

$$f(n)$$

$$f\left(\frac{r_n+1}{\Delta}\right)$$

(1)

$$D_{f(n)} = [-1, 4]$$

$$-1 \leq \frac{r_n+1}{\Delta} \leq 4 \rightarrow -1 \leq r_n+1 \leq 4 \rightarrow -1 \leq r_n \leq 3$$

$$\rightarrow -4 \leq n \leq 2$$

$$D_{f\left(\frac{r_n+1}{\Delta}\right)} = [-4, 2]$$

$$f(r_n-1)$$

(2)

$$D_f = [-1, 3]$$

$$-1 \leq n \leq 3 \rightarrow -1 \leq r_n-1 \leq 3$$

$$\rightarrow f(n) \rightarrow D_{f(n)} = [-1, 3]$$

$$f\left(\frac{r_{n+1}}{r}\right)$$

(3)

$$D = [-1, 3]$$

$$-1 \leq n < 3 \rightarrow -1 \leq \frac{r_{n+1}}{r} < 3$$

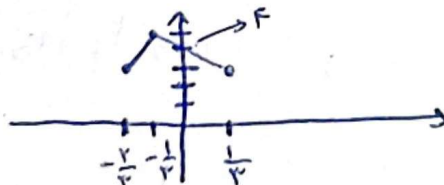
$$f(r-\Delta n) \rightarrow -1 \leq r-\Delta n < 3 \rightarrow -1 \leq -\Delta n < 3 \rightarrow \frac{r}{\Delta} \geq n > -\frac{r}{\Delta}$$

$$\rightarrow D = \left(-\frac{r}{\Delta}, \frac{r}{\Delta}\right]$$

$$f(n)$$

$$r f(r_{n+1}) + r$$

(4)



$$-1 \leq r_{n+1} \leq 1$$

$$\rightarrow -\frac{1}{r} \leq n \leq \frac{1}{r}$$

$$r_{n+1} = 0 \rightarrow n = -\frac{1}{r}$$

$$f(n)$$

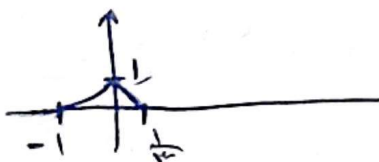
$$\frac{1}{r} f(r-r_n)$$

(5)



$$r-r_n = 1$$

$$n = 0$$



$$1 \leq r-r_n \leq 2 \rightarrow -1 \leq -r_n \leq 1$$

$$\rightarrow \frac{1}{r} \geq n \geq -1$$

$$y = -\frac{1}{3}x^2 + \frac{2}{3}x + 1 \quad (4)$$

$$\text{راس } (4, 3) \rightarrow \text{راس } \left(\frac{2}{3}, \frac{11}{3}\right)$$

اگر فقط انتقال دهیم اندازه و شکل سهی تغییری نمی کند پس ضریب x^2 ثابت می ماند.

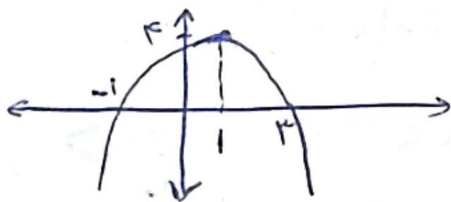
$$\text{طول} = 4 = \frac{b}{\frac{2}{3}} \rightarrow b = \frac{4}{3}$$

$$\text{سهی جدید} \rightarrow -\frac{1}{3}(x-4)^2 + 3 = -\frac{1}{3}x^2 + \frac{4}{3}x - \frac{16}{3} + 3 = \frac{4}{3}$$

$$= -\frac{1}{3}(x^2 - 8x + 16) = -\frac{1}{3}(x-4)(x-4)$$

پس نمودار محور x را در طول 4 و 4 قطع می کند.

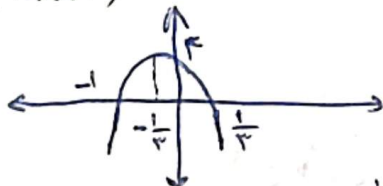
$f(x)$



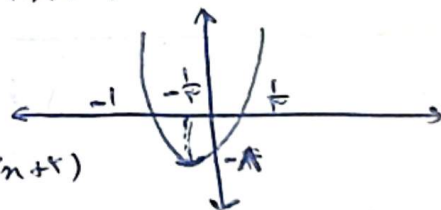
$$A(\alpha, \beta) \\ y = 1 - 2f(2x+2)$$

$$-x^2 + 2x + 3$$

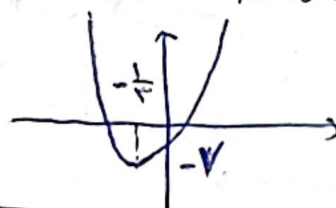
$f(2x+2)$



$-2f(2x+2)$



$$A\left(-\frac{1}{3}, -7\right) \\ \alpha \beta = \frac{7}{3}$$



$$11x^2 + 12x - 2$$

$$D_f = (a, 4]$$

$$D_g = [-b, b)$$

$$y = f(x-1) + g(x+1) \\ D = (-1, 5)$$

(1)

