

تمرین ریاضی

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$f(x) = \sqrt{(a-2)x^2 + 4x + b}$
 $a-2 \geq 0 \Rightarrow a \geq 2$
 دایره باز است

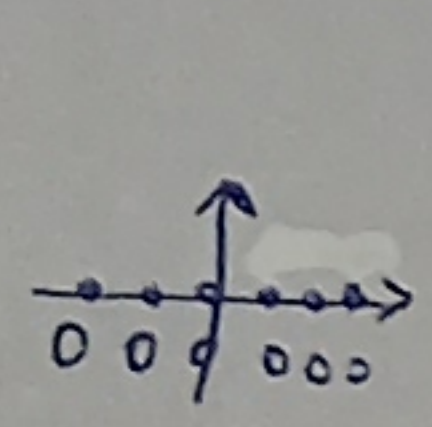
$\sqrt{2a+b}$
 $2a+b \geq 4 \Rightarrow b \geq 4-2a$

$f(x) = \sqrt{x^2 + 2x + 2 - m^2}$

$\Delta \geq 0 \rightarrow \begin{cases} \begin{aligned} &\Delta = 4 - 4(2 - m^2) \geq 0 \\ &4m^2 \geq 0 \\ &m^2 \geq 0 \end{aligned} \\ \begin{aligned} &\Delta = 4 - 4(2 - m^2) < 0 \rightarrow m^2 - 1 \neq 0 \\ &m^2 \neq 1 \rightarrow m \neq \pm 1 \end{aligned} \end{cases}$

$\frac{\sqrt{4-x^2}}{\sqrt{x} + \sqrt{-x} + 1}$

$4-x^2 \geq 0 \rightarrow x^2 \leq 4 \Rightarrow -2 \leq x \leq 2$



دایره باز است
 اشتراک
 $D_f = \{x \mid -2 \leq x \leq 2\}$
 نشان عدد صحیح است!

الف) $\sqrt{x^3 + 3x^2}$

$x^3 + 3x^2 \geq 0 \rightarrow x^2(x+3) \geq 0$
 $\downarrow \quad \downarrow$
 $0 \quad -3$
 $D_f = (-\infty, -3] \cup [0, +\infty)$

ب) $\sqrt{\frac{(x^2-1)(x^3-3x^2)}{x^3-1}}$

$x^2-1 \neq 0 \Rightarrow x \neq \pm 1$
 $x^3-3x^2 \geq 0 \Rightarrow x^2(x-3) \geq 0$
 $x \neq 0 \quad x \neq 3$
 $D_f = (-\infty, -1) \cup (-1, 3) \cup (3, +\infty)$

الف) $y = \sqrt{|x-2| - 3}$

$|x-2| - 3 \geq 0 \Rightarrow |x-2| \geq 3$
 $x-2 \geq 3 \Rightarrow x \geq 5$
 $x-2 \leq -3 \Rightarrow x \leq -1$
 $D_f = (-\infty, -1] \cup [5, +\infty)$

ب) $y = \sqrt{4 - |2-x|}$

$4 - |2-x| \geq 0 \Rightarrow |2-x| \leq 4$
 $|2-x| \leq 4 \Rightarrow -4 \leq 2-x \leq 4$
 $-6 \leq -x \leq 2 \Rightarrow -2 \leq x \leq 6$
 $D_f = [-2, 6]$

