

$$f(x) = \sqrt{(a-1)x^2 + ax + b}$$

۱) تابع به دو دسته تابع خطی است

$$a-1=0 \Rightarrow a=1$$

نیم خطی که به دو دسته $x^2=0$ و $x^2 \neq 0$ تقسیم می شود

$$f(x) = \sqrt{x+b}$$

$$f(x) = \sqrt{x-4} \quad x \geq 4 \quad \begin{cases} x^2 \geq 1(x) + b = 0 \Rightarrow b = -4 \\ x \geq 4 \Rightarrow x \geq 4 \end{cases}$$

$$x \geq 4 \Rightarrow x \geq 4 \checkmark$$

$$f(x) = \sqrt{x^2 + 2x + 1 - m^2}$$

مربع کامل می شود

$$x^2 + 2x + 1 - m^2 \geq 0 \Rightarrow (x+1)^2 + 1 - m^2 \geq 0$$

۲) ۲.۵/

$$x^2 + 2x + 1 - m^2 \geq 0 \Rightarrow (x+1)^2 + 1 - m^2 \geq 0$$

$$1 - m^2 \geq 0 \Rightarrow m^2 \leq 1 \Rightarrow -1 \leq m \leq 1$$

$$D_m = [-1, 1] \sim$$

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$$1 - (-1) = 2 \quad \left[\frac{-1+1}{-1+1} = 0 \right]$$

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$$f(x) = \sqrt{4-x^2} \quad \begin{cases} 1) 4-x^2 \geq 0 \\ (x-2)(x+2) \end{cases}$$

$$[x] + [-x] + 1$$

$$2) [x] + [-x] \neq -1 \Rightarrow$$

$$P_f = \{x \mid x \in K, K \in \mathbb{Z}, K: [x, 2]\}$$

$$-2, -1, 0, 1, 2 \quad \text{و} \quad 0$$

$$1 \cap 2 \Rightarrow P_f = \{x \mid x \in K, K \in \mathbb{Z}, K: [x, 2]\}$$

$$-2, -1, 0, 1, 2 \quad \text{و} \quad 0$$

الف) $y = \sqrt{x^3 + 3x^2} \rightarrow \frac{-3}{-|+|+} \rightarrow D_f = [-3, +\infty)$ (F)

$$x^2(x+3) \geq 0$$

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

$\rightarrow D_f = (-\infty, -1] \cup \{0\} \cup [3, +\infty)$

الف) $y = \sqrt{|x-1| - 3}$ (A)

1) $x \geq 1 \Rightarrow \sqrt{x-4} \Rightarrow D_f: x \geq 4$

2) $x < 1 \Rightarrow \sqrt{-(x+1)} \Rightarrow D_f: x \leq -1$

ب) $y = \sqrt{4 - |x-2|}$

1) $x \leq 2 \Rightarrow \sqrt{x+2} \Rightarrow x \geq -2 \Rightarrow D_f = [-2, 2]$

2) $x > 2 \Rightarrow \sqrt{4-x} \Rightarrow x \leq 4 \Rightarrow D_f = (2, 4]$

$$4 - |x-2| \geq 0$$

$$|x-2| \leq 4 \Rightarrow -4 \leq x-2 \leq 4$$

$$-4 \leq x-2 \leq 4 \Rightarrow -2 \leq x \leq 6$$

$$\text{جواب } y = \sqrt{1-x|x|}$$

$$1) x \geq 0 \Rightarrow \sqrt{(1-x)(1+x)} \quad \frac{-1}{-1+1} = 1 \Rightarrow \text{Def: } [0, 1]$$

$$2) x < 0 \Rightarrow \sqrt{1+x^2} \sim \Delta < 0 \sim \text{Gauss} \Rightarrow \text{Def: } (-\infty, 0)$$

أو: $\lim_{x \rightarrow -\infty} \sqrt{1+x^2} = \infty$

$$1 \cup 2 \Rightarrow (-\infty, 1]$$

$$\text{ب) } y = \frac{1}{\sqrt{r-|x-a|-1}}$$

$$1) r-|x-a| > 0 \sim |x-a| < r \sim x-a < r \sim x < a+r$$

$$2) r-|x-a| \neq 1 \quad \text{①} \quad x-a \geq -r, x \geq a-r$$

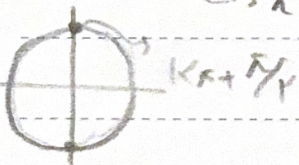
$$\hookrightarrow |x-a| \neq r \Rightarrow x-a \neq r \Rightarrow x \neq a+r$$

$$-x+a \neq r \Rightarrow x \neq a-r$$

$$\text{Def: } [r, a] - \{a+r, a-r\}$$

(1) (2)

$$\text{جواب } y = \frac{\sin^2 x - 1}{\cos x} \sim \cos x \neq 0 \Rightarrow \text{Def: } \mathbb{R} - \{k\pi + \pi/2\}$$



$$y \cos x = 1 \quad y \cos x - 1 \neq 0 \Rightarrow \text{Def: } \mathbb{R} - \{k\pi + \pi/2\}$$

$$\text{ب) } y = \frac{\cos x}{\cos x - 1} \sim \cos x \neq 1 \Rightarrow \text{Def: } \mathbb{R} - \{k\pi\}$$

$$\cos x \neq 1/4$$



الف $|2n+1| \neq |n+3|$

① چون عددی نیستند

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میان ۲ عدد است

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

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

$$\begin{aligned} n^2 - 2n - 8 \neq 0 & \rightarrow n = \frac{2 \pm \sqrt{4 + 32}}{2} \\ (n-4)(n+2) \neq 0 & \rightarrow n \neq -2 \end{aligned} \quad \left. \begin{aligned} & \Delta_f = 16 - \left(-\frac{4}{3}\right) \\ & \Delta_f = 16 + \frac{16}{3} \end{aligned} \right\}$$

در اینجا

ب) $|2n+1| - |n+3| \geq 0$

چون عددی نیستند

$$(2n+1)^2 \geq (n+3)^2$$

میان ۲ عدد است

$$3n^2 + 4n + 1 \geq n^2 + 4n + 9$$

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

$$\frac{-2 \pm \sqrt{4 + 64}}{4}$$

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

$$\Delta_f = (-2 \pm \sqrt{68}) \div (2 \pm \sqrt{68})$$

در اینجا

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

②

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

$$3) \log_{\frac{1}{2}}(2n-1) \geq 0 \rightarrow \log_{\frac{1}{2}}(2n-1) \leq 1 \rightarrow 2n-1 \leq 2$$

$$1 \wedge 2 \wedge 3 \rightarrow \Delta_f = (4n)$$

⑨

$$r \cos \alpha + 1 > 0 \Rightarrow \cos \alpha > -\frac{1}{r} \quad \text{for } r > 1 \Rightarrow \alpha \in [0, \frac{\pi}{2}] \cup [\frac{3\pi}{2}, 2\pi] \quad \text{for } r < 1 \Rightarrow \alpha \in [\frac{\pi}{2}, \frac{3\pi}{2}]$$

$\log \frac{n-1}{n+1} \rightarrow 1) n \neq -1$
 $2) \frac{n-1}{n+1} > 0 \rightarrow \frac{-1}{n+1} \rightarrow (-\infty, -1) \cup (1, +\infty)$

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

$$\frac{-r}{n+1} \approx \frac{-1}{+5} \approx (-0.2)$$

$$1 \text{ nm}^3 \rightarrow R_f = (-\infty, -1)$$