از آنجایی $(-2, 5)$ باز است پس $-2 < x-1 < 5$ و $a = -2$

$$a = -2 - 1 = -3$$

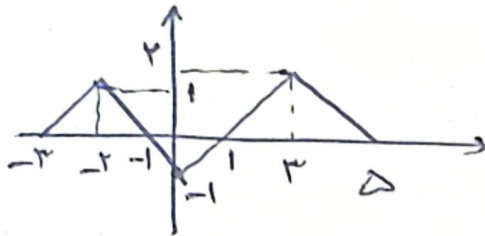
$$b = 5 + 1 = 6$$

b را می دهیم.

$$a - b = -3 - 6 = -9$$

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

(9)



$$y_2 = \sqrt{|2f(x) - 2|}$$

$$-2 \leq x \leq \Delta \rightarrow -\frac{1}{r} \leq \frac{x}{r} + 1 \leq \frac{\Delta}{r}$$

$$f(x) \rightarrow D_f = \left[-\frac{1}{r}, \frac{\Delta}{r}\right] \rightarrow D_{y_2} = \left[-\frac{1}{r}, \frac{\Delta}{r}\right]$$

$$\max f(x) = 2 \rightarrow 2f(x) = 4 \rightarrow 1$$

$$\min f(x) = -1 \rightarrow 2f(x) = -2 \rightarrow \sqrt{\Delta}$$

$$f(x) = \frac{r}{r} \rightarrow 0$$

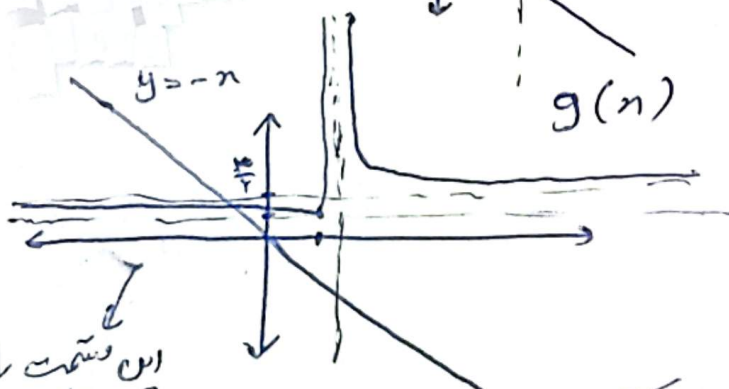
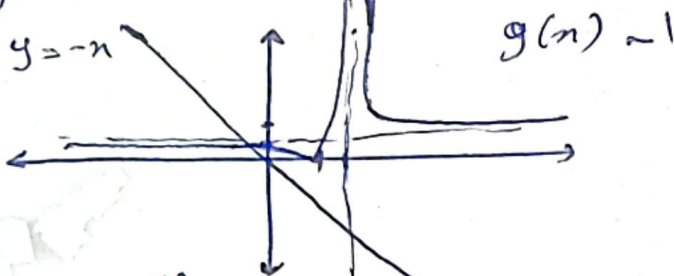
$$R_{y_2} = [0, \sqrt{\Delta}]$$

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

(6)

$$\hookrightarrow \left| \frac{x-1}{2(x-1)+1} \right| \rightarrow g(x) = \left| \frac{x-1}{2x-1} \right| + 1$$

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



$$\left| \frac{x-1}{2x-1} \right| + 1 = -x$$

این حالتی که مثبت است

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

$$\rightarrow -2x^2 - 2x + 1 = x - 1 \rightarrow -2x^2 - 3x + 2 = 0 \rightarrow x = \pm \sqrt{2}$$

$$\rightarrow -2x^2 = -4 \rightarrow x^2 = 2 \rightarrow x = \pm \sqrt{2}$$

$$\text{مجموعه جواب} = (-\infty, -\sqrt{2})$$