

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

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

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

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

$$\varphi(x_n) \Rightarrow -2 \leq x_n \leq 3 \rightarrow -4 \leq x_n \leq 6 \rightarrow -1 \leq x_n - 2 \leq 4$$

$$D_{\varphi} = [-1, 4]$$

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$$\varphi\left(\frac{x_n+1}{4}\right)$$

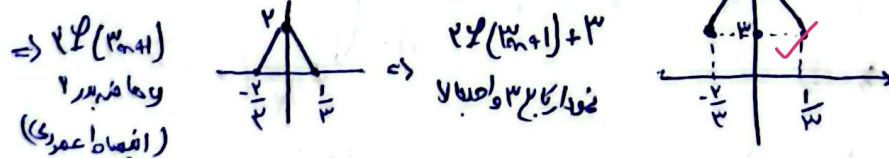
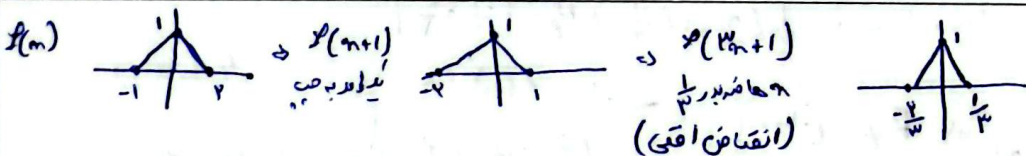
$$\Rightarrow -1 \leq x_n \leq 3 \rightarrow -3 \leq x_n \leq 9 \rightarrow -2 \leq x_n+1 \leq 10 \rightarrow -1 \leq \frac{x_n+1}{4} \leq \frac{10}{4} \Rightarrow D_{\varphi} = [-1, \frac{5}{2}]$$

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

$$D_{\varphi} \Rightarrow -1 \leq 4x_n \leq 2 \Rightarrow -2 \leq -2x_n \leq 1 \Rightarrow \frac{x_n}{2} \geq x_n > -\frac{x_n}{2} \Rightarrow D = \left(-\frac{x_n}{2}, \frac{x_n}{2}\right]$$

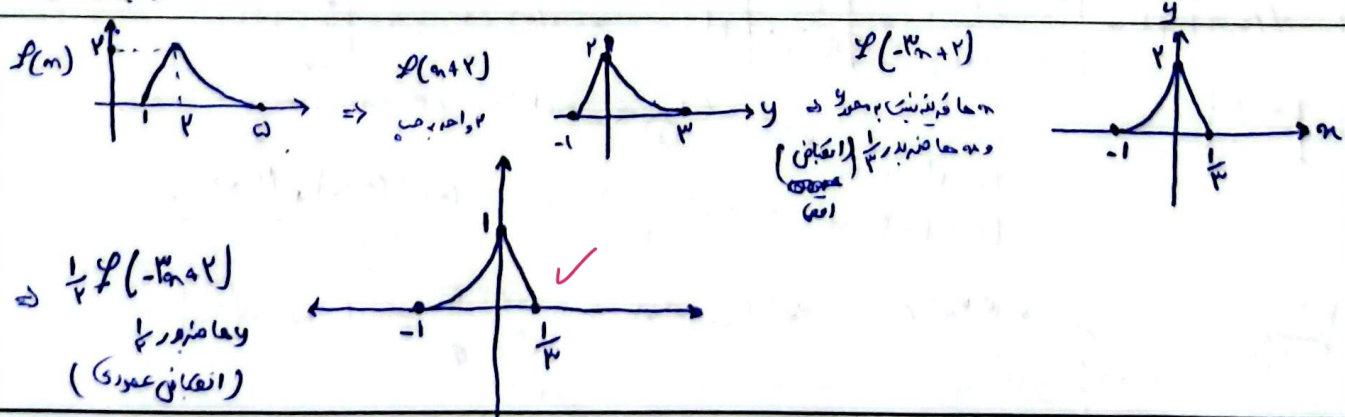
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$$y = -\frac{1}{3}x^2 + \frac{8}{3}x + 1 \xrightarrow{\text{تکمیل مربع}} (x, 3)$$

جواب: انتقال منبسط به و شیب تابع تغییر نمی کند پس

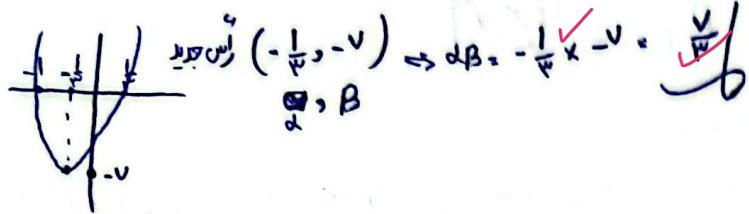
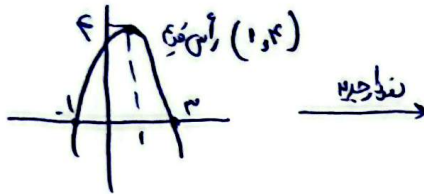
$$y = -\frac{1}{3}(x-4)^2 + 3 \Rightarrow -\frac{1}{3}(x-4)^2 + 3 = 0$$

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

$$x-4 = \pm 3$$

$$x_1 = 1, x_2 = 7 \quad \text{وقت!}$$

نقاط برخورد با محور ها: $(1, 0), (7, 0)$



شکل

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

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

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

$$\Rightarrow a-b = -3-4 = -7$$

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

$$D_{y_1} = \left[-\frac{3}{4}, \frac{5}{4}\right] \rightarrow -\frac{3}{4} \leq x \leq \frac{5}{4} \Rightarrow -\frac{1}{4} \leq \frac{x}{2} + 1 \leq \frac{3}{4} \Rightarrow D_{y_2} = \left[-\frac{1}{4}, \frac{3}{4}\right]$$

$$R_{y_1} = [-1, 2] \rightarrow R_{y_1} = R_{f(n)} \Rightarrow R_{f_2} = [-1, 2] \rightarrow -1 \leq f(n) \leq 2 \rightarrow -2 \leq 2f(n) - 3 \leq 1$$

$$\text{I و II طبق } |2f(n) - 3| \geq 0$$

$$y_2 = \sqrt{|2f(n) - 3|} \Rightarrow D_{y_2} = \left[-\frac{1}{4}, \frac{3}{4}\right] \quad 2f(n) - 3 = 0 \Rightarrow f(n) = \frac{3}{2} \notin D_{y_2}$$

$$\text{محدوده ناشی } |2f(n) - 3| \geq 0 \quad \text{I}$$

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

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

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

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

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

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

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

$$\Rightarrow 3-2n^2 < 0 \Rightarrow 2n^2 > 3 \Rightarrow n^2 > \frac{3}{2} \Rightarrow n < -\sqrt{\frac{3}{2}} \quad \text{I}$$

$$\Rightarrow (-\infty, -\sqrt{\frac{3}{2}})$$

محدوده مثبت است