

$$Df: [-r, r] \quad f\left(\frac{r\alpha+r}{a}\right) \Rightarrow -r \leq \frac{r\alpha+r}{a} \leq r \Rightarrow -1 \leq r\alpha+r \leq r \Rightarrow -1 \leq r\alpha \leq 1 \Rightarrow -r \leq \alpha \leq r$$

$$\Rightarrow Df\left(\frac{r\alpha+r}{a}\right) : [-r, r]$$

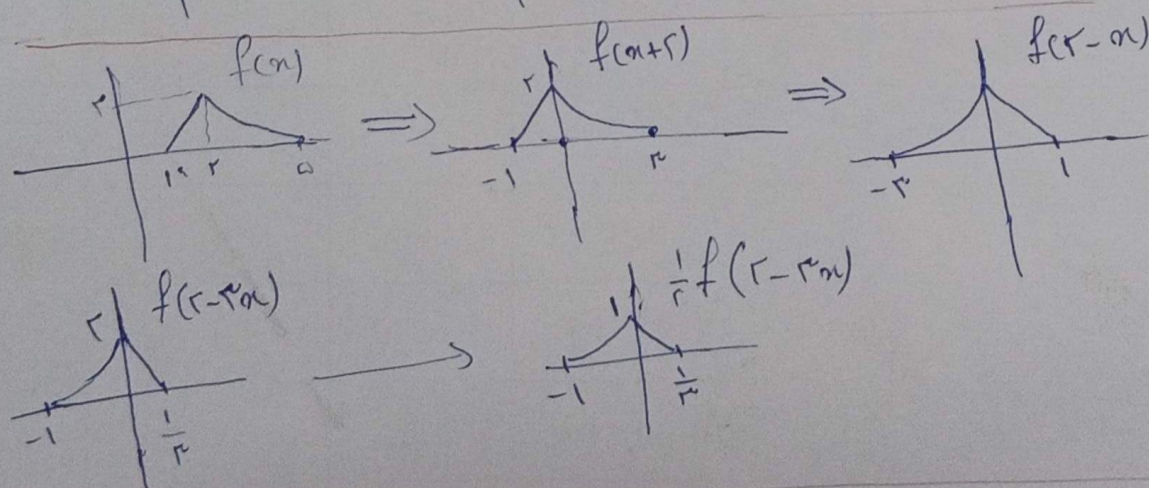
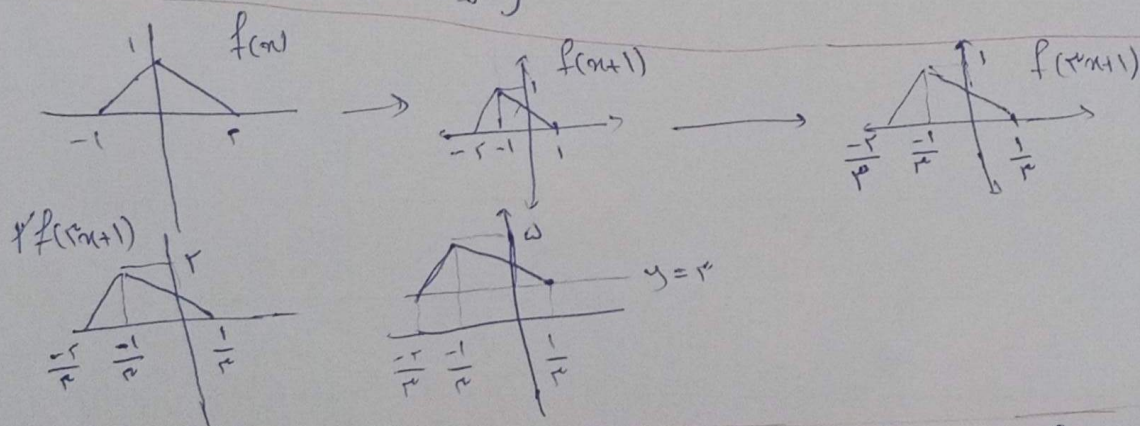
$$Df(r\alpha-r) = [-r, r] \longrightarrow -r \leq \alpha \leq r \longrightarrow -r \leq r\alpha \leq r \longrightarrow -r \leq r\alpha-r \leq r$$

$$\longrightarrow Df(\alpha) = [-r, r]$$

$$Df\left(\frac{r\alpha+r}{c}\right) : [-r, r] \longrightarrow -1 \leq \alpha \leq r \longrightarrow -r \leq r\alpha \leq r \longrightarrow -r \leq r\alpha+1 \leq r \longrightarrow -r-1 \leq r\alpha \leq r-1 \longrightarrow \frac{-r-1}{r} \leq \alpha \leq \frac{r-1}{r}$$

$$Df(\alpha) : \left(\frac{-r-1}{r}, \frac{r-1}{r}\right) \longrightarrow -r \leq r-1-\alpha \leq r \longrightarrow -r \leq -\alpha \leq r \longrightarrow \frac{-r}{a} \leq \alpha \leq \frac{r}{a}$$

