

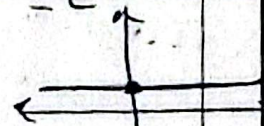
الف) تابع است  $y^3 - x = 2x^2 \rightarrow y^3 = 2x^2 + x \rightarrow y = \sqrt[3]{2x^2 + x}$

ب) تابع نیست  $|y| + x^2 = x + 3 \rightarrow |y| = -x^2 + x + 3 \rightarrow y = \pm (-x^2 + x + 3)$

ج) تابع است  $\sqrt{x-4} + |y-2| = 0 \rightarrow \sqrt{x-4} = 0 \wedge |y-2| = 0 \rightarrow x=4, y=2$

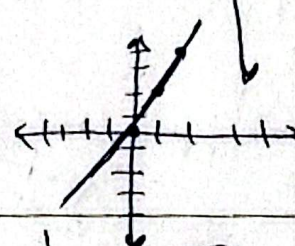
د) تابع نیست  $x \leq \cos y \xrightarrow{x=0} \cos y = 0 \rightarrow y = \frac{\pi}{2} / \frac{3\pi}{2}$

الف) تابع گزینشی است  $y = k, k \in \mathbb{Z} (y \in \mathbb{Z})$



ب) تابع خطی گزینشی است  $y - y_1 = a(x - x_1)$

$(x_1, y_1) = (1, 2) \wedge a = 2 \rightarrow y - 2 = 2(x - 1) \rightarrow y = 2x$



الف) همانی  $y = x \rightarrow y = ax + b \rightarrow a=1, b=0 \rightarrow x + 0 = 1 \rightarrow x = 1$

$x + 0 = 1 \rightarrow x = 1$

ب)  $y = x^2 + ax + b$

Min  $|x|$   $x \leq 2 \rightarrow x = -\frac{a}{2} = 2 \rightarrow a = -4 \rightarrow y = x^2 - 4x + b$

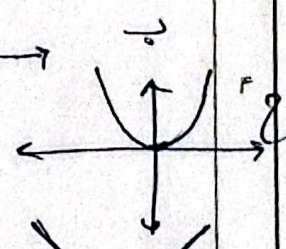
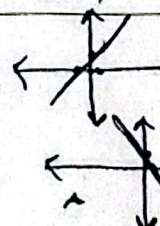
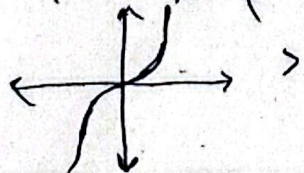
$b = 5$

الف)  $y = 2x + 1$   $b=1$  /  $2x+1=0 \rightarrow x=-\frac{1}{2}$

ب)  $y = -3x + 1$   $b=1$  /  $-3x+1=0 \rightarrow x=\frac{1}{3}$

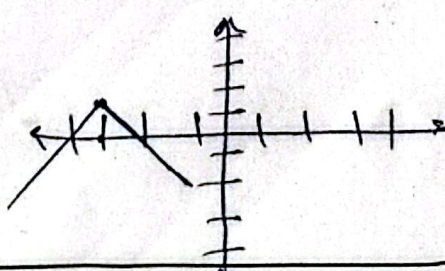
ج)  $y = x^4$

د)  $y = x^5$



الف) دو واحد مثبت است واحد بالا

ب)



Min  $\rightarrow$  Max

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

ب)  $\frac{x+\varepsilon}{x^2-\sqrt{x+1}x} \Rightarrow \Delta = b^2 - 4ac \rightarrow (-1)^2 - 4(1)(1) = -3 < 0$   $D_f = \mathbb{R}$

ج)  $\frac{x+\varepsilon}{x^2+x+\varepsilon} \Rightarrow \Delta = b^2 - 4ac \rightarrow 1^2 - 4(1)(\varepsilon) = 1-4\varepsilon < 0$   $D_f = \mathbb{R}$

