

الف) $y = \frac{u+3}{2u^3+3u^2-1u+3} \rightarrow 2u^3+3u^2-1u+3 \neq 0 \rightarrow$ جمع ضرایب عبارت صفر نیست بر $u-1$ بخش پذیر

$$\Rightarrow 2u^3+3u^2-1u+3 \div u-1$$

$$\begin{array}{r} 2u^3+3u^2-1u+3 \\ -(2u^3-2u^2) \\ \hline 5u^2-1u+3 \\ -(5u^2-5u) \\ \hline 4u+3 \\ -(4u-4) \\ \hline 7 \end{array}$$

$\hookrightarrow (u-1)(2u^2+5u-3) \neq 0$
 $u=1 \leftarrow \hookrightarrow u^2+5u-4=0 \rightarrow (u-1)(u+4)=0 \rightarrow u=1 \div 2 \rightarrow u=\frac{1}{2}$
 $\rightarrow u=-4 \div 2 \rightarrow u=-3$

$D_f = R - \{1, \frac{1}{2}, -3\} \rightarrow$ جواب ✓

ب) $y = \frac{u+3}{2u^3+9u^2+10u+3} \rightarrow 2u^3+9u^2+10u+3 \neq 0 \rightarrow$ جمع ضرایب با توان اولی از 2 با جمع ضرایب با توان های فرد برابر پس عبارت بر $u+1$ بخش پذیر

$$\Rightarrow 2u^3+9u^2+10u+3 \div u+1$$

$$\begin{array}{r} 2u^3+9u^2+10u+3 \\ -(2u^3+2u^2) \\ \hline 7u^2+10u+3 \\ -(7u^2+7u) \\ \hline 3u+3 \\ -(3u+3) \\ \hline 0 \end{array}$$

$\hookrightarrow (u+1)(2u^2+7u+3) \neq 0$
 $u=-1 \leftarrow \hookrightarrow u^2+7u+4=0 \rightarrow (u+1)(u+4)=0 \rightarrow u=-1 \div 2 \rightarrow -\frac{1}{2}$
 $\rightarrow u=-4 \div 2 \rightarrow -2$

$D_f = R - \{-1, -3, -\frac{1}{2}\} \rightarrow$ جواب ✓

الف) $y = \frac{u+3}{u^3-2u^2+2u-1} \rightarrow u^3-2u^2+2u-1 \neq 0 \rightarrow$ جمع ضرایب عبارت صفر نیست بر $u-1$ بخش پذیر

$$\Rightarrow u^3-2u^2+2u-1 \div u-1$$

$$\begin{array}{r} u^3-2u^2+2u-1 \\ -(u^3-u^2) \\ \hline -u^2+2u-1 \\ -(-u^2+u) \\ \hline -u-1 \\ -(-u-1) \\ \hline 0 \end{array}$$

$\hookrightarrow (u-1)(u^2-u+1) \neq 0$
 $u=1 \leftarrow \hookrightarrow \Delta = b^2-4ac \rightarrow \Delta = 1-(2 \times 1 \times 1) = -3 \rightarrow \Delta < 0 \rightarrow$ عبارت ریشه حقیقی ندارد

$\hookrightarrow D_f = R - \{1\} \rightarrow$ جواب ✓

ب) $y = \sqrt{\frac{u+3}{u^3-2u^2+2u-1}} \geq 0 \rightarrow$ جمع ضرایب عبارت صفر نیست بر $u-1$ بخش پذیر

$$\Rightarrow \frac{u+3}{u^3-2u^2+2u-1} \geq 0$$

$\star \rightarrow u+3=0 \rightarrow u=-3$
 $\star \rightarrow u^3-2u^2+2u-1=0 \rightarrow u=1$
 $\hookrightarrow (u-1)(u^2-u+1)$
 $\Delta < 0 \rightarrow$ ریشه حقیقی ندارد

$\frac{-3}{+ \phi - \phi +} \rightarrow D_f = (-\infty, -3] \cup (1, +\infty) \rightarrow$ جواب ✓

$y = \frac{u}{u^2-5|u-1|-2u+5} \rightarrow u^2-5|u-1|-2u+5 \neq 0$

$\star \rightarrow u^2-5u+10 \neq 0 \rightarrow (u-2)(u-5) \neq 0$
 $u=2 \leftarrow \hookrightarrow u=5$
 $\star \rightarrow u^2+3u \neq 0 \rightarrow u(u+3) \neq 0$
 $u=0 \leftarrow \hookrightarrow u=-3$