الف) $y = \sqrt{1 - |x|}$

$1 - |x| \geq 0 \Rightarrow |x| \leq 1 \Rightarrow D_f = [-1, 1]$

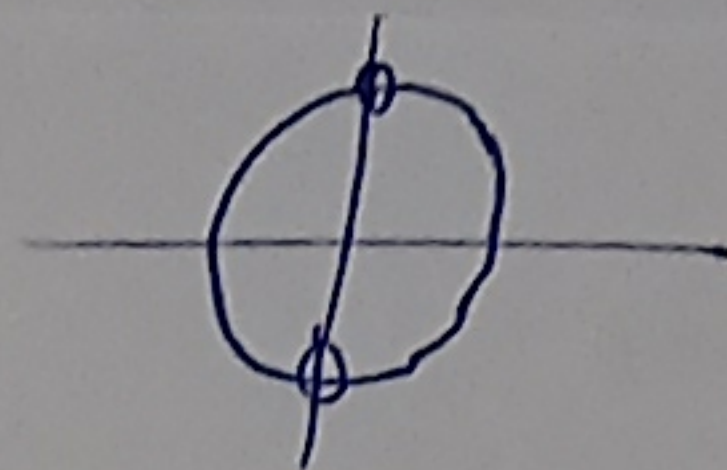
ب) $y = \frac{1}{\sqrt{3 - |x-1| - 1}}$

۱) $3 - |x-1| - 1 \geq 0 \Rightarrow |x-1| \leq 2$
 $|x-1| \leq 2 \Rightarrow -2 \leq x-1 \leq 2 \Rightarrow -1 \leq x \leq 3$
 ۲) $3 - |x-1| \neq 0 \Rightarrow |x-1| \neq 3$
 $|x-1| \neq 3 \Rightarrow x-1 \neq \pm 3 \Rightarrow x \neq 4, x \neq -2$
 $D_f = [-1, 3] \setminus \{-2, 4\}$

$$الف) y = \frac{\sin^2 \alpha - 1}{\cos \alpha}$$

$$\cos \alpha \neq 0$$

$$Df = \mathbb{R} - \{k\pi + \pi/2\}$$

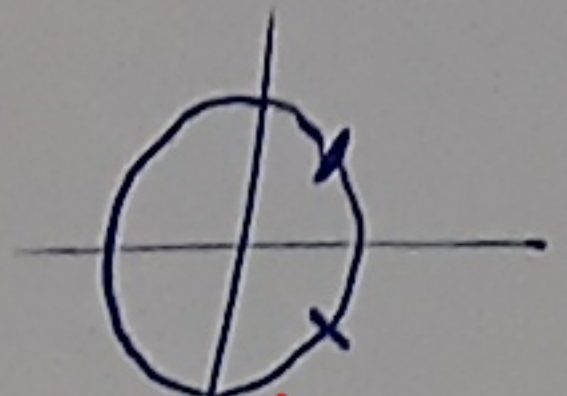


1, 1.5

$$ب) y = \frac{\cos \alpha}{2 \cos \alpha - 1}$$

$$2 \cos \alpha - 1 \neq 0$$

$$\cos \alpha \neq 1/2$$



$$Df = \mathbb{R} - \{2k\pi \pm \pi/3\}$$

دایره منتهی به

$$\cos \frac{\pi}{4} = \frac{\sqrt{2}}{2}, \cos \frac{\pi}{6} = \frac{\sqrt{3}}{2}$$

