

1

$$y = \frac{n+3}{n^3 + 3n^2 - 1n + 3} = \frac{n+3}{(n-1)(n-\frac{1}{2})(n+3)} \rightarrow D_f = \mathbb{R} - \left\{ \frac{1}{2}, -3 \right\} \quad (1)$$

$n=1 \quad n=\frac{1}{2} \quad n=-3$

$$\frac{n^3 + 3n^2 - 1n + 3}{n^3 + 3n^2 - 1n + 3} \cdot \frac{(n-1)}{(n-1)} \rightarrow n^3 + 3n^2 - 1n + 3 - (n^3 + 3n^2 - 1n + 3) = 0$$

$$\frac{n^3 + 3n^2 - 1n + 3}{n^3 + 3n^2 - 1n + 3} \cdot \frac{(n-1)}{(n-1)} \rightarrow n^3 + 3n^2 - 1n + 3 - (n^3 + 3n^2 - 1n + 3) = 0$$

$$\frac{n^3 + 3n^2 - 1n + 3}{n^3 + 3n^2 - 1n + 3} \cdot \frac{(n-1)}{(n-1)} \rightarrow n^3 + 3n^2 - 1n + 3 - (n^3 + 3n^2 - 1n + 3) = 0$$

2

$$y = \frac{n+3}{n^3 + 9n^2 + 16n + 3} = \frac{n+3}{(n+1)(n+3)(n+\frac{1}{2})} \rightarrow D_f = \mathbb{R} - \left\{ -1, -\frac{1}{2}, -3 \right\}$$

$n=-1 \quad n=-\frac{1}{2} \quad n=-3$

$$\frac{n^3 + 9n^2 + 16n + 3}{n^3 + 9n^2 + 16n + 3} \cdot \frac{(n+1)}{(n+1)} \rightarrow n^3 + 9n^2 + 16n + 3 - (n^3 + 9n^2 + 16n + 3) = 0$$

$$\frac{n^3 + 9n^2 + 16n + 3}{n^3 + 9n^2 + 16n + 3} \cdot \frac{(n+1)}{(n+1)} \rightarrow n^3 + 9n^2 + 16n + 3 - (n^3 + 9n^2 + 16n + 3) = 0$$

$$\frac{n^3 + 9n^2 + 16n + 3}{n^3 + 9n^2 + 16n + 3} \cdot \frac{(n+1)}{(n+1)} \rightarrow n^3 + 9n^2 + 16n + 3 - (n^3 + 9n^2 + 16n + 3) = 0$$

3

$$y = \frac{n+3}{n^3 - 2n^2 + 3n - 1} = \frac{n+3}{(n-1)(n^2 - n + 1)} \rightarrow D_f = \mathbb{R} - \{1\}$$

$n=1$

$$\frac{n^3 - 2n^2 + 3n - 1}{n^3 - 2n^2 + 3n - 1} \cdot \frac{(n-1)}{(n-1)} \rightarrow n^3 - 2n^2 + 3n - 1 - (n^3 - 2n^2 + 3n - 1) = 0$$

$$\frac{n^3 - 2n^2 + 3n - 1}{n^3 - 2n^2 + 3n - 1} \cdot \frac{(n-1)}{(n-1)} \rightarrow n^3 - 2n^2 + 3n - 1 - (n^3 - 2n^2 + 3n - 1) = 0$$

$$\frac{n^3 - 2n^2 + 3n - 1}{n^3 - 2n^2 + 3n - 1} \cdot \frac{(n-1)}{(n-1)} \rightarrow n^3 - 2n^2 + 3n - 1 - (n^3 - 2n^2 + 3n - 1) = 0$$

4

$$y = \frac{n+3}{n^3 - 2n^2 + 3n - 1} = \frac{n+3}{(n-1)(n^2 - n + 1)} \rightarrow D_f = (-\infty, 1] \cup (1, +\infty)$$