$D_f = R - \{-3, 0, 2, 5\} \rightarrow$ جواب ✓

الف) $y = \frac{u+3}{|2u+1|-|u+3|} \Rightarrow |2u+1|-|u+3| \neq 0 \rightarrow |2u+1| \neq |u+3| \rightarrow 2u+1 \neq u+3 \rightarrow u \neq 2$
 $\star \rightarrow u \neq 2$ و $\star \rightarrow 2u \neq -1 \rightarrow u \neq -\frac{1}{2} \rightarrow D_f = \mathbb{R} - \{2, -\frac{1}{2}\} \rightarrow$ جواب

ب) $y = \sqrt{|2u+1|-|u+3|} \Rightarrow |2u+1|-|u+3| \geq 0 \rightarrow |2u+1| \geq |u+3| \xrightarrow{\text{مربع کردن}} u^2+2u+1 \geq u^2+4u+9$
 $\Rightarrow 2u^2+2u-8 \geq 0 \rightarrow 2u^2+2u-4 \geq 0 \rightarrow u^2+u-2 \geq 0 \Rightarrow (u-1)(u+2) \geq 0$
 $\Rightarrow u \leq -2 \text{ یا } u \geq 1$
 $\frac{-1}{2} \quad 1$
 $+\quad - \quad + \rightarrow D_f = (-\infty, -\frac{1}{2}] \cup [1, +\infty) \rightarrow$ جواب

الف) $y = \log_p(1-\log_p^u)$
 $\star \rightarrow \log_p^u \Rightarrow \begin{cases} p \neq 1 \\ p > 0 \\ u > 0 \end{cases}$
 $\star \rightarrow 1-\log_p^u > 0 \rightarrow \log_p^u < 1 \rightarrow u < p \text{ (I)}$
 $\star \rightarrow \log_p^u > 0 \rightarrow u > 1 \text{ (II)}$
 $\Rightarrow (I) \cap (II) \Rightarrow D_f = (1, p)$

ب) $y = \log_p(1-\log_p^{\frac{1}{p}})$
 $\star \rightarrow \log_p^{\frac{1}{p}} \Rightarrow \begin{cases} p \neq 1 \\ p > 0 \\ \frac{1}{p} > 0 \end{cases}$
 $\star \rightarrow 1-\log_p^{\frac{1}{p}} > 0 \rightarrow \log_p^{\frac{1}{p}} < 1 \rightarrow u > \frac{1}{p} \text{ (I)}$
 $\star \rightarrow \log_p^{\frac{1}{p}} > 0 \rightarrow u > 0 \text{ (II)}$
 $\Rightarrow (I) \cap (II) \Rightarrow D_f = (\frac{1}{p}, +\infty)$

$f(u) = \sqrt{\log_{\frac{1}{\omega}}(\log_{\frac{1}{\omega}}(2u-1))}$
 $\Rightarrow \log_{\frac{1}{\omega}}(\log_{\frac{1}{\omega}}(2u-1)) \geq 0 \rightarrow \log_{\frac{1}{\omega}}(2u-1) \geq 1 \Rightarrow 2u-1 \leq \frac{1}{\omega} \rightarrow 2u \leq \frac{1}{\omega}+1 \rightarrow u \leq \frac{1}{2}(\frac{1}{\omega}+1) \text{ (I)}$
 $\star \rightarrow \log_{\frac{1}{\omega}}(2u-1) > 0 \rightarrow 2u-1 > 1 \rightarrow 2u > 2 \rightarrow u > 1 \text{ (II)}$
 $\star \rightarrow \log_{\frac{1}{\omega}}(2u-1) > 0 \rightarrow 2u-1 > 1 \rightarrow 2u > 2 \rightarrow u > 1 \text{ (III)}$
 $\Rightarrow I \cap II \cap III \Rightarrow D_f = (1, \frac{1}{2}(\frac{1}{\omega}+1))$

الف) $y = \log_2(2\cos u + 1) \rightarrow 2\cos u + 1 > 0 \rightarrow 2\cos u > -1 \rightarrow \cos u > -\frac{1}{2} \Rightarrow$
 $\Rightarrow D_f = (2k\pi - \frac{2\pi}{3}, 2k\pi + \frac{2\pi}{3}) \rightarrow$ جواب

