

→ gitter periodisch kontinuierlich diskontinuierlich

$$D_{f(n)} = [-1, 1] \Rightarrow D_{f(\frac{1}{\omega}n+1)} = ?$$

$$\begin{aligned} -1 \leq n \leq 1 &\xrightarrow{\text{mit } \frac{1}{\omega}} -1 \leq \frac{1}{\omega}n+1 \leq 1 \xrightarrow{\text{mit } \omega} -\omega \leq n+\omega \leq \omega \xrightarrow{\text{mit } -1} -1-\omega \leq n \leq \omega-1 \\ &\xrightarrow{\text{mit } 1} -1 \leq n \leq \omega \end{aligned}$$

$$\Rightarrow D_{f(\frac{1}{\omega}n+1)} = [-1, \omega]$$

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

$$D_{f(n)} = ?$$

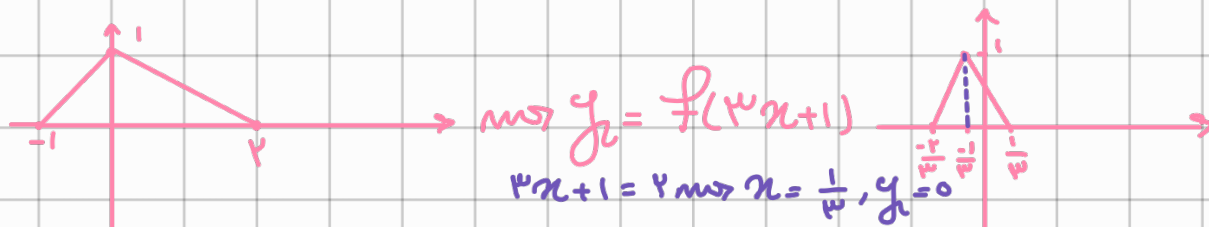
$$-1 \leq n \leq \omega \xrightarrow{\text{mit } \frac{1}{\omega}} -\omega \leq n \leq \omega \xrightarrow{\text{mit } -1} -1-\omega \leq n-1 \leq \omega-1 \Rightarrow D_{f(n)} = [-1-\omega, \omega-1]$$

$$D_{f(\frac{1}{\omega}n+1)} = [-1, \omega]$$

$$D_{f(n-\omega)} = ?$$

$$\begin{aligned} -1 \leq n \leq \omega &\xrightarrow{\text{mit } \frac{1}{\omega}} -\omega \leq n \leq \omega \xrightarrow{\text{mit } -1} -1-\omega \leq n-1 \leq \omega-1 \\ &\xrightarrow{\text{mit } 1} -1 \leq n-1 \leq \omega \end{aligned}$$

$$\Rightarrow D_{f(n-\omega)} = [-1, \omega]$$



$$\Rightarrow y_k = f(\frac{1}{\omega}n+1)$$

$$\frac{1}{\omega}n+1 = 1 \Rightarrow n = \omega, y = 0$$

$$\frac{1}{\omega}n+1 = -1 \Rightarrow n = -\omega, y = 0$$

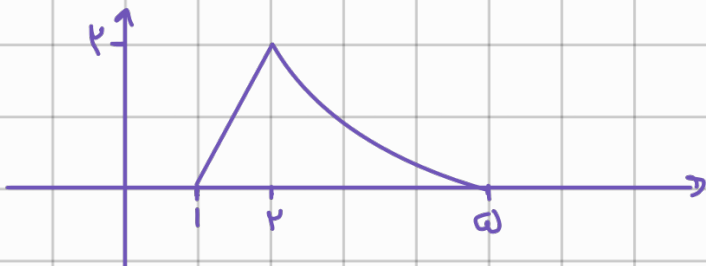
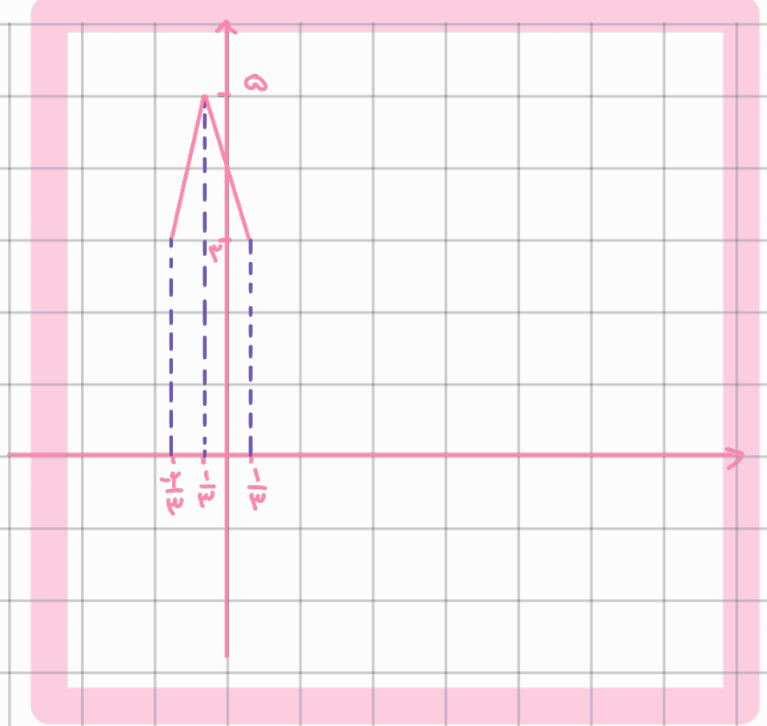
$$\frac{1}{\omega}n+1 = 0 \Rightarrow n = -1, y = 1$$

