

$$D_{\varphi} = [-2, 4]$$

$$D_{\varphi}\left(\frac{x_n+2}{5}\right) \Rightarrow -2 \leq \frac{x_n+2}{5} \leq 4 \Rightarrow -10 \leq x_n+2 \leq 20 \Rightarrow -12 \leq x_n \leq 18 \Rightarrow -4 \leq n \leq 9$$

$$D_{\varphi}\left(\frac{x_n+2}{5}\right) = [-4, 9]$$

$$D = [-2, 3]$$

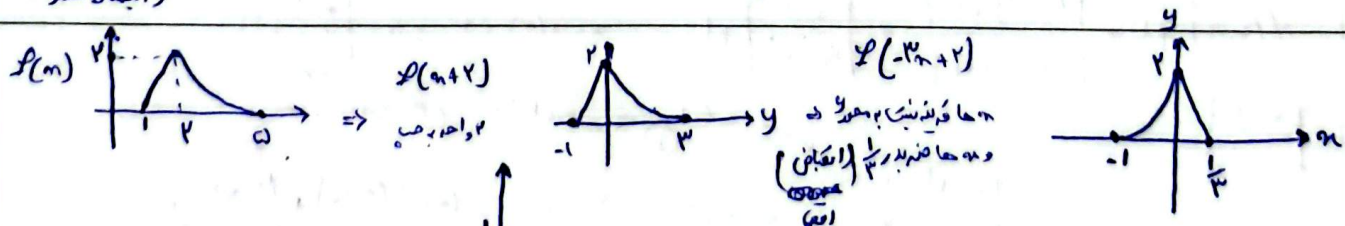
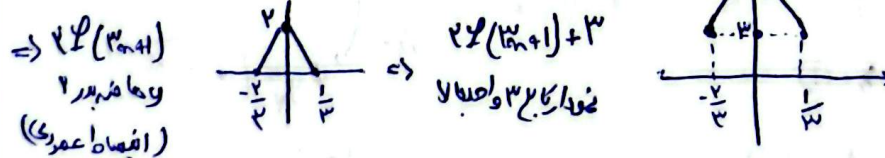
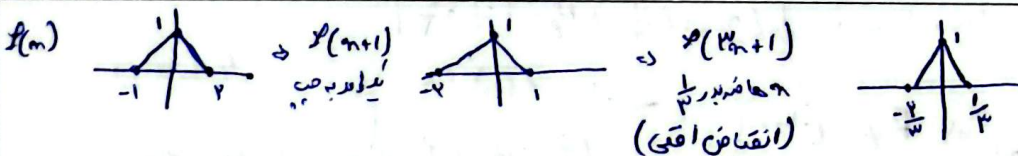
$$\varphi(x_n) \Rightarrow -2 \leq x_n \leq 3 \rightarrow -4 \leq x_n \leq 9 \rightarrow -1 \leq x_n - 2 \leq 7$$

$$D_{\varphi} = [-1, 7]$$

$$\varphi\left(\frac{x_n+1}{4}\right) \Rightarrow -1 \leq x_n \leq 3 \rightarrow -3 \leq x_n \leq 9 \rightarrow -2 \leq x_n+1 \leq 10 \rightarrow -1 \leq \frac{x_n+1}{4} \leq \frac{10}{4} \Rightarrow D_{\varphi} = [-1, \frac{5}{2}]$$

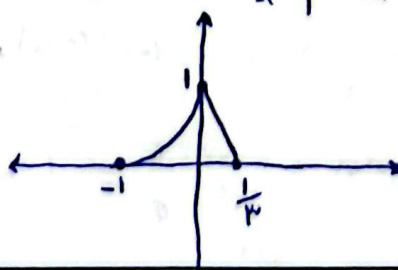
$$D = [-1, 2]$$

$$D_{\varphi}(-2x_n+2) \Rightarrow -1 \leq -2x_n+2 \leq 2 \Rightarrow -3 \leq -2x_n \leq 3 \Rightarrow \frac{3}{2} \geq x_n \geq -\frac{3}{2} \Rightarrow D = \left(-\frac{3}{2}, \frac{3}{2}\right]$$



