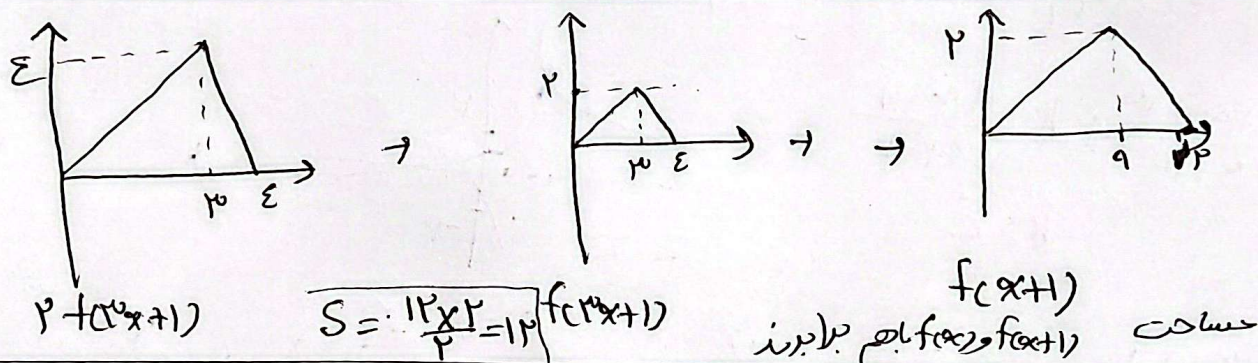


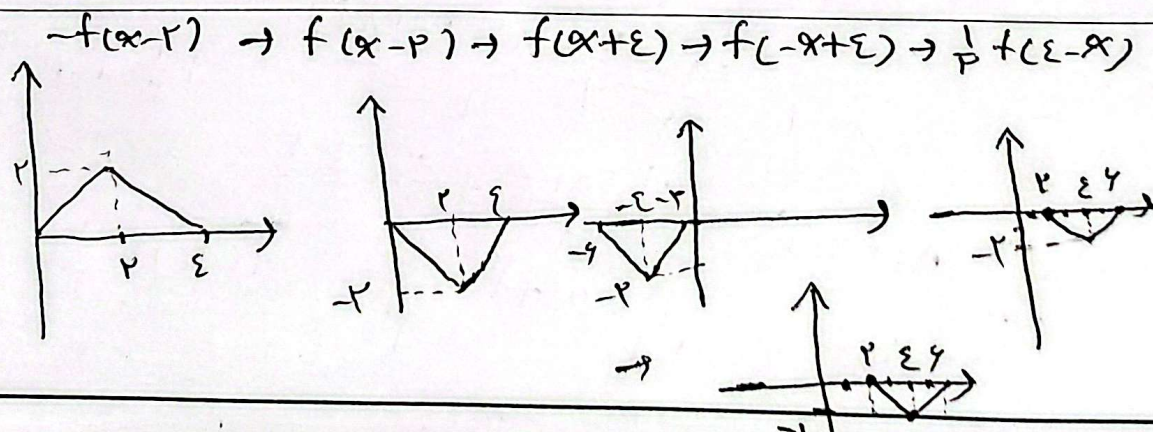
الف) ليكن $f(x)$ متصلة على $[-\varepsilon, \varepsilon]$ $f(x) \leq r$ $\Leftrightarrow f(x) - r \leq 0$ $\forall x \in [-\varepsilon, \varepsilon]$
 ليكن $f(x) \geq -r$ $\Leftrightarrow f(x) + r \geq 0$ $\forall x \in [-\varepsilon, \varepsilon]$

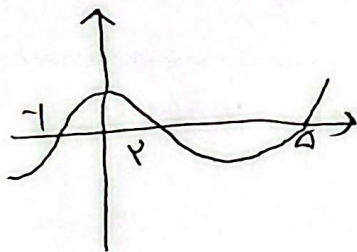
$$D_f = [-12, -1] \Leftrightarrow \begin{matrix} p(-2) - p = -12 \\ p(-1) - p = -1 \end{matrix} \quad D_{f(x)}(0) = [-2, -1]$$

$f(x) = x + \sqrt{x-2}$ (تابع اول) $\xrightarrow{x=8}$ $x-2 + \sqrt{x-2}$ (تابع دوم) $\xrightarrow{x=8}$ $2-2 + \sqrt{2-2} = 0$
 چون تابع دارد که از ترکیب دو تابع صعودی به دست آید است تابع دوارون تابع
 در $x=y$ متقاطع اند
 $x-2 + \sqrt{x-2} = x \Rightarrow \sqrt{x-2} = 2 \Rightarrow x-2 = 4 \Rightarrow x = 6 \Rightarrow y = 6$



$$\begin{aligned} A(\tau, -\tau) \quad y &= f(x) & A'(\alpha, \tau\alpha - 1) \quad y &= a + \tau f\left(\frac{x-a}{\tau}\right) \\ \frac{x-a}{\tau} = \tau &\Rightarrow x = \tau + a = \alpha & A'(-\tau, -1\tau) \\ y &= 1 + \tau a - 1 = \tau a \\ \tau a &= a + \tau f(\tau) \Rightarrow \tau a = a - \tau \Rightarrow \boxed{a = -1} \end{aligned}$$





