

الف) $\frac{(n-1)^2 - n^2}{n^2 - n} \geq 0 \rightarrow \frac{-2n+1}{n^2-n} \geq 0$ $\frac{0}{+} \frac{+}{-} \frac{1}{+}$ $D_f = (-\infty, 0) \cup [\frac{1}{2}, +\infty)$

ب) $f(n) = \frac{\frac{1}{n+1} - \frac{2}{n}}{\frac{2}{n-1} + \frac{1}{n+2}}$ $D = \mathbb{R} - \{ \frac{5}{2}, -2, -1, 0, 1 \}$

فرض $\Rightarrow \frac{2}{n-1} + \frac{1}{n+2} \neq 0$ $\frac{2n+5}{n^2+n-2} \neq 0 \rightarrow n \neq \frac{5}{2}$

الف) $\sqrt{((\frac{1}{2})^n - 9)(32 - \varepsilon^n)}$ $\frac{-2}{+} \frac{\log \frac{32}{\varepsilon}}{-}$ $D_f = (-\infty, -2] \cup [\log \frac{32}{\varepsilon}, +\infty)$
 $\log \frac{32}{\varepsilon} = \log \frac{2^5}{\varepsilon} = \frac{5}{\varepsilon}$

ب) $\sqrt[n]{n-1} + \sqrt[n]{n+1} = 3$ $\sqrt[n]{n+1} = 3 - \sqrt[n]{n-1} \rightarrow$ باید همواره مثبت باشد $\rightarrow \sqrt[n]{n-1} \leq 3 \rightarrow n-1 \leq 27 \rightarrow n \leq 28$
 $\sqrt[n]{n+1} = 3 - \sqrt[n]{n-1} \rightarrow n+1 = 9 + \sqrt[n]{n-1} - \sqrt[n]{n-1}$
 $n = 1 + \sqrt[n]{n-1} - \sqrt[n]{n-1} \Rightarrow D_f = [1, +\infty)$

$f(n) = \frac{\log \frac{(n^2-n-2)}{\varepsilon}}{\sqrt{n^2-1} + 1}$ $n^2-n-2 > 0$ $(n-2)(n+1) > 0$ $\frac{-1}{+} \frac{2}{-}$ $(-\infty, -1) \cup (2, +\infty)$
 $n^2-1 \geq 0$ $n^2 \geq 1$ $\frac{n}{n} \geq 1$ $\frac{n}{n} \leq -1 \rightarrow (-\infty, -1] \cup [1, +\infty)$
 $D_f = (-\infty, -1) \cup (2, +\infty)$

$f(n) = \sqrt{3+an-n^2}$ $D_f = [-2, b]$

$n = -2 \rightarrow \sqrt{-2a-1} = 0 \rightarrow -2a-1 = 0 \rightarrow a = \frac{-1}{2}$

$\sqrt{3+\frac{1}{2}n-n^2} \rightarrow -n^2 - \frac{1}{2}n + 3 \geq 0$ $\Delta = \frac{1}{4} + 12 = \frac{49}{4}$

$n = \frac{\frac{1}{2} \pm \sqrt{\frac{49}{4}}}{-2}$ $\frac{-2}{+} \frac{3}{-}$ $D_f = [-2, \frac{5}{2}]$

$f(n) = \begin{cases} 3n-2 & n \geq 1 \\ 2n+3 & n < 1 \end{cases}$ $g(n) = \sqrt{f(n)-n}$
 $f(n)-n \geq 0$

$f(n) = n \rightarrow 3n-2 = n \rightarrow n = 1$
 $2n+3 = n \rightarrow n = -3$

$\frac{-3}{+} \frac{1}{-}$

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

چون عبارت ۲ ضابطه ای است نه تری با جدول تست کن!

$3n-2 \geq 0 \rightarrow n \geq \frac{2}{3}$
 $2n+3 \geq 0 \rightarrow n \geq -\frac{3}{2} \rightarrow D_f = [-\frac{3}{2}, +\infty)$

$$f(w) = 2w^2 - 2w \rightarrow 2w(w-1)$$

$$f\left(\sin \frac{\pi}{4} + \cos \frac{\pi}{4}\right) \rightarrow f\left(\frac{\sqrt{2}}{2} + 1\right)$$

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

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

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

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

مجموعه مقعر

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$$f(w) = w^2 - 2w \xrightarrow{w=g(a)} f(g(a)) = (g(a))^2 - 2g(a) = -2$$

$$f(g(a)) = -2$$

$$(g(a))^2 - 2g(a) + 2 = 0$$

$$(g(a) - 2)^2 = 0$$

$$g(a) = 2$$

$$g(w) = \sqrt{w-1} \rightarrow g(a) = \sqrt{a-1} \Rightarrow \sqrt{a-1} = 2$$

$$a-1 = 4 \rightarrow a = 5 \rightarrow \alpha = \pm \sqrt{5}$$

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$$f(w+3) = w^2 - 2w + 4 \Rightarrow (w-2)(w-3)$$

$$w+3 = 2 \rightarrow w = -1 \Rightarrow f(2) = 4 \Rightarrow f(2) \times f(-3) = 12 \times 4 = 48$$

$$w+3 = -3 \rightarrow w = -6 \Rightarrow f(-3) = 17$$

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$$f(\xi \cos^2 w + \Delta \cos w) = \tan^2 w$$

$$\xi \cos^2 w + \Delta \cos w = \tan^2 w$$

$$\xi \cos^2 w + \Delta \cos w - \frac{1}{\cos^2 w} = 0 \Rightarrow \Delta = 2\Delta + \Delta^2 = 11$$

$$\cos w = \frac{-\Delta \pm 9}{1} \rightarrow \frac{1}{\cos^2 w} \Rightarrow w = 40^\circ \Rightarrow \tan^2 40^\circ = 3$$

کثیرالزاویه است

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

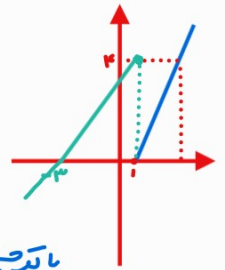
I, II $\rightarrow 1 \leq x \leq 10 \rightarrow Df = [1, 10]$

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

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

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

باید به پس نیز مشخص است!



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