$\Rightarrow \frac{1}{4}\varphi(-x_n+2)$

نقاط ضربه در $\frac{1}{12}$ و $\frac{1}{6}$ (انقباض عمودی)



$$y = -\frac{1}{3}x^2 + \frac{8}{3}x + 1 \rightarrow (x, y)$$

جواب: انتقال منبسط و شیب تابع تغییر نمی کند پس

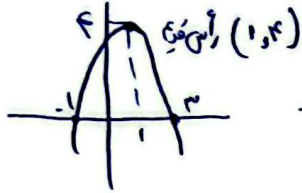
$$y = -\frac{1}{3}(x-4)^2 + 3 \Rightarrow -\frac{1}{3}(x-4)^2 + 3 = 0$$

$$(x-4)^2 = 9$$

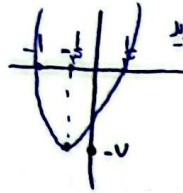
$$x-4 = \pm 3$$

$$x_1 = 1, x_2 = -7$$

نقاط برخورد با محورهای



نتیجه



$$(-\frac{1}{3}, -7) \Rightarrow \alpha\beta = -\frac{1}{3} \times -7 = \frac{7}{3}$$

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$$D_f = (a, b] \rightarrow D_{f(g(n))} = a < n-1 \leq b \Rightarrow a+1 < n \leq b+1 \Rightarrow (a+1, b+1]$$

$$D_g = [-1, b) \rightarrow D_{g(n+1)} = -1 \leq n+1 < b \Rightarrow -2 \leq n < b-1 \Rightarrow [-2, b-1)$$

$$D_y = D_{g(n+1)} \cap D_{f(n-1)} = (a+1, b+1] \cap [-2, b-1) = (-2, b) \xrightarrow{\text{مقایسه}} a+1 = -2 \Rightarrow a = -3$$

$$b-1 = a \Rightarrow b = 9$$

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$$y_1 \in (\frac{3}{4}, 1)$$

$$D_{y_1} = [-\frac{3}{4}, \frac{3}{4}] \rightarrow -\frac{3}{4} \leq x \leq \frac{3}{4} \Rightarrow -\frac{1}{4} \leq \frac{x}{2} + 1 \leq \frac{7}{4} \Rightarrow D_{y_2} = [-\frac{1}{4}, \frac{7}{4}]$$

$$R_{y_1} = [-1, 2] \rightarrow R_{y_1} = R_{f(n)} \Rightarrow R_{f(n)} = [-1, 2] \rightarrow -1 \leq f(n) \leq 2 \rightarrow -2 \leq 2f(n) - 3 \leq 1$$

$$\text{I} \Rightarrow \text{مطلوبی و تطبیق} \Rightarrow 2 \leq |2f(n) - 3| \leq 1$$

$$y_2 = \sqrt{|2f(n) - 3|} \Rightarrow D_{y_2} = [-\frac{1}{4}, \frac{7}{4}] \Rightarrow 2f(n) - 3 \in [-\frac{1}{4}, \frac{7}{4}] \Rightarrow f(n) \in [\frac{5}{8}, \frac{11}{8}]$$

$$\text{مطلوبی و تطبیق} \Rightarrow |2f(n) - 3| \geq 0 \text{ I}$$

$$R_{y_2} = [0, \sqrt{2}]$$

$$g(n) = f(n-2) + 1 = \frac{|(n-2)+1|}{|2(n-2)+1|} = \left| \frac{n-1}{2n-3} \right| + 1 \Rightarrow n+g(n) < 0 \Rightarrow n + \left| \frac{n-1}{2n-3} \right| + 1 < 0$$

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

$$a < -1 \text{ I} \Rightarrow n+1 < 0 \Rightarrow n < -1$$

$$|n-1| = 1-n$$

$$|2n-3| = 3-2n$$

$$n+1 + \frac{1-n}{3-2n} < 0 \Rightarrow \frac{(n+1)(3-2n) + (1-n)}{3-2n} < 0$$

$$\Rightarrow \frac{3-2n^2}{3-2n} < 0$$

$$\rightarrow 3-2n^2 < 0 \Rightarrow 2n^2 > 3 \Rightarrow n^2 > \frac{3}{2} \Rightarrow n < -\sqrt{\frac{3}{2}} \text{ I} \Rightarrow (-\infty, -\sqrt{\frac{3}{2}})$$

مفروضه صحت است