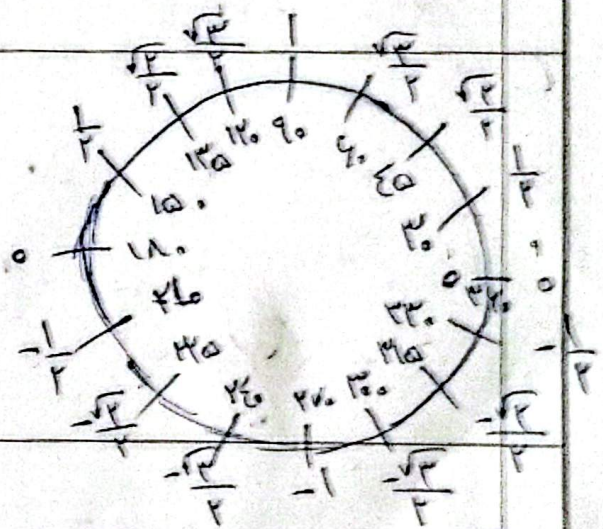
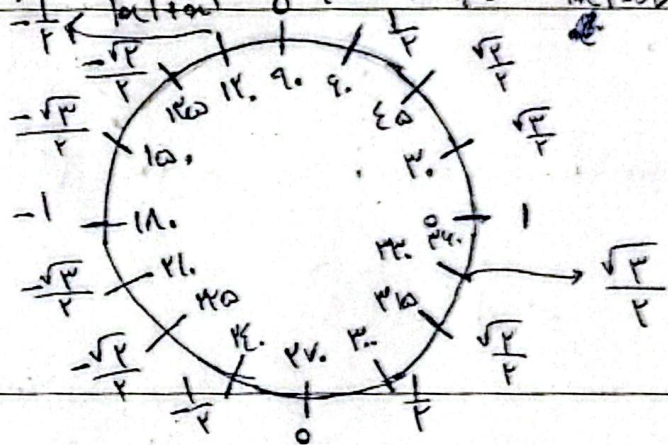
د)  $\frac{x+\varepsilon}{x^2-\varepsilon x^2} \Rightarrow x^2-\varepsilon x^2 \neq 0 \quad x^2(x-\varepsilon) \neq 0$   $D_f = \mathbb{R} - \{0, \pm \varepsilon\}$

الف)  $y = \sqrt{4-x} + \sqrt{x-1} \quad 4-x \geq 0 \quad x-1 \geq 0 \rightarrow 1 \leq x \leq 4$   $D_f = [1, 4]$

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

ج)  $y = \frac{\sqrt{x-1}}{x-\varepsilon} \quad x-1 \geq 0 \quad x-\varepsilon \neq 0$   $D_f = [1, \varepsilon) \cup (\varepsilon, +\infty)$

د)  $y = \frac{x+1}{|x|+x^2} \quad |x|+x^2 \neq 0 \quad |x|=0 \checkmark \quad x^2 \neq 0 \checkmark$   $D_f = \mathbb{R} - \{0\}$



الف)  $\cos \frac{\pi}{3} = \cos 60^\circ = \frac{1}{2} \quad -(-\frac{1}{2}) = \frac{1}{2} \quad \sin \theta = \frac{1}{2} \quad \theta = 30^\circ = \frac{\pi}{6}$

ب)  $\cos \frac{11\pi}{6} = \cos 330^\circ = \frac{\sqrt{3}}{2} \Rightarrow -\frac{\sqrt{3}}{2} \quad \sin \theta = -\frac{\sqrt{3}}{2} \quad \theta = \frac{4\pi}{3}$

ج)  $\cos \frac{5\pi}{4} = \cos 225^\circ = -\frac{\sqrt{2}}{2} \Rightarrow -\frac{\sqrt{2}}{2} \quad \sin \theta = -\frac{\sqrt{2}}{2} \quad \theta = \frac{5\pi}{4}$