$$y = \sqrt{-(x+2)f(x-1)}$$

$$\begin{aligned} 2x-1 &= 0 \Rightarrow x = \frac{1}{2} \\ 2x-1 &= 2 \Rightarrow x = \frac{3}{2} \\ 2x-1 &= -1 \Rightarrow x = 0 \end{aligned}$$

x	$-\infty$	$-\frac{1}{2}$	0	$\frac{1}{2}$	1	$+\infty$
y	$-$	$+$	$+$	$-$	$+$	$-$

$$D_y = [-\frac{1}{2}, 0] \cup [\frac{1}{2}, 1]$$

$$f(x) = |2x-1|+1$$

$$\begin{aligned} f(x+k) &= |2(x+k)-1|+1 \\ &= |2x+2k-1|+1 \end{aligned}$$

$$f(x+k)-1 = |2x+2k-1| - 1$$

$$|2x+2k-1|-1 = |2x-1|+1 \Rightarrow |2k-1|-1 = \varepsilon$$

$$\begin{aligned} k > \frac{\varepsilon}{2} & \quad 2k-1-1 = \varepsilon \Rightarrow k = \frac{\varepsilon+2}{2} \\ k < \frac{\varepsilon}{2} & \quad -2k+1-1 = \varepsilon \Rightarrow k = -\frac{\varepsilon}{2} \end{aligned} \Rightarrow \delta = \frac{\varepsilon}{2}$$

$$f(x) = \frac{2x-1}{x+1}$$

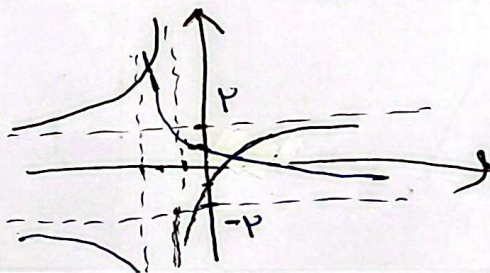
$$-f(x) = \frac{-2x+1}{x+1}$$

$$-f\left(\frac{x}{\delta}\right) = \frac{-2x+1}{x+1}$$

$$-f\left(\frac{x}{\delta}\right)+h = \frac{-2x+1}{x+1}+h$$

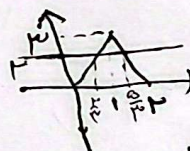
$$\frac{-2x+1}{x+1}+h = \frac{2x-1}{x+1}$$

$$h = \varepsilon$$

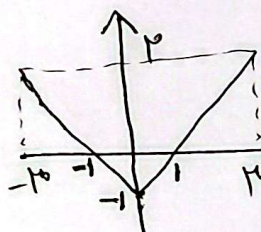


$$y = -f\left(\frac{x}{\delta}\right)+1$$

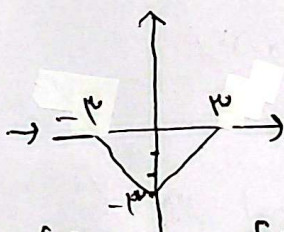
$$y = f(x-1) \quad y = 1 - f(x-1)$$



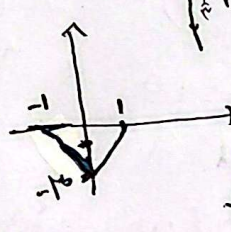
$$\frac{1}{\delta} = \frac{\varepsilon}{\delta} = \delta$$



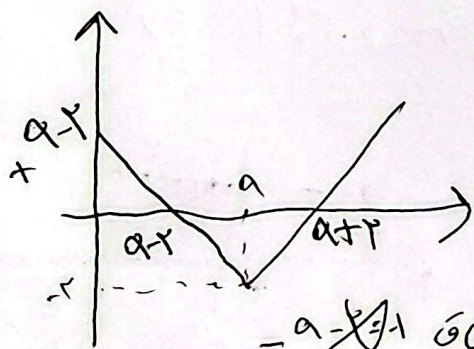
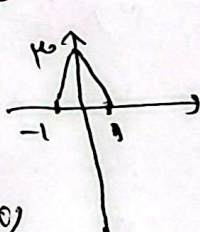
$$y = -f\left(\frac{x}{\delta}\right)$$



$$-f(x)$$



$$f(x)$$



$$\frac{(a-1)^2}{\delta} + \frac{(a+1)(a+1)(1)}{\delta}$$

$$\frac{a^2-2a+1}{\delta} + \frac{2a+2}{\delta} = \frac{a^2-2a+1+2a+2}{\delta} = \frac{a^2+3}{\delta}$$

$$a^2-2a+1 = 0$$

$$a = 1$$

$$f\left(\frac{1}{\delta}\right) = \frac{1}{\delta}$$