

نام : سفا فاضلی

شماره تکلیف : ۳

(دهم جمع طا)

الف) $y^3 - x = 2x^2 \rightarrow \begin{cases} y_1^3 - x = 2x^2 \\ y_2^3 - x = 2x^2 \end{cases} \rightarrow y_2^3 = y_1^3 \rightarrow y_2 = y_1$ به کمک تعریف ریشه تابع است

ب) $|y| + x^2 = x + 3 \rightarrow \begin{cases} |y_1| + x^2 = x + 3 \\ |y_2| + x^2 = x + 3 \end{cases} \rightarrow |y_1| = |y_2| \rightarrow y_1 = \pm y_2$

ج) $\sqrt{x-4} + |y-2| = 0 \rightarrow y \rightarrow 2 \quad x \rightarrow 4$ همچون عدد غیر منفی صفر شده و هر دو صفر تابع است

د) $x = \cos y \rightarrow x = 0 \rightarrow y = \frac{\pi}{2} \text{ و } \frac{3\pi}{2} \dots$ می تواند ۲۷۰ و ۹۰ و ... باشد پس تابع نیست

الف) $y = \frac{x+4}{x^2-4x} \rightarrow x^2-4x=0 \rightarrow x(x-4)=0 \rightarrow \begin{cases} x=4 \\ x=0 \end{cases} \quad D_f = \mathbb{R} - \{4, 0\}$

ب) $y = \frac{x+4}{x^2-4x+4} \Rightarrow D_f = \mathbb{R}$

ج) $D_f = \mathbb{R}$ (همواره مثبت است)

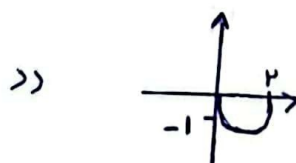
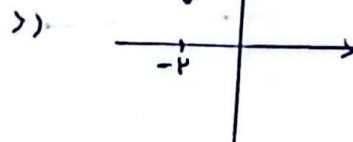
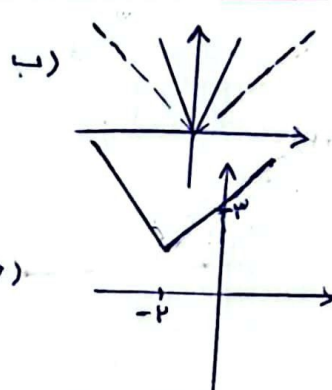
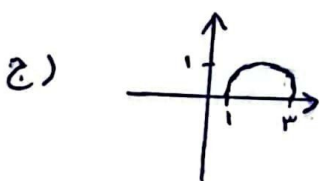
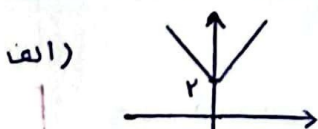
د) $x^4 - 4x^2 \rightarrow x^2(x^2-4)=0 \rightarrow x^2(x+2)(x-2)=0 \rightarrow \begin{cases} x=0 \\ x=2 \\ x=-2 \end{cases} \rightarrow D_f = \mathbb{R} - \{0, 2, -2\}$

الف) $y = \sqrt{4-x} + \sqrt{x-2} \quad \begin{matrix} 4-x \geq 0 & x \leq 4 & (-\infty, 4] \\ x-2 \geq 0 & x \geq 2 & [2, \infty) \end{matrix} \quad \cap \rightarrow [2, 4] = D_f$

ب) $\frac{x+1}{x^2+1} \quad D_f = \mathbb{R}$

ج) $x-4 \neq 0 \rightarrow x \neq 4 \quad \text{و} \quad x-2 > 0 \rightarrow x > 2 \rightarrow D_f = [2, \infty) - \{4\}$

د) $D_f = \mathbb{R} - \{0\}$



الف)

$$\begin{array}{c|c|c|c} 2 & 3 & 4 & \\ \hline - & + & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$(x-2)(x-3)(x-4)=0$$

$$\begin{array}{ccc} \downarrow & \downarrow & \downarrow \\ 2 & 3 & 4 \end{array}$$

ب)

$$\begin{array}{c|c|c|c} 2 & 3 & 4 & \\ \hline + & - & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$(x-2)(x-3)(x-4)=0$$

الف)

$$\begin{array}{c|c|c|c} 2 & 3 & 4 & \\ \hline - & + & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$D_f = (4, \infty) \cup (2, 3)$$

ب)

$$\begin{array}{c|c|c|c} 2 & 3 & 4 & \\ \hline + & - & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$D_f = (4, \infty) \cup (-\infty, 2)$$

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

$$\begin{array}{c|c|c|c} -2 & 1 & 3 & \\ \hline + & - & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$D_f = (4, \infty) \cup (-\infty, 2)$$

$$\begin{array}{r} x^3 - 3x^2 + 2x - 1 \\ -x^3 + x^2 \\ \hline x^2 - 4x + 2 \end{array}$$

$$\begin{array}{r} x^2 - 4x + 2 \\ -x^2 + x \\ \hline -3x + 2 \\ -3x + 2 \\ \hline 0 \end{array}$$

ب) $\frac{(x-1)(x-2)}{(x-1)(x-3)}$

$$\begin{array}{c|c|c|c} 1 & 2 & 3 & \\ \hline + & 0 & - & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$D_f = (4, \infty) \cup (1, 2) \cup (-\infty, 1)$$

الف)

$$D_f = \mathbb{R} \quad (\text{عبارت همیشه تعریف شده است و مثبت})$$

ب)

$$D_f = \mathbb{R}$$

الف) $\frac{x^3-1}{x^3-x} \geq 0$

$$\frac{(x-1)(x^2+x+1)}{x^1(x+1)(x-1)}$$

$$\begin{array}{c|c|c|c} -1 & 0 & 1 & \\ \hline + & - & + & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$D_f = (1, \infty) \cup (0, 1) \cup (-\infty, -1)$$

ب) $\frac{x^2-14}{x^2-5x+4} \geq 0$

$$\frac{(x+4)(x-4)}{(x-1)(x-4)}$$

$$\begin{array}{c|c|c|c} -4 & 1 & 4 & \\ \hline + & - & + & + \\ \hline 0 & 0 & 0 & 0 \end{array}$$

$$D_f = (4, \infty) \cup (1, 4) \cup (-\infty, -4)$$