

$$Df(x) = \lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h} = \lim_{h \rightarrow 0} \frac{\sqrt{1-(x+h)^2} - \sqrt{1-x^2}}{h}$$

$$y = \sqrt{1-x^2}$$

حالت ۱: $x > 0$

$$\lim_{h \rightarrow 0} \frac{\sqrt{1-(x+h)^2} - \sqrt{1-x^2}}{h} = \lim_{h \rightarrow 0} \frac{1-(x+h)^2 - (1-x^2)}{h(\sqrt{1-(x+h)^2} + \sqrt{1-x^2})}$$

$$= \lim_{h \rightarrow 0} \frac{-2xh - h^2}{h(\sqrt{1-(x+h)^2} + \sqrt{1-x^2})} = \lim_{h \rightarrow 0} \frac{-2x - h}{\sqrt{1-(x+h)^2} + \sqrt{1-x^2}}$$

$$= \frac{-2x}{2\sqrt{1-x^2}} = \frac{-x}{\sqrt{1-x^2}}$$

$$Df(x) = \frac{-x}{\sqrt{1-x^2}}$$

$$Df(0) = \frac{-0}{\sqrt{1-0^2}} = 0$$

$$Df(1) = \frac{-1}{\sqrt{1-1^2}} = \text{undefined}$$

$$Df(-1) = \frac{-(-1)}{\sqrt{1-(-1)^2}} = \text{undefined}$$

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اصف min و max برابر است

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تتميز بـ عدد صحيح!

10

$$\begin{pmatrix} 8 \\ -8 \end{pmatrix} + \begin{pmatrix} 0 \\ -1 \end{pmatrix} = \begin{pmatrix} 8 \\ -9 \end{pmatrix}$$

$[-r, r]$

3- ب) $\frac{(x^2-1)(x^2-x^2)}{(x^2-1)} \geq 0 \rightarrow \frac{(n-1)(n+1)(n^2)(n-1)}{(n-1)(n^2+n+1)} \geq 0$ -1 * * 3
+ - - - +

$D_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$ Δ<0 ریشه ندارد

4- الف) $1 - n|n| \geq 0$

$n \geq 0 \rightarrow 1 - n^2 \geq 0 \rightarrow n^2 \leq 1 \rightarrow -1 \leq n \leq 1 \xrightarrow{n \geq 0} 0 \leq n \leq 1$

$n \leq 0 \rightarrow 1 + n^2 \geq 0$ همواره مثبت ✓

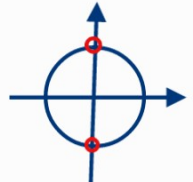
$D_f = (-\infty, 1] \leftarrow$

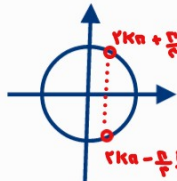
اینجا مرتعاشیم مثل تابع را رسم کنیم

4- ب) $3 - |n-5| \geq 0 \rightarrow |n-5| \leq 3 \rightarrow -3 \leq n-5 \leq 3 \rightarrow 2 \leq n \leq 8$

$\sqrt{3 - |n-5|} - 1 \neq 0 \rightarrow \sqrt{3 - |n-5|} \neq 1 \rightarrow 3 - |n-5| \neq 2 \rightarrow |n-5| \neq 2 \rightarrow n \neq 3, 7$

$D_f = [2, 8] - \{3, 7\} = [2, 3) \cup (3, 7) \cup (7, 8]$

5- الف) $y = \frac{\sin^2 n - 1}{\cos n} \rightarrow \cos n \neq 0 \rightarrow$  $\rightarrow D_f = \mathbb{R} - \{kn + \frac{\pi}{2}\}$

5- ب) $y = \frac{\cos n}{\cos n - 1} \rightarrow \cos n - 1 \neq 0 \rightarrow \cos n \neq \frac{1}{2} \rightarrow$  $D_f = \mathbb{R} - \{2kn \pm \frac{\pi}{3}\}$

$$٨ - \text{الف}) |r_{n+1}| - |n+3| = 0 \rightarrow |r_{n+1}| = |n+3| \xrightarrow{\text{نقد}} r_n^2 + r_{n+1} = n^2 + 4n + 9$$

$$\rightarrow r_n^2 - r_n - 8 = 0 \rightarrow n^2 - r_n - 2 = 0 \rightarrow (n-4)(n+2) = 0 \quad \begin{matrix} \rightarrow n = \frac{4}{1} = 4 \\ \rightarrow n = -\frac{2}{1} \end{matrix} \rightarrow D_f = \mathbb{R} - \left\{ -\frac{4}{1}, 4 \right\}$$

$$٨ - \text{ب}) |r_{n+1}| - |n+3| \geq 0 \rightarrow |r_{n+1}| \geq |n+3| \xrightarrow{\text{نقد}} r_n^2 + r_{n+1} \geq n^2 + 4n + 9 \rightarrow r_n^2 - r_n - 8 \geq 0$$

$$\frac{-\frac{4}{1} \pm \sqrt{\frac{16}{1} + 32}}{2 \cdot 1} \rightarrow D_f = (-\infty, -\frac{4}{1}] \cup [4, +\infty)$$

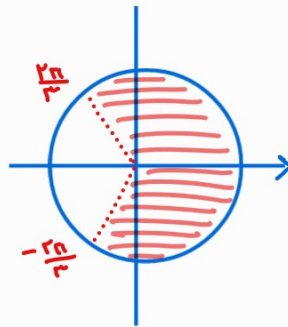
$$٩) \log_{\frac{1}{5}} \log_{\frac{1}{5}}^{r_{n-1}} \rightarrow r_{n-1} > 0 \rightarrow n > \frac{1}{1}$$

$$\log_{\frac{1}{5}}^{r_{n-1}} > 0 \rightarrow r_{n-1} > 5^0 \rightarrow r_{n-1} > 1 \rightarrow n > 1$$

$$\log_{\frac{1}{5}} \log_{\frac{1}{5}}^{r_{n-1}} \geq 0 \xrightarrow{\text{من بابي هـ د ا}} \log_{\frac{1}{5}}^{r_{n-1}} \leq 4 \rightarrow \log_{\frac{1}{5}}^{r_{n-1}} \leq 1 \rightarrow r_{n-1} \leq 5 \rightarrow r_n \leq 4 \rightarrow n \leq 3$$

$\hookrightarrow D_f = (1, 3]$

$$١٠ - \text{الف}) r_n \cdot \sin n + 1 > 0 \rightarrow r_n \cdot \sin n > -\frac{1}{1}$$



$$\rightarrow D_f = (r_n - \frac{\pi}{1}, r_n + \frac{\pi}{1})$$

$$١٠ - \text{ب}) \frac{n-1}{n+1} > 0 \rightarrow n > 1 \leq n < -1$$

$$\log_{\frac{1}{5}} \frac{n+1}{n-1} \geq 0 \rightarrow \frac{n-1}{n+1} \geq (1) \rightarrow \frac{n-1}{n+1} \geq 1 \rightarrow \frac{n-1}{n+1} - 1 \geq 0 \rightarrow \frac{n-1-n-1}{n+1} \geq 0 \rightarrow \frac{-2}{n+1} \geq 0$$

$$n+1 < 0 \rightarrow n < -1 \rightarrow D_f = (-\infty, -1)$$