frac{x}{n-1} \geq 0 \rightarrow \frac{x^2 - 2n + 1 - n^2}{x(n-1)} \geq 0 \rightarrow \frac{-2n+1}{x(n-1)} \geq 0$

$\frac{1}{x} - \frac{1}{n-1} \geq 0 \rightarrow D_f = (-\infty, 0) \cup [\frac{1}{n-1}, 1)$

ب ۱) تمام ریشه‌های مخرج‌ها نباید در دامنه باشند!

$x+2 \neq 0 \rightarrow x \neq -2$; $\frac{x}{x-1} + \frac{1}{x+2} \neq 0 \rightarrow \frac{x^2 + 2 + x - 1}{(x-1)(x+2)} \neq 0 \rightarrow x^2 + x + 1 \neq 0 \rightarrow x \neq -\frac{1}{2}$

$D_f = \mathbb{R} - \{-1, 0, 1, -2, -\frac{1}{2}\}$

الف ۲) $((\frac{1}{x})^n - 9)(3x - \frac{5}{x}) \geq 0 \rightarrow \frac{-2}{x} - \frac{5}{x^2} \geq 0 \rightarrow D_f = (-\infty, -2] \cup [\frac{5}{2}, +\infty)$

$(\frac{1}{x})^n = 9 \rightarrow n = -2$; $3x = \frac{5}{x} \rightarrow x = \frac{5}{3}$

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

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

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

۳- $\log_{\frac{1}{x}} x^2 - n - 2 \rightarrow x^2 - n - 2 > 0 \rightarrow (n-2)(n+1) > 0$; $\frac{-1}{x} \geq 0 \rightarrow n > 2 \leq n < -1$ I

$\sqrt{x^2-1} + 1 \rightarrow \sqrt{x^2-1} \geq 0 \rightarrow x^2-1 \geq 0 \rightarrow x \geq 1 \leq x \leq -1$ II

I, II $\rightarrow x < -1$, $x > 2 \rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$

۴- -2 و b باید ریشه‌های عبارت زیر را بسازند بنابراین: $a = -\frac{1}{x}$

$f(x) = \sqrt{3 - \frac{x}{x} - x^2} \rightarrow -x^2 - \frac{x}{x} + 3 = 0 \rightarrow x = (\frac{1}{x} \pm \sqrt{\frac{1}{x^2} + 12}) \times -\frac{1}{x}$; $n = -2$
 $\hookrightarrow x = \frac{3}{x} \rightarrow b = \frac{3}{x}$

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

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

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

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

بالتوجه به شکل نیز مشخص است!