$$\leadsto g_h = \gamma f(\psi x + 1) + \psi$$

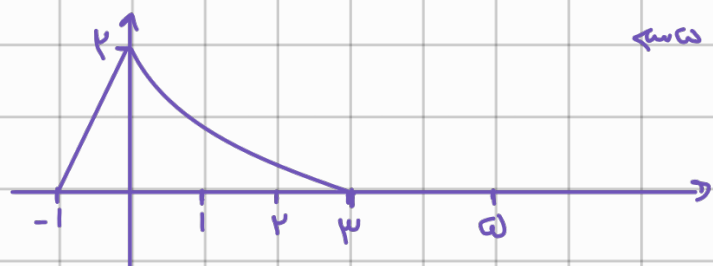
$$x = -\frac{\gamma}{\psi} \leadsto g'_h = 0 \leadsto g_h = \gamma \times 0 + \psi \leadsto y = \psi$$

$$x = -\frac{1}{\psi} \leadsto g'_h = 1 \leadsto g_h = \gamma \times 1 + \psi \leadsto y = \omega$$

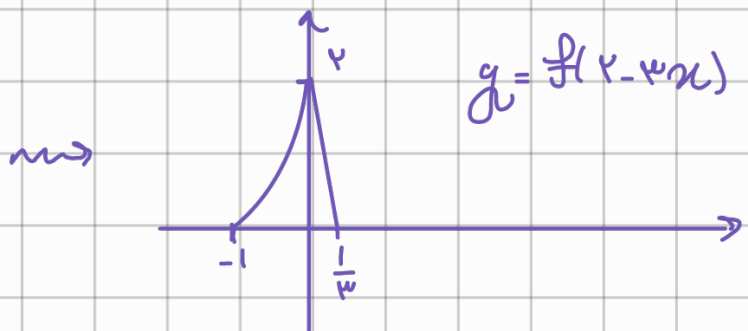
$$x = \frac{1}{\psi} \leadsto g'_h = 0 \leadsto g_h = \gamma \times 0 + \psi \leadsto y = \psi$$



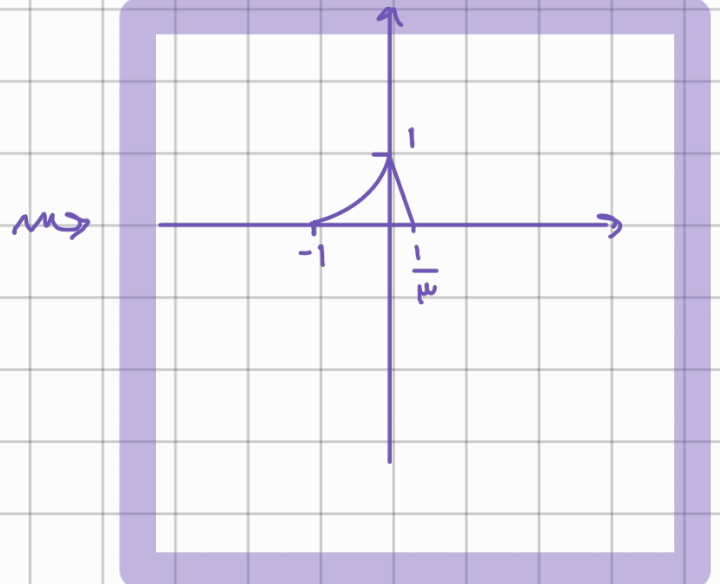
$$g_h = f(x)$$



$$g_h = f(x+2)$$



$$g_h = f(2-3x)$$



معادله ای داریم که در آن  $x$  و  $y$  به هم وابسته اند  
 (رابطه بین  $x$  و  $y$  را می بینیم)

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

$\downarrow$   
 در  $(4, 0)$  است

سیستم معادلات  
 سه نقطه با هم اشتراک دارند

$$y = (x-4)^2 + 3$$

$\downarrow$   
 در  $(4, 3)$  است

برای اینکه ضرایب  $x^2$  ها برابر باشند  
 در سمت راست معادله را با 3 ضرب می کنیم

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

معادله ها را مساوی می کنیم

$$y=0 \Rightarrow -\frac{1}{3}(x-4)^2 + 3 = 0 \Rightarrow \frac{1}{3}(x-4)^2 = 3 \Rightarrow (x-4)^2 = 9 \Rightarrow x-4 = \pm 3$$

$$\Rightarrow x = 1, 7$$

$$3x + 2 = 1 \Rightarrow 3x = -1 \Rightarrow x = -\frac{1}{3} = \alpha \quad (1)$$

$$y = 1 - 2f(3x+2) \xrightarrow{x=-\frac{1}{3}} 1 - 2f(1) = 1 - 1 = -1 = \beta \quad (2)$$

