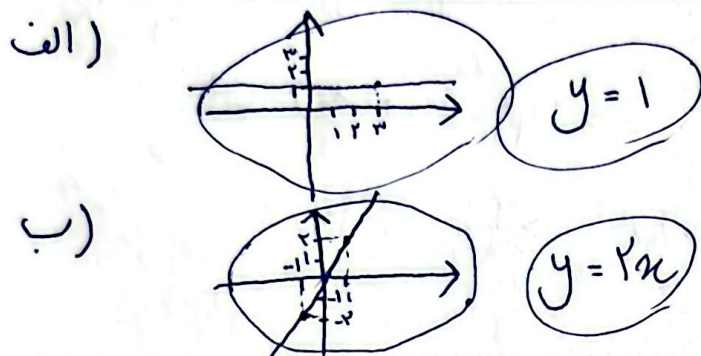


الف) $y^3 - x = 2x^2 \quad y_1^3 - x_1 = 2x_1^2 \Rightarrow y_1^3 = 2x_1^2 + x_1 \quad y_2^3 - x_2 = 2x_2^2 \Rightarrow y_2^3 = 2x_2^2 + x_2 \quad \xrightarrow{x_1=x_2} y_1^3 = y_2^3 \Rightarrow y_1 = y_2$
 if $x_1 = x_2 \Rightarrow y_1 = y_2$ تابع است

ب) $|y| + x^2 = x + 3$ (مثال نقض)
 if $x=1 \rightarrow |y| + 1 = 4 \Rightarrow |y| = 3 \Rightarrow y = \{-3, 3\} \Rightarrow$ تابع نیست

ج) $\sqrt{x-4} + |y-2| = 0 \quad x=4, y=2$ دو عبارت نامنفی با هم جمع شده اند و حاصل شده صفر پس هر دو صفر بوده اند
 یک نقطه است تابع است

د) $x = \cos y$ if $x=0 \rightarrow 0 = \cos y \Rightarrow y = \{\frac{\pi}{2}, \frac{3\pi}{2}\} \Rightarrow y = \{2k\pi + \frac{\pi}{2}, 2k\pi + \frac{3\pi}{2}\}$ تابع نیست

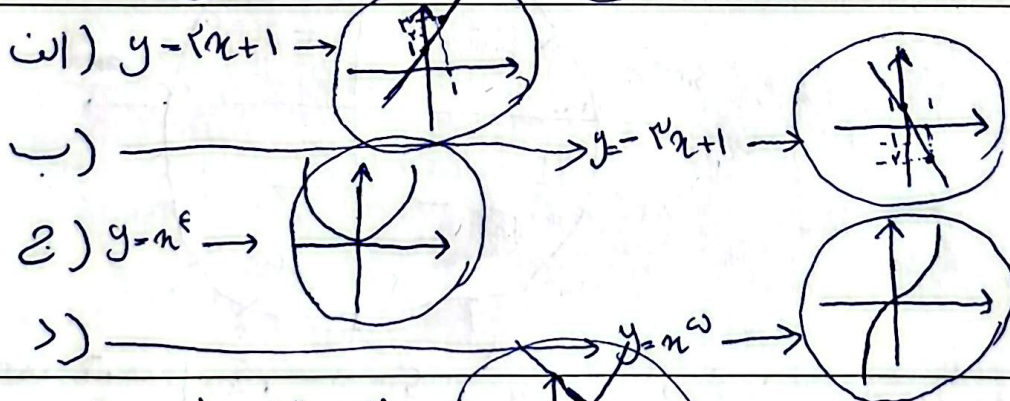


الف) $y = ax + b \rightarrow$ تابع هانی باشد $\Rightarrow y = x \Rightarrow b=0, a=1$

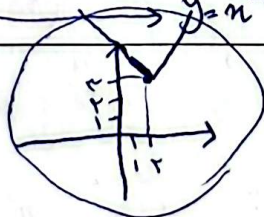
$a+2b \Rightarrow 1+2x_0 = 1$

ب) $x^2 + ax + b \rightarrow \min | \quad \Rightarrow \frac{-a}{2} = 2 \Rightarrow a = -4$

