

الف) $y - x = 2x^2 \Rightarrow y^3 = 2x^2 + x \Rightarrow y^3 = x(2x + 1) \Rightarrow \begin{cases} y_1 = (2x+1)x \\ y_2 = (2x+1)x \\ y_3 = y_1 = y_2 \end{cases}$
 تابع است
 ب) $|y| + x^2 = x + 3 \Rightarrow |y| = -x^2 + x + 3$
 بازای $y = \pm 3 \leq x = 3$ تابع نیست

ج) $\sqrt{x-4} + |y-2| = 0 \Rightarrow \begin{cases} |y-2| = -\sqrt{x-4} \\ |y-2| = -\sqrt{x-4} \end{cases} \Rightarrow y-2 = \pm(-\sqrt{x-4}) \Rightarrow \begin{cases} y_1 = 2 - \sqrt{x-4} \\ y_2 = 2 + \sqrt{x-4} \end{cases}$
 تابع نیست

د) $x = \cos y \Rightarrow x = 0 \Rightarrow \cos y = 0 \Rightarrow y = \frac{\pi}{2}, \frac{3\pi}{2} \Rightarrow y = 90^\circ, 270^\circ$
 تابع نیست

الف) $y = \frac{x+4}{x^2-4x} = \frac{x+4}{x(x-4)} \Rightarrow x(x-4) \neq 0 \Rightarrow \begin{cases} x \neq 0 \\ x \neq 4 \end{cases} \Rightarrow D = \mathbb{R} - \{0, 4\}$

ب) $y = \frac{x+4}{x^2-4x+16} \Rightarrow x^2-4x+16 \neq 0 \Rightarrow \Delta = (-4)^2 - 4(16) = -60 \Rightarrow D = \mathbb{R}$

ج) $y = \frac{x+4}{x^2+x+4} \Rightarrow x^2+x+4 \neq 0 \Rightarrow \Delta = 1^2 - 4(4) = -15 \Rightarrow D = \mathbb{R}$

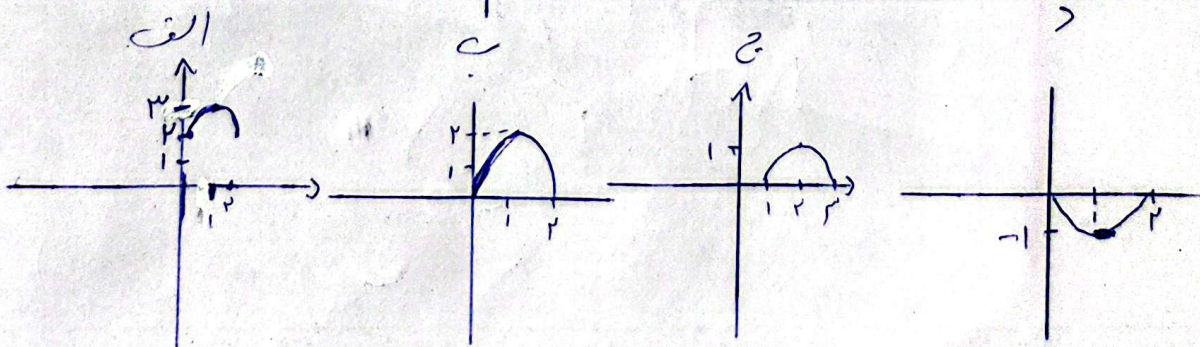
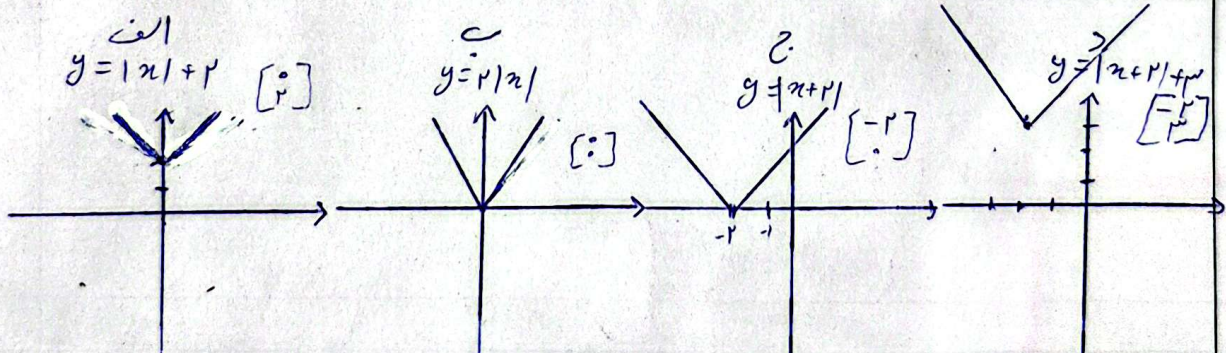
د) $y = \frac{x+4}{x^2-4x} \Rightarrow x^2-4x \neq 0 \Rightarrow (x^2-4x)(x^2+4x) \neq 0 \Rightarrow (x(x-4))(x(x+4)) \neq 0$
 $\Rightarrow \begin{cases} x \neq 0 \\ x \neq 4 \end{cases} \Rightarrow D = \mathbb{R} - \{0, 4\}$

الف) $y = \sqrt{4-x} + \sqrt{x-2}$
 $4-x \geq 0 \Rightarrow x \leq 4$
 $x-2 \geq 0 \Rightarrow x \geq 2$
 $D = [2, 4]$

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

ج) $y = \frac{\sqrt{x-2}}{x-4} \Rightarrow x-4 \neq 0 \Rightarrow x \neq 4$
 $D = [2, \infty) - \{4\}$

د) $y = \frac{2x+3}{|x|+x^2} \Rightarrow |x|+x^2 \neq 0 \Rightarrow D = \mathbb{R} - \{0\}$



الف

$$y = (x-2)(x-3)^2(x-4)$$

ب

$$y = (x-2)(x-3)^2(x-4)$$

تواند

الف

$$[2, 3] \cup [4, +\infty)$$

ب

$$(-\infty, 2] \cup [3] \cup [4, +\infty)$$

الف

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ب

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ب

$$y = (x-2)(x-3)^2(x-4)$$

الف

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

ب

$$y = \frac{x^3 - 3x^2 + 2}{x^2 - 4x + 3} = \frac{(x-1)(x-2)}{(x-1)(x-3)}$$

الف

$$y = \frac{x^4 - x^2}{x^2 + x + 1} = \frac{(x^2 - x)(x^2 + x)}{x^2 + x + 1} = \frac{(x(x-1))(x(x+1))}{x^2 + x + 1}$$

ب

$$y = \frac{x^4 + 3x^2 + 2}{x^2 + 2x + 3} = \frac{(x^2 - 1)(x^2 + 3)}{x^2 + 2x + 3}$$

الف

$$y = \sqrt{\frac{x^4 - 1}{x^3 - x}} = \sqrt{\frac{x^4 - 1}{x(x^2 - 1)}} = \sqrt{\frac{x^4 - 1}{x(x-1)(x+1)}}$$

ب

$$y = \sqrt{\frac{x^4 - 16}{x^3 - 8x + 16}} = \sqrt{\frac{(x-2)(x+2)(x+4)}{(x-2)(x-1)^2}}$$