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

$$D_f = (a, 4], f(x-1) \Rightarrow a < x-1 \leq 4 \Rightarrow a+1 < x \leq 5 \Rightarrow D_f = (a+1, 5] \quad (1)$$

$$D_g = [-1, b), g(x+1) \Rightarrow -1 \leq x+1 < b \Rightarrow -2 \leq x < b-1 \Rightarrow D_g = [-2, b-1) \quad (2)$$

$$y = f(x-1) + g(x+1) \Rightarrow D_y = (-2, 5) \Rightarrow D_y = D_{f(x-1)} \cap D_{g(x+1)} \xrightarrow{(1), (2)}$$

$$(a+1, 5] \cap [-2, b-1) = (-2, 5) \Rightarrow \begin{cases} a+1 = -2 \Rightarrow a = -3 \\ b-1 = 5 \Rightarrow b = 6 \end{cases} \Rightarrow a-b = -3-6 = -9$$

$$g(n) = g_{\frac{1}{2}} = \sqrt{|2f(n) - 3|} \quad \leadsto |2f(n) - 3| \geq 0 \quad \leadsto \text{Bewertungsbereich für } D_g = D_f \text{ aus}$$

$$m(n) = g_{\frac{1}{2}} = f\left(\frac{n}{2} + 1\right) \leadsto D_m = [-3, \infty) \leadsto -3 \leq n \leq \infty \leadsto -\frac{3}{2} \leq \frac{n}{2} \leq \frac{\infty}{2}$$

$$\leadsto -\frac{1}{2} \leq \frac{n}{2} + 1 \leq \frac{\infty}{2} \leadsto D_g = D_f = \left[-\frac{1}{2}, \frac{\infty}{2}\right]$$

$$D_p f \leadsto -1 \leq f(n) \leq 2 \quad \leadsto -2 \leq 2f(n) \leq 4 \quad \leadsto$$

$$-2 \leq 2f(n) - 3 \leq 1 \quad \xrightarrow{\text{Bewertungsbereich}} \quad 0 \leq |2f(n) - 3| \leq 2 \quad \xrightarrow{\text{Bewertungsbereich}}$$

$$0 \leq \sqrt{|2f(n) - 3|} \leq \sqrt{2} \quad \leadsto D_p = [0, \sqrt{2}]$$

$$f(n) = \left| \frac{n+1}{2n+1} \right| \quad \xrightarrow{\text{Bewertungsbereich}} \quad \left| \frac{(n-2)+1}{2(n-2)+1} \right| + 1 = g(n) \quad \leftarrow \text{auto}$$

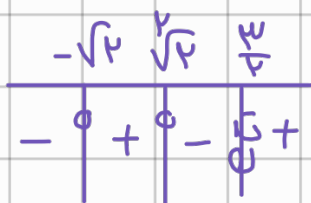
$$g(n) = \left| \frac{n-1}{2n-3} \right| + 1 \quad \leadsto \quad \begin{array}{c} 1 \\ + \quad - \quad \frac{2}{1} + \end{array}$$

$g(x) + x \rightarrow$

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

$$\xrightarrow{x=\pm\sqrt{2}} = \frac{2x^2 - 1}{2x-3}$$

$$x = \frac{\pm\sqrt{2}}{2}$$



برای  $x < -\sqrt{2}$  جواب - است

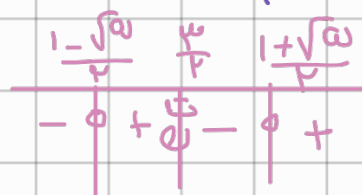
مجموعه جواب  $= (-\infty, -\sqrt{2})$

$$x + \frac{1-x}{2x-3} + 1 =$$

$$\frac{2x^2 - 3x + 1 - x + 2x - 3}{2x-3}$$

$$\xrightarrow{x=\frac{1\pm\sqrt{5}}{2}} = \frac{2x^2 - 2x - 2}{2x-3}$$

$$\xrightarrow{x=\frac{3}{2}} =$$



برای  $\frac{3}{2} < x < \frac{1+\sqrt{5}}{2}$  جواب +

است و پس در این بازه جوابی

ندارد

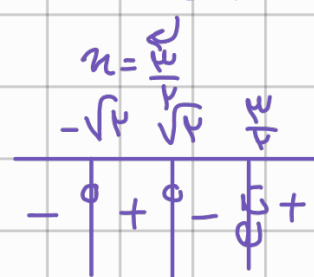
$\frac{3}{2}$

$$x + \frac{x-1}{2x-3} + 1 =$$

$$\frac{2x^2 - 3x + x - 1 + 2x - 3}{2x-3}$$

$$\xrightarrow{x=\pm\sqrt{2}} = \frac{2x^2 - 1}{2x-3}$$

$$x = \frac{\pm\sqrt{2}}{2}$$



برای  $x > \frac{3}{2}$  جواب +

است و پس در این بازه جوابی

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