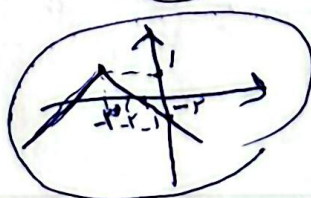
$\{ -4(2) + b = 1 \Rightarrow b = 9 \Rightarrow a+2b = -4+18 = 14$
 طول برای پیدا کردن عرض



الف) $y = |x-2| + 3$



ب) $y = -|x+3| + 1$



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

ب) $\frac{x+\varepsilon}{x^2-\sqrt{x+14}} \Rightarrow x^2-\sqrt{x+14} \neq 0 \Rightarrow \Delta = 49-4\varepsilon < 0 \Rightarrow D_f = \mathbb{R}$

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

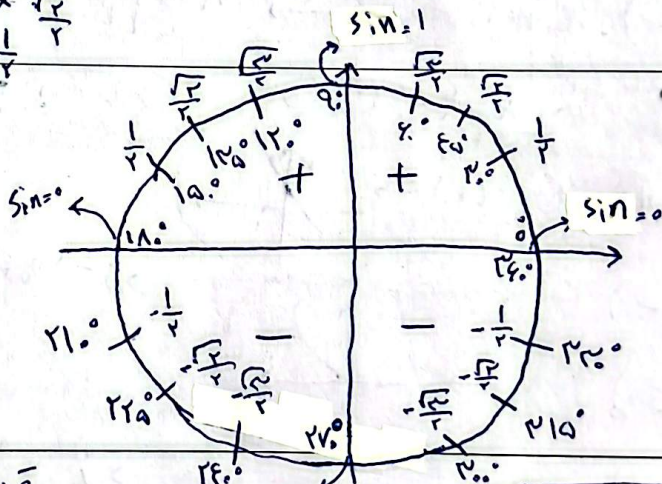
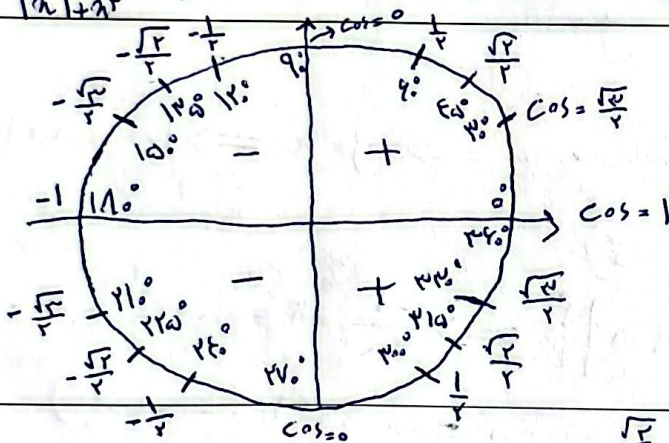
د) $\frac{x+\varepsilon}{x^2-\varepsilon x^2} \Rightarrow x^2-\varepsilon x^2 \neq 0 \Rightarrow x^2(x^2-\varepsilon) \neq 0 \Rightarrow x \neq \{0, \sqrt{\varepsilon}, -\sqrt{\varepsilon}\} \Rightarrow D_f = \mathbb{R} - \{0, \sqrt{\varepsilon}, -\sqrt{\varepsilon}\}$

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

ب) $y = \frac{x^2+1}{x^2+1} \Rightarrow x^2+1 \neq 0 \Rightarrow x^2+1 \rightarrow \text{همواره مثبت است} \Rightarrow D_f = \mathbb{R}$

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

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



الف) $\cos \frac{7\pi}{4} = \cos 150^\circ = -\frac{1}{2} \xrightarrow{\text{مربع}} \frac{1}{2} = \sin x \Rightarrow \sin = 1 \Rightarrow x = \left\{ 2k\pi + \frac{\pi}{2}, 2k\pi + \frac{5\pi}{2} \right\}$

ب) $\cos \frac{11\pi}{4} = \cos 330^\circ = \frac{\sqrt{3}}{2} \xrightarrow{\text{مربع}} -\frac{\sqrt{3}}{2} = \sin x \Rightarrow x = \left\{ 2k\pi + \frac{3\pi}{2}, 2k\pi + \frac{5\pi}{2} \right\}$