$$الف) y = \frac{n+3}{|2n+1| - |n+3|}$$

$$2n+1 \neq n+3 \rightarrow n \neq 2$$

$$|2n+1| \neq |n+3| \rightarrow 2n+1 \neq -n-3 \rightarrow n \neq -4/3$$

$$Df = \mathbb{R} - \{2, -4/3\}$$

$$ب) y = \sqrt{|2n+1| - |n+3|}$$

$$|2n+1| \geq |n+3|$$

$$(2n+1)^2 \geq (n+3)^2 \rightarrow 4n^2 + 4n + 1 \geq n^2 + 6n + 9$$

$$-3n^2 - 2n - 8 \leq 0$$

$$3n^2 - 2n - 8 \geq 0$$

$$(3n+4)(n-2) \geq 0$$

$$Df = [-4/3, -1] \cup [2, +\infty)$$

از اینجا ادامه

$$f(n) = \sqrt{\log_{10} \frac{(2n-1)}{10}}$$

$$\log_{10} \frac{(2n-1)}{10} \geq 0$$

$$2n-1 \geq 10$$

$$2n \geq 11 \rightarrow n \geq 5.5$$

$$\log_{10} 2n-1 \geq 0$$

$$2n-1 \geq 1 \rightarrow n \geq 1$$

$$\log_{10} 2n-1 \geq 0$$

$$2n-1 \geq 1 \rightarrow n \geq 1$$

$$Df = \{1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, \dots\}$$

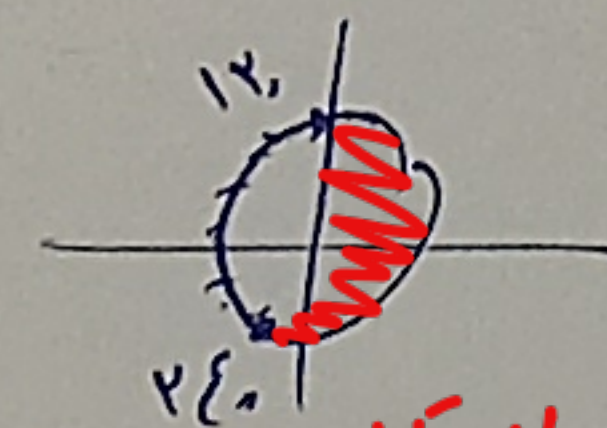
وقتی متناهی است و انتهایت نامتناهی محسوب می شود

(معمولاً متناهی هستند!)

$$n \leq 4 \rightarrow 2n \leq 8 \rightarrow 2n-1 \leq 7$$

$$الف) y = \log(2 \cos \alpha + 1)$$

$$2 \cos \alpha + 1 \geq 0 \rightarrow \cos \alpha \geq -1/2$$



R

$$Df = [2k\pi + 2\pi/3, 2k\pi + 4\pi/3]$$

بازه متبیل
تبدیل!

$$ب) \sqrt{\log \frac{n-1}{n+1}}$$

$$\frac{n-1}{n+1} \geq 0$$

$$-1 < n < 1$$

$$(-\infty, -1) \cup (1, +\infty)$$

$$\log \frac{n-1}{n+1} \geq 0$$

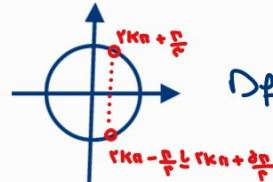
$$\frac{n-1}{n+1} \geq 1$$

$$\frac{n-1}{n+1} \geq 1 \rightarrow \frac{n-1-n-1}{n+1} \geq 0 \rightarrow \frac{-2}{n+1} \geq 0$$

$$n < -1$$

$$Df = (-\infty, -1)$$

٧- ب) $y = \frac{C \cdot \sin}{rC \cdot \sin - 1} \rightarrow rC \cdot \sin - 1 \neq 0 \rightarrow C \sin \neq \frac{1}{r}$



$D_f = \mathbb{R} - \left\{ rCn \pm \frac{\pi}{r} \right\}$

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

$\frac{-\frac{r}{2} - \frac{r}{2}}{+ \phi - \phi +} \rightarrow D_f = (-\infty, -\frac{r}{2}] \cup [\frac{r}{2}, +\infty)$

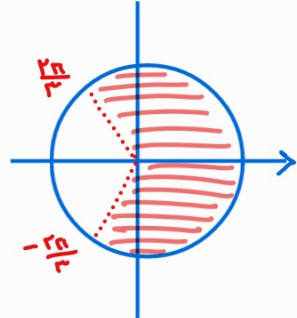
٩) $\log_{1/5} \log_a^{r_{n-1}} \rightarrow r_{n-1} > 0 \rightarrow n > \frac{1}{r}$

$\log_a^{r_{n-1}} > 0 \rightarrow r_{n-1} > 0 \rightarrow r_{n-1} > 1 \rightarrow n > 1$

$\log_{1/5} \log_a^{r_{n-1}} \geq 0 \xrightarrow{\text{من بابین دورا حجت موضه مستعد!}} \log_a^{r_{n-1}} \leq (1/5)^0 \rightarrow \log_a^{r_{n-1}} \leq 1 \rightarrow r_{n-1} \leq 5 \rightarrow r_n \leq 4 \rightarrow n \leq 3$

$\hookrightarrow D_f = (1, 3]$

الف - د) $rC \cdot \sin + 1 > 0 \rightarrow C \cdot \sin > -\frac{1}{r}$



$D_f = (rCn - \frac{\pi}{r}, rCn + \frac{\pi}{r})$