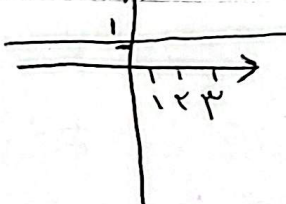


الف) $\begin{cases} y_1^3 = 2x_1^2 + x_1 \\ y_2^3 = 2x_2^2 + x_2 \end{cases} \xrightarrow{x_1=x_2} y_1^3 = y_2^3 \rightarrow y_1 = y_2$ تابع است ✓

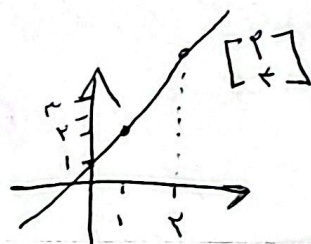
ب) $|y| = x^2 + x + 2$ مثال نقض $x=0 \rightarrow |y| = 2 \rightarrow y = \pm 2$ تابع نیست ✗

ج) $\sqrt{x-4} = -|y-2| \rightarrow x=4, y=2$ تابع است ✓

د) $x = \cos y$ مثال نقض $x=0 \rightarrow y=90^\circ \text{ و } 270^\circ$ تابع نیست ✗

الف) $f(x) = 1$ 

ب) $f(x) = 2x + b$ $\begin{bmatrix} 1 \\ 2 \end{bmatrix} \rightarrow 2 = 2 + b \Rightarrow b = 0$
 $f(x) = 2x$



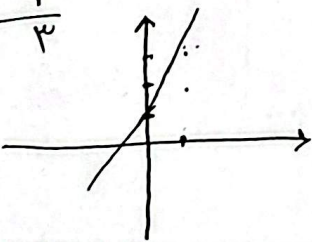
الف) $f(x) = ax + b$ $\xrightarrow{f(x)=x} a=1, b=0$ $\boxed{a+2b=1}$

ب) $y = x^2 + ax + b$ $\begin{bmatrix} 1 \\ 1 \end{bmatrix} \rightarrow 1 = 1 + a + b \rightarrow 2 = 2a + b$

د) $2 = -\frac{a}{2} \rightarrow a = -4 \rightarrow b = 0 \rightarrow \boxed{a+2b=4}$

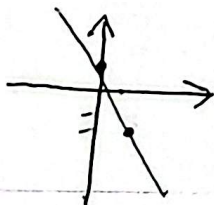
الف)

$\begin{matrix} x & 0 & 1 \\ y & 3 & 1 \end{matrix}$

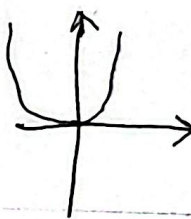


ب)

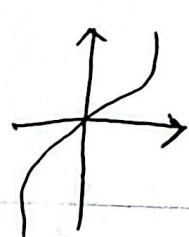
$\begin{matrix} x & 0 & 1 \\ y & 1 & -2 \end{matrix}$



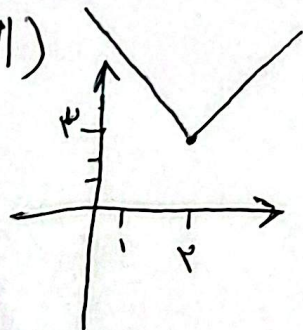
ج)



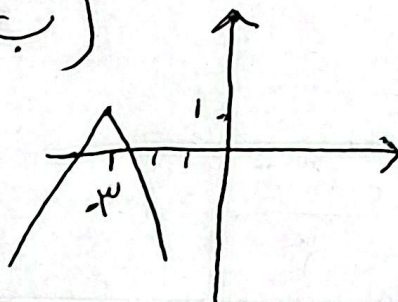
د)



الف)



ب)