ب) $y = \sqrt{\log \frac{u-1}{u+1}} \Rightarrow \log \frac{u-1}{u+1} \geq 0 \rightarrow \frac{u-1}{u+1} \geq 1 \Rightarrow \frac{u-1}{u+1} - 1 \geq 0 \Rightarrow \frac{u-1-u-1}{u+1} \geq 0$
 $\Rightarrow \frac{-2}{u+1} \geq 0 \rightarrow \frac{-1}{+\frac{1}{2}-} \Rightarrow D_f = (-\infty, -1) \text{ I}$
 $\Rightarrow \log \frac{u-1}{u+1} \Rightarrow \frac{u-1}{u+1} > 0 \rightarrow \frac{-1}{+\frac{1}{2}-} \rightarrow (-\infty, -1) \cup [1, +\infty) \text{ II}$

$f(u) = \sqrt{(a+2)u^2+au+b}$
 $\Rightarrow (a+2)u^2 \geq 0 \Rightarrow a+2 \geq 0 \Rightarrow a \geq -2$
 $\Rightarrow a+2 \geq 0 \Rightarrow -2u+b \geq 0 \rightarrow -2 \times 4 + b = 0 \Rightarrow -2+b=0 \Rightarrow b=2$
 $D_f = (-\infty, 4] \cup [1, +\infty)$

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$$f(u) = \sqrt{u^2 + 2u + 2 - m^2} \rightarrow \text{گفته اند اعداد حقیقی هستند پس } D_f = \mathbb{R} \Rightarrow u^2 + 2u + 2 - m^2 \geq 0$$

$$\Rightarrow \Delta = b^2 - 4ac = 4 - 4 + 4m^2 = 0$$

$$\Rightarrow -4 + 4m^2 = 0 \Rightarrow 4m^2 = 4 \Rightarrow m^2 = 1$$

و این را بچه ها به روش دیگری پیدا میکنند (با استفاده از $\Delta = 0$)

اختلاف بیشترین و کمترین مقدار $\rightarrow 1 - (-1) = 2$ جواب

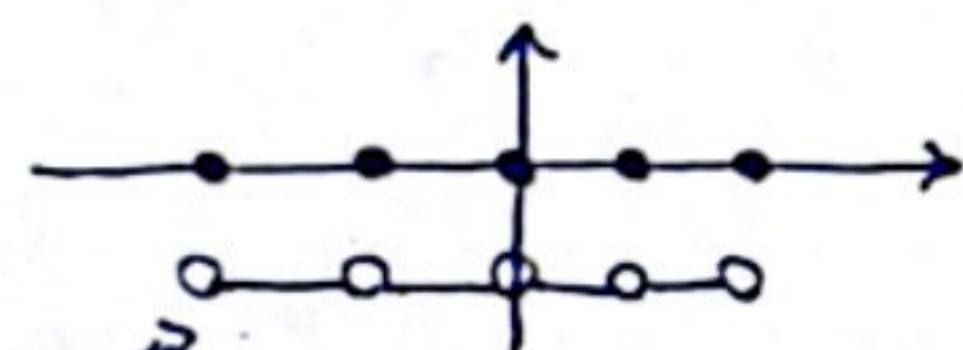
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$$f(u) = \frac{\sqrt{4 - u^2}}{[u] + [-u] + 1}$$

$$\Rightarrow \sqrt{4 - u^2} \Rightarrow 4 - u^2 \geq 0 \rightarrow u^2 \leq 4 \rightarrow -2 \leq u \leq 2 \Rightarrow D_f = [-2, 2] \text{ I}$$

$$\Rightarrow [u] + [-u] + 1 \neq 0 \Rightarrow [u] + [-u] \neq -1$$

$$\Rightarrow I \cap II = D_f = [-2, 2]$$



$$y = [u] + [-u]$$

$$\begin{cases} 0 \leq u \in \mathbb{Z} \Rightarrow u \in \mathbb{Z} \text{ II} \\ -1 \leq u \notin \mathbb{Z}^* \end{cases}$$

که چند عدد صحیح؟
که $\{-2, -1, 0, 1, 2\}$ است
که جواب

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