

الف) $y^3 - x = 2x^2 \rightarrow y^3 = 2x^2 + x \rightarrow y^3 = x(2x+1) \Rightarrow \begin{cases} y_1^3 = (2x+1)x \\ y_2^3 = (2x+1)x \end{cases} \rightarrow y_1 = y_2 \checkmark$

ب) $|y| + x^2 = x + 3 \rightarrow |y| = -x^2 + x + 3 \rightarrow |y| = -(x^2 - x - 3) \Rightarrow \begin{cases} |y|_1 = -(x^2 - x - 3) \\ |y|_2 = -(x^2 - x - 3) \end{cases} \rightarrow y_1 = -y_2 \times$

ج) $\sqrt{x-2} + |y-2| = 0 \rightarrow |y-2| = -\sqrt{x-2} \Rightarrow \begin{cases} |y-2|_1 = -\sqrt{x-2} \\ |y-2|_2 = -\sqrt{x-2} \end{cases} \rightarrow y_1 - 2 = \pm(y_2 - 2) \Rightarrow \begin{cases} y_1 = 2 - y_2 \\ y_1 = y_2 \end{cases} \times$

د) $x = \cos y \xrightarrow[\text{مثال شصت و یک}]{x=0} 0 = \cos y \Rightarrow \begin{cases} y = 90^\circ \\ y = 270^\circ \end{cases} \times$

الف) $y = \frac{x+2}{x^2-2x} = \frac{(x+2)}{x(x-2)} \rightarrow x(x-2) \neq 0 \rightarrow D_f = \mathbb{R} - \{0, 2\}$

ب) $y = \frac{x+2}{x^2-7x+12} \Rightarrow x^2-7x+12 \neq 0 \rightarrow D_f = \mathbb{R} \xrightarrow{\text{دلیل}} x^2-7x+12=0 \rightarrow x = \frac{7 \pm \sqrt{49-48}}{2} \rightarrow \text{تن}$

ج) $y = \frac{x+2}{x^2+x+2} \Rightarrow x^2+x+2 \neq 0 \rightarrow D_f = \mathbb{R} \xrightarrow{\text{دلیل}} x^2+x+2=0 \rightarrow x = \frac{-1 \pm \sqrt{1-8}}{2} \rightarrow \text{تن}$

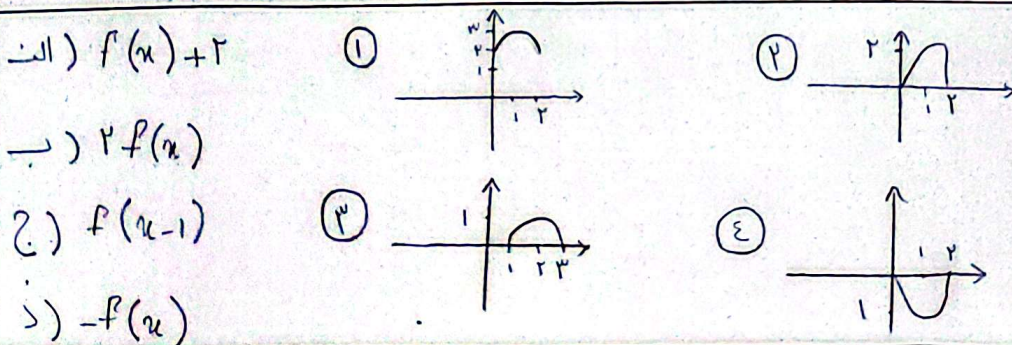
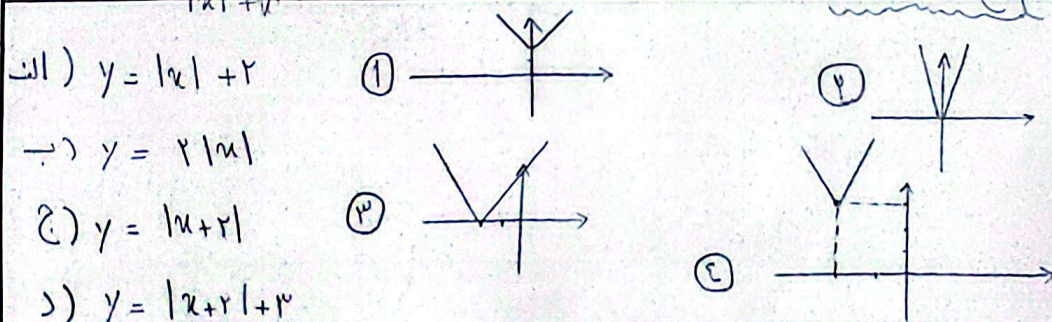
د) $\frac{x+2}{x^2-5x+2} \Rightarrow x^2(x^2-5) = x^2(x+2)(x-2) \neq 0 \rightarrow D_f = \mathbb{R} - \{0, -2, 2\}$

