

۲. آزمون

$$R(x) = \sqrt{(a-x)x^2 + bx + c}$$

-b/2a

$$(a-x=0 \rightarrow x=a)$$

$$R(x) = \sqrt{x^2 + b}$$

$$R(1) + b = 0$$

$$1 + b = 0 \rightarrow b = -1$$

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

$$(1) - f(1-m^2) \leq 0$$

$$D(f) = \mathbb{R}$$

$$1 - 1 + 2 - m^2 \leq 0 \rightarrow 2 - m^2 \leq 0 \rightarrow m^2 \geq 2 \rightarrow m \leq -\sqrt{2} \text{ or } m \geq \sqrt{2}$$

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$$f(x) = \sqrt{4 - x^2}$$

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

$$D(f) = [-2, 2]$$

$$x \in (-2, 2) \text{ and } x \in \mathbb{Z} \rightarrow D(f) = \{-2, -1, 0, 1, 2\}$$

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$$f(x) = \sqrt{x^3 + 3x^2} \Rightarrow x^3 + 3x^2 \geq 0 \rightarrow x^2(x+3) \geq 0$$

$$D(f) = [-3, +\infty)$$

$$x^2 = 1 \rightarrow x = \pm 1$$

$$g = \frac{(x^3 - 1)(x^3 - 3x^2)}{x^3 - 1}$$

$$x^3 = 1 \rightarrow x = 1$$

$$x^3 - 3x^2 = 0$$

$$x^2(x-3) = 0$$

$$x = 0 \text{ or } x = 3$$

$$D(f) = (-\infty, -1] \cup [0] \cup [3, +\infty)$$

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$$y = \sqrt{|x-2| - 3} \begin{cases} x-2-3 \geq 0 \rightarrow x \geq 5 \\ -x+2-3 \geq 0 \rightarrow x \leq -1 \end{cases}$$

$$D(f) = [-1, 5]$$

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$$g = \sqrt{4 - |2-x|} \begin{cases} 4 + 2 - x \geq 0 \rightarrow x \leq 6 \\ 4 - 2 + x \geq 0 \rightarrow x \geq -2 \end{cases}$$

$$x \geq 2$$

$$x < 2$$

الف) $y = \sqrt{1 - x/|x|} \Rightarrow 1 - x/|x| \geq 0 \Rightarrow x/|x| \leq 1 \Rightarrow D(f) = (-\infty, 0] \cup [1, \infty)$

ب) $y = \frac{1}{\sqrt{3 - |x - \Delta|} - 1} \Rightarrow 3 - |x - \Delta| > 0 \Rightarrow \begin{cases} 3 - x + \Delta > 0 \\ 3 + x - \Delta > 0 \end{cases} \Rightarrow \begin{cases} x < 3 + \Delta \\ x > \Delta - 3 \end{cases}$
 $3 - |x - \Delta| \neq 1 \Rightarrow |x - \Delta| \neq 2 \Rightarrow \begin{cases} x - \Delta \neq 2 \\ x - \Delta \neq -2 \end{cases} \Rightarrow \begin{cases} x \neq \Delta + 2 \\ x \neq \Delta - 2 \end{cases}$
 $D(f) = (\Delta - 3, \Delta + 2) \setminus \{\Delta - 2, \Delta + 2\}$

الف) $y = \frac{\sin^2 x - 1}{\cos x \neq 0} \Rightarrow D(f) = \{x \in \mathbb{R} \mid x \neq \frac{\pi}{2} + k\pi, k \in \mathbb{Z}\}$

ب) $\frac{\cos x}{x \cos x - 1} \Rightarrow x \cos x - 1 \neq 0 \Rightarrow x \cos x \neq 1 \Rightarrow \cos x \neq \frac{1}{x} \Rightarrow D(f) = \mathbb{R} \setminus \{x \mid x \cos x = 1\}$

الف) $y = \frac{x + 3}{|x + 1| - |x + 2|} \Rightarrow |x + 1| - |x + 2| \neq 0 \Rightarrow (|x + 1|) \neq (|x + 2|)$
 $\star D(f) = \mathbb{R} \setminus \{-1, -\frac{3}{2}\}$
 $|x + 1| \neq |x + 2| \Rightarrow x^2 + 2x + 1 \neq x^2 + 4x + 4 \Rightarrow -2x - 3 \neq 0 \Rightarrow x \neq -\frac{3}{2}$
 $|x + 1| > |x + 2| \Rightarrow x^2 + 2x + 1 > x^2 + 4x + 4 \Rightarrow -2x - 3 > 0 \Rightarrow x < -\frac{3}{2}$
 $|x + 1| < |x + 2| \Rightarrow x^2 + 2x + 1 < x^2 + 4x + 4 \Rightarrow -2x - 3 < 0 \Rightarrow x > -\frac{3}{2}$

$F(x) = \sqrt{\log_2(\log_2(x-1))}$
 $\log_2(x-1) > 0 \Rightarrow x-1 > 1 \Rightarrow x > 2$
 $\log_2(\log_2(x-1)) > 0 \Rightarrow \log_2(x-1) > 1 \Rightarrow x-1 > 2 \Rightarrow x > 3$
 $D(f) = (3, \infty)$

الف) $\log(\sqrt{\cos x + 1}) \Rightarrow \log_2(\sqrt{\cos x + 1}) \Rightarrow \cos x + 1 > 0 \Rightarrow \cos x > -1 \Rightarrow x \neq \pi + 2k\pi, k \in \mathbb{Z}$
 $D(f) = \mathbb{R} \setminus \{\pi + 2k\pi, k \in \mathbb{Z}\}$
 $\log_2(\sqrt{\cos x + 1}) > 0 \Rightarrow \sqrt{\cos x + 1} > 1 \Rightarrow \cos x + 1 > 2 \Rightarrow \cos x > 1 \Rightarrow x = 2k\pi, k \in \mathbb{Z}$
 $D(f) = \mathbb{R} \setminus \{\pi + 2k\pi, k \in \mathbb{Z}\}$