

۱۹،۲۵ آفرین خدب نوشته

سوال ۸۱

$$y = \frac{x+3}{2x^3+3x^2-1x+3} \rightarrow (x-1)(2x^2+5x-3) \neq 0$$

$$D_f = \mathbb{R} - \left\{ -3, \frac{1}{2}, 1 \right\}$$

$$\begin{aligned} 2x^2+5x-3 &= 0 \\ \frac{-5}{2} &\leftarrow (x+4)(x-1) \rightarrow \frac{1}{2} \end{aligned}$$

$$\text{ب) } \frac{x+3}{2x^3+9x^2+10x+3} \quad (x+1)(2x^2+7x+3) \neq 0$$

$$\begin{aligned} (x+\frac{1}{2})(x+3) &\leftarrow \frac{x^2+7x+3}{(x+1)(x+4)} \rightarrow \frac{-7}{2} \\ D_f &= \mathbb{R} - \left\{ -3, -1, -\frac{1}{2} \right\} \end{aligned}$$

$$\begin{aligned} &2x^3+3x^2-1x+3 \quad | \quad x-1 \\ &\underline{-2x^3+6x^2-2x-3} \\ &9x^2-1x+3 \\ &\underline{-9x^2+9x-3} \\ &10x \\ &\underline{-10x+10} \\ &3 \\ &\underline{-3x+3} \\ &0 \end{aligned}$$

$$\begin{aligned} &2x^3+9x^2+10x+3 \quad | \quad x+1 \\ &\underline{-2x^3+2x^2+2x-3} \\ &11x^2+12x-3 \\ &\underline{-11x^2-11x-11} \\ &23x-8 \\ &\underline{-23x+23} \\ &15 \end{aligned}$$

سوال ۸۲

$$\Delta = b^2 - 4ac$$

$$y = \frac{x+3}{x^3-2x^2+2x-1} \rightarrow (x-1)(x^2-x+1)$$

$$\Delta = 1 - 4(1)(1) = -3$$

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

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

$$\frac{-3}{+\infty - \frac{1}{\infty} +} \quad \Delta = 1 - 4(1)(1) = -3$$

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

$$\begin{aligned} &x^3-2x^2+2x-1 \quad | \quad x-1 \\ &\underline{-x^3+2x^2-x+1} \\ &-x^2+x-1 \\ &\underline{+x^2-x} \\ &-1 \\ &\underline{-x+1} \\ &0 \end{aligned}$$

$$\begin{aligned} &x^3-2x^2+2x-1 \quad | \quad x-1 \\ &\underline{-x^3+2x^2-x+1} \\ &-x^2+x-1 \\ &\underline{+x^2-x} \\ &-1 \\ &\underline{-x+1} \\ &0 \end{aligned}$$

$$y = \frac{2}{x^2-5|x-1|-2x+5}$$

خلاف صفر

$$\begin{aligned} x > 1 &\rightarrow x^2-5x+5-2x+5 = x^2-7x+10 \\ &\rightarrow (x-2)(x-5) = 0 \end{aligned}$$

$$x < 1 \rightarrow x^2+5x-5-2x+5 = x^2+3x = x(x+3) = 0$$

$$D_f = \mathbb{R} - \left\{ -3, 0, 2, 5 \right\}$$

سوال ۸۴

الف) $y = \sqrt{[-x]-2}$ $[-x]-2 \geq 0$ $[x] \geq 2$ $D_f = (-\infty, -2]$

ب) $y = \frac{5x^2+4}{[x]^2-2[x]-3}$ $t^2-2t-3 \neq 0 \rightarrow (t-3)(t+1) \neq 0$ ۱، ۳

$[x]=t$ $[x]=3 \rightarrow x=[3, 4)$ $[x]=-1 \rightarrow x=[-1, 0)$ $D_f = [-1, 0) \cup [3, 4)$

این بازه‌ها بنابر درجانی تابع باشند چون ریشه‌های منفرد هستند $D_f = \mathbb{R} - \{(-1, 0) \cup [3, 4)\}$

مسئله ۸۵

الف) $\sqrt{[x-\frac{1}{3}]+[x+\frac{2}{3}]}$ $[x-\frac{1}{3}]+[x+\frac{2}{3}] \geq 0 \rightarrow [x-\frac{1}{3}]+[x+\frac{2}{3}]-1 \geq -1$
 $\rightarrow [x-\frac{1}{3}]+[x-\frac{1}{3}] \geq -1 \rightarrow [x-\frac{1}{3}] \geq -\frac{1}{2} \rightarrow D_f = [\frac{1}{3}, +\infty)$

ب) $\sqrt{[x-\frac{1}{3}]+[\frac{1}{3}-x]}$ $\rightarrow [t]+[-t]$ $t \in \mathbb{Z}$ $x-\frac{1}{3} \in \mathbb{Z}$
 $\rightarrow D_f = \{x = k + \frac{1}{3} \mid k \in \mathbb{Z}\}$

سوال ۹۶

الف) $\frac{\cot x + 1}{\tan x + 1}$ $\cot = \frac{\cos}{\sin} \rightarrow \sin \neq 0 \rightarrow x \neq k\pi$
 $\tan x + 1 \neq 0 \rightarrow \tan x \neq -1 \rightarrow x \neq k\pi + \frac{\pi}{4} + \frac{\pi}{4}$
 $\tan = \frac{\sin}{\cos} \rightarrow \cos \neq 0 \rightarrow x \neq k\pi + \frac{\pi}{2}$
 $D_f = \mathbb{R} - \{k\pi, k\pi + \frac{\pi}{4} + \frac{\pi}{4}, k\pi + \frac{\pi}{2}\}$