$n=1$

$$y = \frac{x^2}{x^2 - 4|x-1| - x + 4}$$

$x=1 \rightarrow x^2 - 4|x-1| - x + 4 = 1 - 4(0) - 1 + 4 = 0 \rightarrow \Delta = 1 - 4 = -3 < 0$
 $x > 1 \rightarrow x^2 - 4(x-1) - x + 4 = x^2 - 5x + 8 = 0 \rightarrow (x-2)(x-4) = 0$
 $x < 1 \rightarrow x^2 - 4(1-x) - x + 4 = x^2 + 3x = 0 \rightarrow x(x+3) = 0$
 $x=0, x=-3$

$$\rightarrow P_f = \mathbb{R} - \{2, 4, 0, -3\}$$

$$\text{ii) } y = \sqrt{[x] - x} \rightarrow [x] - x \geq 0 \rightarrow [x] \geq x \rightarrow P_f = (-\infty, 0]$$

$$\text{iii) } y = \frac{x^2 + x}{[x]^2 - x}$$

$[x]^2 - x \neq 0 \rightarrow [x] = t \rightarrow t^2 - t \neq 0 \rightarrow t(t-1) \neq 0$
 $t \neq 0 \rightarrow [x] \neq 0 \rightarrow x \notin [0, 1)$
 $t \neq 1 \rightarrow [x] \neq 1 \rightarrow x \notin [1, 2)$

$$P_f = \mathbb{R} - [0, 1) \cup [1, 2)$$

$$\text{iv) } y = \sqrt{[x - \frac{1}{x}] + [x + \frac{1}{x}]} = \sqrt{[x - \frac{1}{x}] + [x - \frac{1}{x} + 1]} = \sqrt{[x - \frac{1}{x}] + [x - \frac{1}{x}] + 1}$$

$$= \sqrt{2[x - \frac{1}{x}] + 1} \rightarrow 2[x - \frac{1}{x}] + 1 \geq 0 \rightarrow [x - \frac{1}{x}] \geq -\frac{1}{2} \rightarrow [x - \frac{1}{x}] \geq 0$$

$$\rightarrow x - \frac{1}{x} \geq 0 \rightarrow x \geq \frac{1}{x} \rightarrow P_f = [\frac{1}{x}, +\infty)$$

$$\text{v) } y = \sqrt{[x - \frac{1}{x}] + [\frac{1}{x} - x]} = \sqrt{[x - \frac{1}{x}] + [-(x - \frac{1}{x})]} = [x - \frac{1}{x}] + [-(x - \frac{1}{x})] \geq 0$$

$$\rightarrow x - \frac{1}{x} \in \mathbb{Z} \rightarrow x \in \mathbb{Z} + \frac{1}{x} \rightarrow P_f = \{x \mid x = k + \frac{1}{x}, k \in \mathbb{Z}\}$$

$$\text{vi) } y = \frac{6 + \pi + 1}{\tan \pi + 1}$$

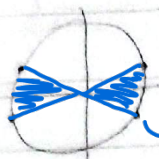
$n \neq k\pi$
 $n \neq k\pi + \frac{\pi}{2}$
 $\tan n + 1 \neq 0 \rightarrow \tan n \neq -1 \rightarrow n \neq k\pi + \frac{3\pi}{4}$

$$\rightarrow P_f = \mathbb{R} - \{\frac{k\pi}{x}, \frac{k\pi + \frac{3\pi}{4}}{x}\}$$

$$\div) y = \sqrt{1 - 4 \sin^2 n} \rightarrow 1 - 4 \sin^2 n \geq 0 \rightarrow (1 - 2 \sin n)(1 + 2 \sin n) \geq 0$$

چرا بازه کار را به حسب دستور نوشتم!

$$\begin{aligned} 2 \sin n &\neq 1 & 2 \sin n &\neq -1 \\ \sin n &\neq \frac{1}{2} & \sin n &= -\frac{1}{2} \end{aligned}$$



$$D_f = \{k\pi \pm \frac{\pi}{6}\} \rightarrow D_f = [k\pi - \frac{\pi}{6}, k\pi + \frac{\pi}{6}]$$

1,5

$$\div) y = \sqrt{2 \sin n - 1} \rightarrow 2 \sin n - 1 \geq 0 \rightarrow \sin n \geq \frac{1}{2} \rightarrow D_f = [k\pi + \frac{\pi}{6}, k\pi + \frac{5\pi}{6}]$$



1,5

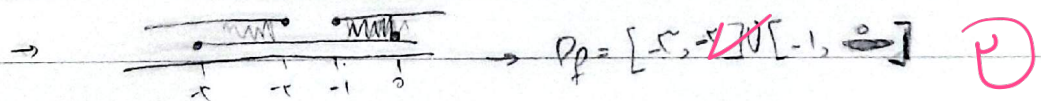
$$\div) y = \sqrt{1 - 2 \cos n} \rightarrow 1 - 2 \cos n \geq 0 \rightarrow \cos n \leq \frac{1}{2} \rightarrow D_f = [k\pi + \frac{\pi}{3}, k\pi + \frac{5\pi}{3}]$$



