

$$\rightarrow f(x) = \sqrt{(a-1)x^3 + ax + b} \quad \rightarrow \text{تعریف می شود! } [1^3, +\infty)$$

$$\rightarrow (a-1)x^3 + ax + b \quad \rightarrow \text{بزرگترین } +1^3 \text{ دارد!}$$

$$\rightarrow (a-1) = 0 \rightarrow a = 1$$

$$\rightarrow 1x + b \quad \xrightarrow{x=1^3} 1(1^3) + b = 0$$

$$\rightarrow 1 + b = 0 \rightarrow b = -1 \rightarrow \boxed{b = -1}$$

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$$\rightarrow f(x) = \sqrt{x^3 + 1x + 1 - m^2}$$

$$\rightarrow b^2 - 4ac \leq 0 \rightarrow 1^2 - 4 \times 1 \times (1 - m^2) \leq 0$$

$$\rightarrow 1 - 4(1 - m^2) \leq 0 \rightarrow 1 - 4 + 4m^2 \leq 0 \rightarrow 4(m^2 - 1) \leq 0$$

$$\rightarrow m^2 - 1 \leq 0 \rightarrow m^2 \leq 1 \rightarrow -1 \leq m \leq 1 \quad \begin{cases} m = -1 \\ m = 1 \end{cases} \rightarrow 1 - (-1) = 1 + 1 = \boxed{2}$$

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$$\rightarrow f(x) = \frac{\sqrt{4-x^2}}{[x] + [-x] + 1} \quad \rightarrow 4 - x^2 \geq 0 \rightarrow x^2 \leq 4 \rightarrow -2 \leq x \leq 2$$

$$\rightarrow [x] + [-x] + 1 \neq 0 \rightarrow [x] + [-x] \neq -1 \rightarrow x \in \mathbb{Z}$$

$$\rightarrow Df = \{-2, -1, 0, 1, 2\} \rightarrow \boxed{5}$$

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$$b) y = \sqrt{\frac{(x^3-1)(x^3-1^3x^3)}{x^3-1}}$$

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

$$\frac{-1}{+} \frac{0}{-} \frac{1}{-} \frac{1^3}{-} \frac{1^3}{+}$$

$$Df = (-\infty, -1] \cup \{-1\} \cup [1^3, +\infty)$$

$$الف) y = \sqrt{x^3 + 1^3x^3}$$

$$\rightarrow x^3 + 1^3x^3 \geq 0 \rightarrow x^3(x + 1^3) \geq 0$$

$$\frac{-1^3}{-} \frac{0}{+} \frac{1^3}{+}$$

$$Df = [-1^3, +\infty)$$

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$$b) y = \sqrt{4 - |2-x|}$$

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

$$\rightarrow -4 \leq 2-x \leq 4 \rightarrow -4 \leq -x \leq 4$$

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

$$\rightarrow Df = [-2, 4]$$

$$الف) y = \sqrt{|x-1|-1^3}$$

$$\rightarrow |x-1|-1^3 \geq 0 \rightarrow |x-1| \geq 1^3$$

$$\rightarrow x-1 \geq 1^3 \rightarrow x \geq 2$$

$$\rightarrow x-1 \leq -1^3 \rightarrow x \leq 0$$

$$Df = (-\infty, -1] \cup [2, +\infty)$$

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