

$$D_{f(x)} = [-2, 2] \rightarrow -2 \leq \frac{x+2}{5} \leq 2 \rightarrow \boxed{-8 \leq x \leq 4}$$

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$$D_{f(x-2)} = [-2, 2] \rightarrow \boxed{D_{f(x)} = [-8, 4]}$$

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$$-2 \leq x \leq 2 \rightarrow -11 \leq x-2 \leq 4$$

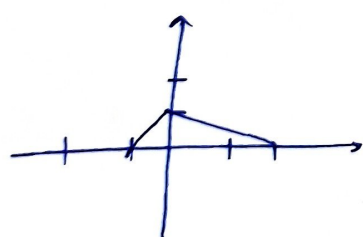
$$D_{f\left(\frac{x+1}{2}\right)} = [-1, 3] \Rightarrow D_{f(x)} = [-1, 5]$$

$$-1 \leq x \leq 3, -1 \leq \frac{x+1}{2} \leq 3$$

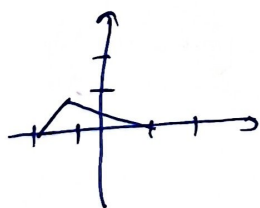
$$\rightarrow -3 \leq x+1 \leq 5 \rightarrow -4 \leq x \leq 4$$

$$\rightarrow D_{f(2-x)} = \boxed{\left(-\frac{3}{2}, \frac{3}{2}\right]}$$

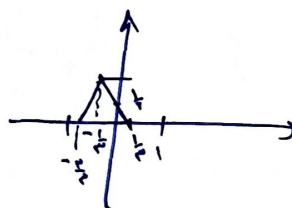
$$\rightarrow -\frac{3}{2} \leq x \leq \frac{3}{2}$$



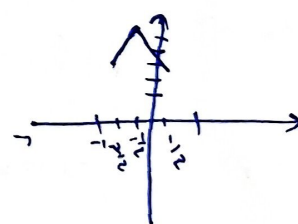
$f(x)$



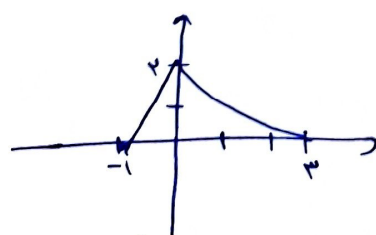
$f(x+1)$



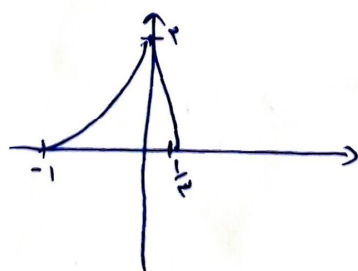
$f\left(\frac{x+1}{2}\right)$



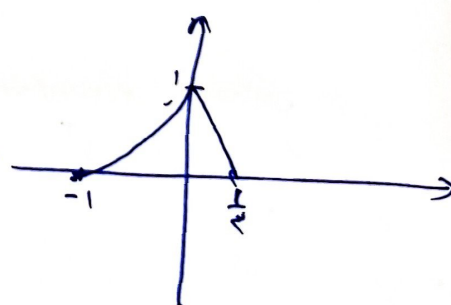
$2f\left(\frac{x+1}{2}\right) + 3$



$f(x+2)$



$f(2-x)$



$\frac{1}{2} f(2-x)$

3

4

$$y = -\frac{1}{2}x^2 + \frac{1}{2}x + 1 \quad \begin{matrix} -\frac{b}{2a} = \frac{1}{2} \\ -\frac{c}{a} = \frac{1}{2} \end{matrix} \quad \text{et} \quad \frac{1}{2}$$

$$\rightarrow y = a(x-b)^2 + c \rightarrow \text{et} \quad \begin{matrix} a = -\frac{1}{2} \\ b = \frac{1}{2} \\ c = \frac{1}{2} \end{matrix} \rightarrow y_n = -\frac{1}{2}(x-\frac{1}{2})^2 + \frac{1}{2}$$

$$\rightarrow x \in \left[\frac{1}{2}, 1 \right]$$

$$y = 1 - 2f(x_{n+1}) \rightarrow \begin{cases} x_{n+1} = 1 \rightarrow x_s = -\frac{1}{2} \\ 1 - 2f_1 = -2 \rightarrow y_s = -2 \end{cases}$$

$$\alpha = -\frac{1}{2} \quad \beta = -2 \rightarrow \alpha\beta = \frac{1}{2}$$

$$f_n = -(n+1)(n-1) \rightarrow 1 - 2f_{n+1} = 2(n+1)(n-1) + 1 = 2n^2 + 2n - 2 \quad \text{et} \quad \begin{matrix} -\frac{1}{2} \\ -2 \end{matrix}$$

$$D_{f_n} = (a, c] \quad D_{f_{(n-1)}} = (a+1, c]$$

$$D_{g_n} = [-1, b) \rightarrow D_{g_{(n+1)}} = [-2, b-1) \rightarrow (-2, c) \rightarrow \begin{matrix} a = -2 \\ b = -1 \end{matrix}$$

$$a - b = \boxed{-9}$$

$$-2 \leq x \leq 2 \rightarrow -\frac{1}{2} \leq \frac{x}{2} + 1 \leq \frac{1}{2} \quad D_{g_n} = D_{f_n} = [-2, c]$$

$$D_{f_n} = [-1, 2] \quad -1 \leq f_n \leq 2 \rightarrow -2 \leq 2f_n - 1 \leq 1$$

$$0 \leq |2f_n - 1| \leq 2 \rightarrow 0 \leq \sqrt{2f_n - 1} \leq \sqrt{2} \rightarrow R_{g_n} = \boxed{[0, \sqrt{2}]}$$

$$f_n = \left| \frac{n+1}{n-1} \right| \rightarrow g_n = \left| \frac{n-1}{n-2} \right| + 1 \quad n + \left| \frac{n-1}{n-2} \right| + 1 < 0 \rightarrow n + \frac{n-1}{n-2} < -1 - n$$

$$\frac{n-1}{n-2} + 1 + n < 0 \rightarrow \frac{n^2 - 1}{n-2} < 0 \rightarrow (-\infty, -\sqrt{2}) \cup (\sqrt{2}, \frac{1}{2})$$

$$\frac{n-1}{n-2} - n - 1 > 0 \rightarrow \frac{-n^2 + n + 1}{n-2} > 0 \rightarrow (-\infty, \frac{1-\sqrt{5}}{2}) \cup (\frac{1+\sqrt{5}}{2}, \infty)$$

$$\boxed{(-\infty, -\sqrt{2})}$$

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