$$\div) y = \arcsin(n^2 + 3n + 1) \rightarrow -1 \leq n^2 + 3n + 1 \leq 1 \rightarrow n^2 + 3n + 1 \leq 1 \rightarrow n^2 + 3n \leq 0$$

$$\rightarrow n(n + 3) \leq 0 \rightarrow \frac{-3}{2} \leq n \leq 0 \rightarrow [-\frac{3}{2}, 0]$$

$$\rightarrow n^2 + 3n + 1 \geq -1 \rightarrow n^2 + 3n + 2 \geq 0 \rightarrow (n + 2)(n + 1) \geq 0 \rightarrow n \leq -2 \text{ or } n \geq -1 \rightarrow (-\infty, -2] \cup [-1, \infty)$$



$$\div) \cos y = \sqrt{5 - x n} \rightarrow -1 \leq \sqrt{5 - x n} \leq 1 \rightarrow \sqrt{5 - x n} \leq 1 \rightarrow 5 - x n \leq 1 \rightarrow -x n \leq -4 \rightarrow x n \geq 4$$

$$\begin{aligned} x n + 4 &\leq 0 \rightarrow -n + 2 \leq 0 \rightarrow n \geq 2 \\ 5 - x n &\geq 0 \rightarrow 5 \geq x n \rightarrow n \leq \frac{5}{x} \end{aligned} \rightarrow D_f = [2, \frac{5}{x}]$$

$$\div) y = \log_r \rightarrow n > 0$$

$$1 - \log_r n \geq 0 \rightarrow \log_r n < 1 \rightarrow n < r \rightarrow D_f = (0, r)$$

$$\div) \log_r \rightarrow n > 0$$

$$1 - \log_{\frac{1}{r}} n \geq 0 \rightarrow \log_{\frac{1}{r}} n < 1 \rightarrow n < \frac{1}{r} \rightarrow D_f = (0, \frac{1}{r})$$

چون متناهی صفر است حجت نامعادله نمی رود

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

$$\text{ا) } y = \sqrt{r^{n-n^2}} - 1 \rightarrow r^{n-n^2} - 1 \geq 0 \rightarrow r^{n-n^2} \geq 1 \rightarrow r^{n-n^2} \geq r^1 \rightarrow n-n^2 \geq 1$$

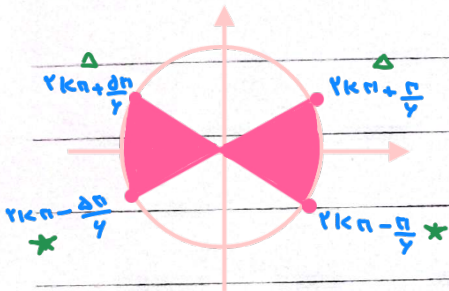
$$\rightarrow n^2 - (n+1) \leq 0 \rightarrow (n-1)(n+1) \leq 0 \rightarrow \frac{1+r}{r-1} \rightarrow \phi = [1, 2]$$

$$\tau \Rightarrow y = \left(\frac{r^{n+\Delta}}{r^{n+\delta}} \right)! \rightarrow \frac{r^{n+\Delta}}{r^{n+\delta}} \in W \rightarrow r^{n+\Delta} \geq r^{n+\delta} \rightarrow r^{n+\Delta} \geq r^{n+\delta} \rightarrow r^{n+\Delta} \geq r^{n+\delta}$$

$$\rightarrow \lambda(r-\delta) \geq \delta W - \Delta \rightarrow n = \frac{\delta W - \Delta}{r - \delta W}$$

$$\rightarrow D_f = \{n \mid n = \frac{\delta k - \Delta}{r - \delta k}, k \in W\}$$

$$9- \text{ب) } 1 - r \sin^n \geq 0 \rightarrow r \sin^n \leq 1 \rightarrow \sin^n \leq \frac{1}{r} \rightarrow -\frac{1}{r} \leq \sin n \leq \frac{1}{r}$$



$$\rightarrow D_f = [kn - \frac{\Delta}{r}, kn + \frac{\Delta}{r}]$$

$$9- \text{ب) } 1 - r \sin^n \geq 0 \rightarrow \sin^n \leq \frac{1}{r} \rightarrow D_f = [kn + \frac{\Delta}{r}, kn + \frac{\Delta}{r}]$$

$$9- \text{ب) } y = \log_r \left(1 - \log \frac{n}{r} \right) \rightarrow \log \frac{n}{r} \rightarrow n > 0$$

$$\rightarrow 1 - \log \frac{n}{r} > 0 \rightarrow \log \frac{n}{r} < 1 \rightarrow n > \frac{1}{r}$$

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