$$\longrightarrow Df(r-\alpha) = \left(-\frac{r}{a}, \frac{r}{a}\right)$$



$$f(\alpha) = \frac{1}{r}\alpha + \frac{c}{a}\alpha + 1 \rightarrow a = \frac{1}{r} \quad y = a(x-h) + k \rightarrow \frac{1}{r}(\alpha-r) + r = 0 \rightarrow \frac{1}{r}(\alpha-r) = -r$$

$$\rightarrow (\alpha-r) = -a \rightarrow \alpha-r = \pm r \quad \begin{cases} \alpha_1 = +r \\ \alpha_2 = -r \end{cases}$$

$$\frac{1}{2}r$$

$$f(1) = e \quad y = 1 - \sqrt{f(x+2)} \quad A, (\alpha, \beta) \rightarrow f(x) = f(1) \Rightarrow \sqrt{x+2} = 1 \Rightarrow x+2 = 1 \Rightarrow x = -1 = \alpha$$

$$\beta = 1 - \sqrt{f(1)} \rightarrow \beta = 1 - 1 = 0 = \beta \Rightarrow \alpha\beta = (-1)(0) = 0 \Rightarrow \boxed{\frac{1}{\sqrt{e}}}$$

$$Df = (a, c] \xrightarrow{f(x-1)} a < x-1 \leq c \rightarrow a+1 < x \leq c+1 \rightarrow Df_{(x+1)} = (a+1, c+1]$$

$$Dg = [-1, b) \xrightarrow{g(x+1)} -1 \leq x+1 < b \rightarrow -2 \leq x < b-1 \rightarrow Dg_{(x+1)} = [-2, b-1)$$

$$y = f(x-1) + g(x+1) \quad D_y = Df_{(x+1)} \cap Dg_{(x+1)} = (-2, c+1]$$

$$\Rightarrow a+1 = -2 \Rightarrow \boxed{a = -3} \quad b-1 = c+1 \Rightarrow \boxed{b = c+2}$$

$$Df_{(\frac{x}{e}+1)} = [-2, c+1] \rightarrow -2 \leq \frac{x}{e}+1 \leq c+1 \rightarrow \frac{-2}{e} \leq \frac{x}{e} \leq c \rightarrow \frac{-1}{e} \leq \frac{x}{e}+1 \leq \frac{c}{e} \quad (9)$$

$$\rightarrow Df(x) = \left[-\frac{1}{e}, \frac{c}{e}\right] \quad R_{f(\frac{x}{e}+1)} = R_{f(x)} = [-1, 2]$$

$$-1 \leq f(x) \leq 2 \rightarrow -2 \leq \sqrt{f(x)} \leq \sqrt{2} \rightarrow -2 \leq \sqrt{f(x)} - 1 \leq 1 \Rightarrow 1 \leq |\sqrt{f(x)} - 1| \leq \sqrt{2}$$

$$\rightarrow 1 \leq \sqrt{|f(x) - 1|} \leq \sqrt{2} \rightarrow R: [1, \sqrt{2}]$$

$$f(x) = \left| \frac{x+1}{x+1} \right| \rightarrow f(x-2) = \left| \frac{(x-2)+1}{x(x-2)+1} \right| = \left| \frac{x-1}{x^2-2x+1} \right| \rightarrow f(x-2)+1 = \left| \frac{x-1}{x^2-2x+1} \right| + 1 = g(x) \quad (10)$$

$$x + g(x) < 0 \quad g(x) = \left| \frac{x-1}{x^2-2x+1} \right| + 1 > 0 \Rightarrow x < -1 \quad \begin{cases} x-1 < 0 \\ x^2-2x+1 < 0 \end{cases}$$

چون صورت وخرج هر دو منفی هستند پس خود کسر مثبت است و نیز می توان به قدر مطلق نوشت

$$\left| \frac{x-1}{x^2-2x+1} \right| = \frac{x-1}{x^2-2x+1} = \frac{-(1-x)}{-(x^2-2x+1)} = \frac{1-x}{x^2-2x+1} \rightarrow \frac{1-x}{x^2-2x+1} + 1 + x < 0$$

$$\Rightarrow 1-x + (1+x)(x^2-2x+1) < 0 \rightarrow -2x^2 + x + x^3 + 1 - x < 0 \rightarrow -2x^2 + x^3 < 0$$

$$\rightarrow x^3 > 2x^2 \rightarrow x^3 > 2 \quad \begin{cases} x > \sqrt{2} & \text{عق} \\ x < -\sqrt{2} & \text{عق} \end{cases} \quad \begin{matrix} \text{زیرا می دانیم } x < -1 \\ \text{عق} \end{matrix} \rightarrow \underline{\underline{(-\infty, -\sqrt{2})}}$$