ب) $\sqrt{1-4\sin^2 x}$ $1-4\sin^2 x \geq 0 \rightarrow (1-2\sin x)(1+2\sin x) \geq 0$
 $\rightarrow -\frac{1}{2} \leq \sin x \leq \frac{1}{2}$
 $D_f = [k\pi - \frac{\pi}{6}, k\pi + \frac{\pi}{6}]$



Subo

سوال ۸۷

الف) $y = \sqrt{2 \sin x - 1}$ $2 \sin x - 1 \geq 0 \rightarrow 2 \sin x \geq 1 \rightarrow \sin x \geq \frac{1}{2}$ 

$D_f = \left[2k\pi + \frac{\pi}{6}, 2k\pi + \frac{5\pi}{6} \right]$

ب) $y = \sqrt{1 - 2 \cos x}$ $1 - 2 \cos x \geq 0 \rightarrow 2 \cos x \leq 1 \rightarrow \cos x \leq \frac{1}{2}$ 

$D_f = \left[2k\pi + \frac{2\pi}{3}, 2k\pi + \frac{4\pi}{3} \right]$

سوال ۸۸

الف) $y = \arcsin(x^2 + 3x + 1)$ $x^2 + 3x + 1 \leq 1 \rightarrow x^2 + 3x \leq 0 \rightarrow x(x+3) \leq 0 \rightarrow x \in [-3, 0]$

$x^2 + 3x + 1 \geq -1 \rightarrow x^2 + 3x + 2 \geq 0 \rightarrow (x+1)(x+2) \geq 0 \rightarrow x \in (-\infty, -2] \cup [-1, +\infty)$

$D_f = [-3, -2] \cup [-1, 0]$

$(-\infty, -2] \cup [-1, +\infty)$

ب) $y = \sqrt{5 - 2x}$ $\sqrt{5 - 2x} \leq 1 \rightarrow 5 - 2x \leq 1 \rightarrow -2x \leq -4 \rightarrow x \geq 2$
 $\sqrt{5 - 2x} \geq 0 \rightarrow 5 - 2x \geq 0 \rightarrow -2x \geq -5 \rightarrow x \leq \frac{5}{2}$
 $D_f = [2, \frac{5}{2}]$

سوال ۸۹

الف) $y = \log_2(1 - \log_3 x)$ $1 - \log_3 x > 0 \rightarrow \log_3 x < 1 \rightarrow x < 3$
 $\log_3 x \rightarrow x > 0$
 $D_f = (0, 3)$

ب) $y = \log_2(1 - \log_3 \frac{x}{4})$ $\log_3 \frac{x}{4} \rightarrow x > 0$

$D_f = (0, \frac{1}{4})$

$1 - \log_3 \frac{x}{4} > 0 \rightarrow \log_3 \frac{x}{4} < 1 \rightarrow x < \frac{1}{4}$

چون مبدا بینهایت است جهت نامعادله عوض می‌شود!

$\log_{\frac{1}{2}} x < 1 \rightarrow x > \frac{1}{2} \rightarrow D_f = (\frac{1}{2}, +\infty)$

$$\sqrt{2} \leq \sqrt{2} \frac{\sqrt{4x-x^2}}{2} - 1 \quad \frac{4x-x^2}{2} - 1 \geq 0 \rightarrow \frac{4x-x^2}{2} \geq 1$$

$$4x-x^2 \geq 2 \rightarrow -x^2+4x-2 \geq 0 \rightarrow x^2-4x+2 \leq 0 \rightarrow (x-1)(x-3) \leq 0$$

$$D_f = [1, 3]$$

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

$$b \mid \left(\frac{3x+a}{2x+2} \right) \mid \rightarrow \frac{3x+a}{2x+2} = n \quad \text{با عدد صحیح برای اشیاء نامتناهی!}$$

اعداد صحیح نامتناهی
 $n =$

$$3x+a = 2nx+2n \rightarrow 3x-2nx = 2n-a \rightarrow x(3-2n) = 2n-a$$

$$\rightarrow x = \frac{2n-a}{3-2n} \rightarrow D_f = \left\{ \frac{a-2n}{2n-3} \mid n \in \mathbb{Z} \right\}$$

$$b) -4) \quad [x]^2 - 2[x] - 3 = 0 \quad [x] = t \rightarrow t^2 - 2t - 3 = 0 \rightarrow (t-3)(t+1) = 0$$

$$t=3 \rightarrow [x]=3 \rightarrow x \in [3, 4)$$

$$t=-1 \rightarrow [x]=-1 \rightarrow x \in [-1, 0)$$

$$\rightarrow D_f = (-\infty, -1) \cup [3, 4) \cup [4, +\infty)$$

$$\mathbb{R} - \left\{ \frac{b}{2} \mid [x, 4) \cup [4, 5) \right\}$$

$$9) - b) \quad y = \log_r \left(1 - \log_{\frac{n}{r}} \right) \rightarrow \log_{\frac{n}{r}} \rightarrow n$$

$$\rightarrow 1 - \log_{\frac{n}{r}} > 0 \rightarrow \log_{\frac{n}{r}} < 1 \quad \text{مناسب} \rightarrow n > \frac{1}{r}$$

$$D_f = \left(\frac{1}{r}, +\infty \right)$$