الف) $x^2 - 4x \neq 0 \rightarrow x(x-4) \neq 0$ $D_f = \mathbb{R} - \{4, 0\}$

ب) $x^2 - 17x + 14 \neq 0$ $\Delta < 0$ $D_f = \mathbb{R}$

ج) $x^2 + x + 4 \neq 0$ $\Delta < 0$ $D_f = \mathbb{R}$

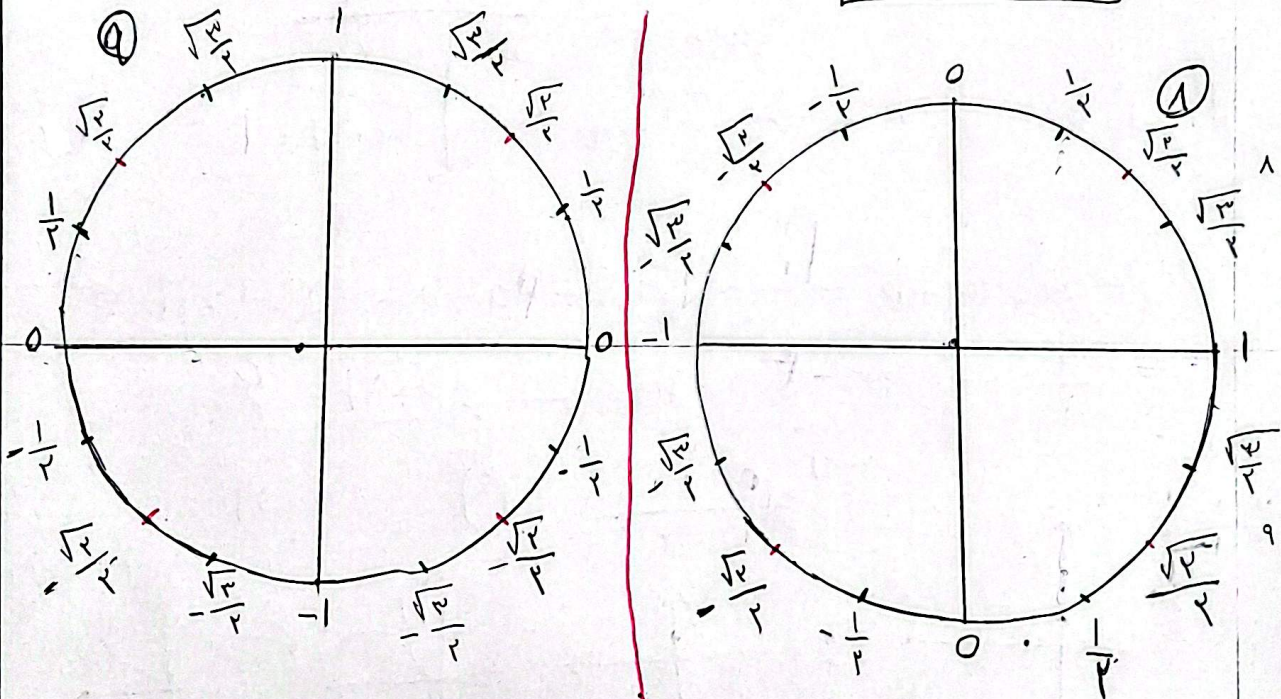
د) $x^4 - 4x^2 \neq 0 \rightarrow x^2(x^2 - 4) \neq 0 \rightarrow x^2(x-2)(x+2) \neq 0 \rightarrow D_f = \mathbb{R} - \{2, -2, 0\}$

هـ) $0 < 4 - x \geq 0 \rightarrow x \leq 4$ $0 < x - 2 \geq 0 \rightarrow x \geq 2 \rightarrow D_f = [2, 4]$

و) $x^2 + 1 \geq 0$ $D_f = \mathbb{R}$

ز) $0 < x = 2 \geq 0 \rightarrow x \geq 2$ $0 < x - 4 \neq 0 \rightarrow x \neq 4 \rightarrow D_f = [2, \infty) \cup (-\infty, 4)$

ح) $|x| + x^2 \neq 0 \rightarrow |x| \neq -x^2$ $D_f = \mathbb{R} - \{0\}$



الف) $\frac{\pi}{4}$ و $\frac{5\pi}{4}$

$\leftarrow \sin x = \frac{1}{2}$

ب) $\frac{4\pi}{3}$ و $\frac{10\pi}{3}$

$\leftarrow \sin x = -\frac{\sqrt{3}}{2}$