

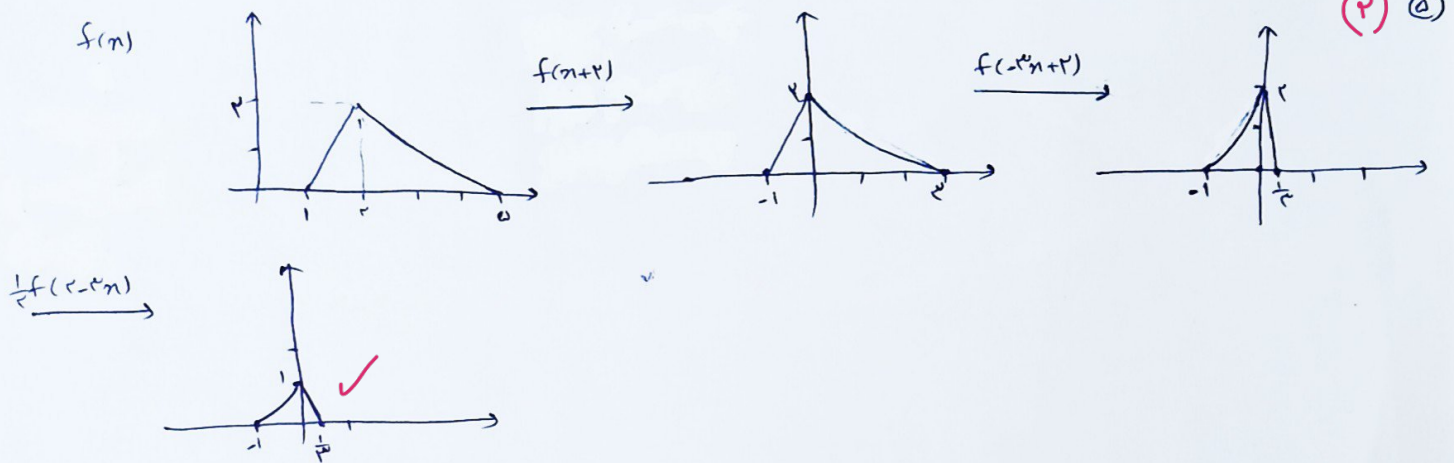
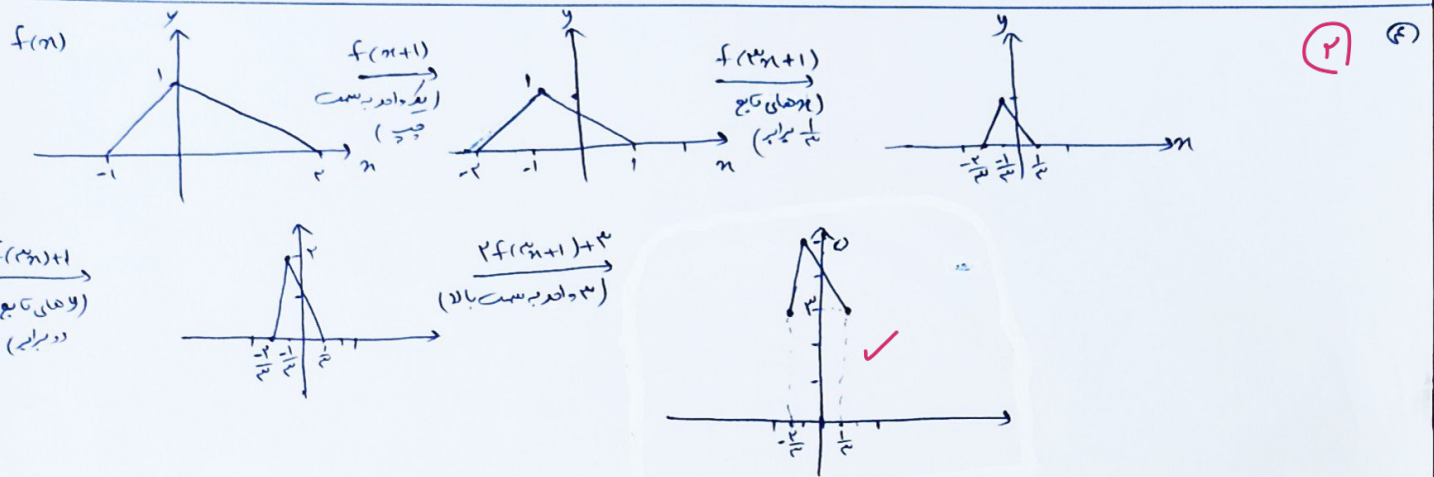
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$$-x \leq \frac{x^2 + 2}{\Delta} \leq 1 \rightarrow -10 \leq x^2 + 2 \leq 10 \rightarrow -12 \leq x^2 \leq 18 \rightarrow -4 \leq x \leq 6 \Rightarrow [-4, 6] \quad (۲) \text{ ۱}$$

$$f(x^2 - 2) \begin{cases} x^2 - 2 \leq -1 \\ x^2 - 2 \geq 7 \end{cases} \Rightarrow D_f = [-1, 7] \quad (۲) \text{ ۲}$$

$$-1 \leq x \leq 3 \rightarrow x^2 \leq 9 \rightarrow -2 \leq x^2 + 1 \leq 10 \rightarrow -1 \leq \frac{x^2 + 1}{2} \leq 5$$