الف) $y = \sqrt{4-x} + \sqrt{x-2} \Rightarrow \begin{cases} 4-x \geq 0 \rightarrow x \leq 4 \\ x-2 \geq 0 \rightarrow x \geq 2 \end{cases} \Rightarrow D_f = [2, 4]$

ب) $y = \frac{3x+1}{x^2+1} \Rightarrow x^2+1 \neq 0 \rightarrow x^2 \neq -1 \rightarrow D_f = \mathbb{R}$

ج) $y = \frac{\sqrt{x-2}}{x-2} \Rightarrow \begin{cases} x-2 \geq 0 \rightarrow x \geq 2 \\ x-2 \neq 0 \rightarrow x \neq 2 \end{cases} \rightarrow D_f = [2, +\infty) - \{2\}$

د) $y = \frac{3x+3}{|x|+x} \Rightarrow |x|+x \neq 0 \rightarrow |x| \neq -x \rightarrow D_f = \mathbb{R} - \{0\}$



الف) $y = (x-2)(x-3)(x-4)$

$$\frac{2}{-} \frac{3}{+} \frac{4}{-} \frac{5}{+}$$

ب) $y = (x-2)(x-3)(x-3)(x-4)$

$$\frac{2}{+} \frac{3}{-} \frac{3^*}{-} \frac{4}{+}$$

الف) $y = \frac{(x-2)(x-4)}{(x-3)}$

$$\frac{2}{-} \frac{3}{+} \frac{4}{-} \frac{5}{+}$$

ب) $y = \frac{(x-2)(x-4)}{(x-3)(x-3)}$

$$\frac{2}{+} \frac{3}{-} \frac{3^*}{-} \frac{4}{+}$$

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

$$\frac{1}{+} \frac{1}{-} \frac{2}{+} \frac{3}{-}$$

بر $x-1$ بخشیم

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

$$\frac{1}{+} \frac{1}{-} \frac{2}{+} \frac{3}{-}$$

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

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

بر x در خارج رشت حتمی اندازد

ب) $y = \frac{x + 3x + 2}{x^2 + 2x + 3} \Rightarrow$

$$\frac{0}{+} \frac{1}{+}$$

بر x در خارج رشت حتمی اندازد

الف) $\sqrt{\frac{x^3-1}{x^3-x}} \Rightarrow x^3-1 \geq 0 \rightarrow x \geq 1$

$$x(x+1)(x-1) > 0 \rightarrow x = \mathbb{R}^+ - \{0, 1, -1\}$$

$$\rightarrow x > 1 \rightarrow D_f = (1, +\infty)$$

ب) $\sqrt{\frac{x^3-14}{x^3-5x+6}} \Rightarrow x^3-14 \geq 0 \rightarrow x \geq \sqrt[3]{14}$

$$(x-2)(x-1) > 0 \rightarrow x = \mathbb{R} - [1, 2]$$

$$\rightarrow D_f = (\sqrt[3]{14}, +\infty)$$