$$-1 \leq 2 - \Delta x \leq 5 \rightarrow -3 \leq -\Delta x \leq 3 \rightarrow \frac{-3}{\Delta} \leq x \leq \frac{3}{\Delta} \Rightarrow D = \left(\frac{-3}{\Delta}, \frac{3}{\Delta} \right) \quad (۲) \text{ ۳}$$



$$y = -\frac{1}{x}x^2 + \frac{5}{\Delta}x + 1$$

$$\text{ext} \begin{cases} x \leq \frac{5}{\Delta} \\ x \geq \frac{5}{\Delta} \end{cases}$$

$$y \leq -\frac{1}{x} \left(\frac{5}{\Delta} \right)^2 + \frac{5}{\Delta} \cdot \frac{5}{\Delta} + 1 = \frac{25}{\Delta^2} + \frac{25}{\Delta^2} + 1 = \frac{50}{\Delta^2} + 1 \leq \frac{10}{\Delta}$$

$$\frac{25}{\Delta^2} + B \leq 10 \Rightarrow B \leq \frac{10}{\Delta}$$

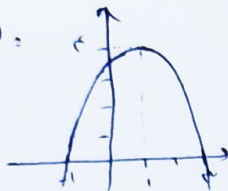
$$\frac{25}{\Delta} + A \leq 1 \Rightarrow A \leq \frac{1}{\Delta}$$

$$-\frac{1}{x}x^2 + \frac{5}{\Delta}x + 1 \leq \frac{10}{\Delta} \xrightarrow{(x \neq 0)} -x^2 + 5x + \Delta = -10$$

$$x^2 - 5x - \Delta = 0 \Rightarrow x = \frac{5 \pm \sqrt{25 + 4\Delta}}{2}$$

$$\begin{aligned} x &\leq \frac{5 + \sqrt{25 + 4\Delta}}{2} \\ x &\geq \frac{5 - \sqrt{25 + 4\Delta}}{2} \end{aligned}$$

f(x):



$$1 - \sqrt{f(x)} \rightarrow \text{ext} \left| \begin{matrix} \alpha \\ \beta \end{matrix} \right., \alpha \beta < 0?$$

$$x \leq \alpha \Rightarrow 1 \Rightarrow x \leq \alpha \Rightarrow \alpha \leq \frac{1}{\alpha}$$

$$1 - \sqrt{f(x)} < \beta \Rightarrow \boxed{\beta \leq -1}$$

$$\alpha \beta \Rightarrow \boxed{\frac{\alpha}{\beta}}$$

(2) (3)

$$D_f = (a, c], D_g = [-1, b), y = f(x-1) + g(x+1), a-b < 0$$

$$D \subseteq (r, d)$$

$$D_{f(x-1)} \Rightarrow a < x-1 \leq c \Rightarrow a+1 < x \leq c+1$$

$$\cap$$

$$a+1 < x \leq c+1 \Rightarrow a-b < -x-1 < -c-1 \Rightarrow a-b < -x-1 < -c-1$$

$$D_{g(x+1)} \Rightarrow -1 \leq x+1 < b \Rightarrow -2 \leq x < b-1$$

(2) (4)

$$y_1 \leq f\left(\frac{x}{r}+1\right)$$

$$\left(\frac{x}{r}+1\right) \begin{matrix} x \leq -r \\ x < 0 \end{matrix} \Rightarrow \begin{matrix} \frac{x}{r}+1 \leq -\frac{1}{r} \\ \frac{x}{r}+1 \leq \frac{x}{r} \end{matrix}$$

$$\Rightarrow D_{y_1} = \left[-\frac{1}{r}, \frac{x}{r}\right]$$

(2) (4)

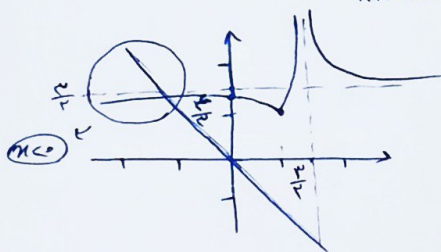
$$[-1, r] \subseteq R_{f(x)} \subseteq R_{f\left(\frac{x}{r}+1\right)} \Rightarrow -1 \leq \sqrt{f(x)} - r \leq 1 \Rightarrow 0 \leq \sqrt{r f(x)} - r \leq \sqrt{r} \Rightarrow R_{y_1} = [0, \sqrt{r}]$$

$$R_{y_1} = [0, \sqrt{r}]$$

$$f(x) = \left| \frac{x+1}{x-1} \right| \Rightarrow \left| \frac{(x-1)+1}{x-1} \right| + 1 \Rightarrow \left| \frac{x}{x-1} \right| + 1$$

$$x + g(x) < 0 \Rightarrow g(x) < -x$$

(2) (4)



$$\begin{matrix} \text{مجاورة} = \frac{x}{r} \\ \text{مجاورة} = \frac{1}{r} \end{matrix}$$

$$\frac{x-1}{x-1} + 1 < -x$$

$$\frac{x-1+x-1}{x-1} < -x \xrightarrow{x < 0} x-1 < -x \Rightarrow -x > 1-x \Rightarrow x > 1$$

$$x > 1 \Rightarrow x > 1$$

$$x > 1 \Rightarrow x < -1$$

$$\boxed{x < -1} \leftarrow \boxed{x < 0}$$