

$$\cos \frac{\pi x}{4} \xrightarrow{(\frac{\pi}{4})} \cos \frac{\pi}{4} \rightarrow \cos 45^\circ \rightarrow \frac{\cos 45^\circ}{\sin 45^\circ} \rightarrow \frac{\frac{\sqrt{2}}{2}}{\frac{\sqrt{2}}{2}} = \sqrt{3} \quad -1$$

$$f(\sqrt{3}) \rightarrow \sqrt{(\sqrt{3})^2 + 1} \rightarrow (2) \quad f \circ f\left(\frac{1}{\sqrt{3}}\right) = 2$$

$$g\left(\frac{\pi}{4}\right) = 2 \cos^2 \frac{\pi}{4} \rightarrow 2 \times \frac{1}{2} = 1 \quad f \circ g\left(\frac{\pi}{4}\right) = \left(\frac{\sqrt{3}}{2}\right) \quad -2 \text{ الف}$$

$$f\left(\frac{1}{2}\right) = \sqrt{\frac{3}{4}}$$

$$g\left(\frac{\sqrt{2}}{1-\sqrt{2}}\right) = \frac{\sqrt{2}}{1-\sqrt{2}} \rightarrow f\left(\frac{\sqrt{2}}{1-\sqrt{2}}\right) \rightarrow \left[\frac{\sqrt{2}}{1-\sqrt{2}}\right] = [-2.414] = (-4) \quad -2 \text{ ب}$$

$$f\left(\frac{\pi}{4}\right) = f(45^\circ) = \sin^2 45^\circ \rightarrow \frac{1}{2}$$

$$g\left(\frac{\sqrt{2}}{2}\right) = \frac{\sqrt{2}}{2} \times \sqrt{1 - \frac{1}{2}} \rightarrow \frac{\sqrt{2}}{2} \times \frac{1}{\sqrt{2}} = \frac{1}{2} \quad g \circ f\left(\frac{\pi}{4}\right) = \frac{1}{2} \quad (3)$$

الف)  $f \circ g(x) = 4 \rightarrow 6 \rightarrow 8$   
 $2 \rightarrow 4 \rightarrow 8$   
 $6 \rightarrow 8 \rightarrow 12$   
 $8 \rightarrow 10 \rightarrow 12$

باید به اضافی مولفه های اول یکایان  
 مولفه های دوم یکایان باشند پس  
 تابع نیست.

ب)  $g \circ f(x)$   
 $4 \rightarrow 8 \rightarrow x$   
 $6 \rightarrow 8 \rightarrow x$   
 $8 \rightarrow 12 \rightarrow x$   
 $10 \rightarrow 12 \rightarrow x$

ب)  $f \circ f(x) = 4 \rightarrow 8 \rightarrow x$   
 $6 \rightarrow 8 \rightarrow x$   
 $8 \rightarrow 12 \rightarrow x$   
 $10 \rightarrow 12 \rightarrow x$

ج)  $g \circ g(x) = 4 \rightarrow 6 \rightarrow 8 \quad \{(4, 8), (6, 6), (8, 10)\}$   
 $2 \rightarrow 4 \rightarrow 6$   
 $6 \rightarrow 8 \rightarrow 10$   
 $8 \rightarrow 10 \rightarrow x$

تابع است

$$f \circ g(r) \rightarrow (r, r) \rightarrow a \rightarrow r \rightarrow r \Rightarrow \boxed{a=r} \quad -d$$

$$g \circ f(r) = (r, 1) \rightarrow r \rightarrow d \rightarrow 1 \Rightarrow \boxed{b=d} \quad (r, d)$$

$$f(f(x)) = (x+1) \rightarrow f(x) = x+1 \quad -g$$

$$f(-1) = -1+1 = 0 \rightarrow g(-1) = 1(-1)-1 \rightarrow \boxed{-1}$$

$$x+1 = -1 \rightarrow x = -2, x = -2$$

$$x \in \mathbb{R} \rightarrow x+|x| \geq 0 \rightarrow |x| \geq -x \rightarrow D_f = \mathbb{R} \cup [0, +\infty) \quad -v$$

$$g(x) \xrightarrow{D_f = [0, +\infty)} \frac{1}{x(x-1)} \rightarrow D(g \circ f) = (0, +\infty)$$

$$\cancel{f(x) = \sqrt{x+1}} \quad f(x) = \sqrt{(1-x)(1+x)} \quad -1$$

$$\cancel{g(x) = \frac{-1}{x+1}} \quad \frac{-1}{x+1} \quad D_f = [-1, 1]$$

$$f+g(x) \rightarrow \sqrt{x} \quad [0, +\infty) \cap [-1, 1] = [0, 1] \quad \bigcap \rightarrow D_f = [0, 1]$$

$$f\left(\frac{3x+1}{x-2}\right) = f(x+1) \rightarrow \text{نقطة} \rightarrow x = \frac{2+1}{1-3} \quad (9-الف)$$

$$f(t) = \frac{f(2+1)}{1-3} + \frac{2+1-1}{1-3} = \frac{13+1}{1-3} \rightarrow f(x) = \frac{13x-11}{x-3}$$

$$f\left(x + \frac{1}{x}\right) = x^3 + \frac{1}{x^3} \quad (9-ب)$$

$$x + \frac{1}{x} = t \rightarrow \left(x + \frac{1}{x}\right)^3 = x^3 + 3x^2 \cdot \frac{1}{x} + 3x \cdot \frac{1}{x^2} + \frac{1}{x^3}$$

$$x^3 + 3x + \frac{3}{x} + \frac{1}{x^3} \rightarrow x^3 + \frac{1}{x^3} = \left(x + \frac{1}{x}\right)^3 - 3\left(x + \frac{1}{x}\right)$$

$$x + \frac{1}{x} = t, f(t) = t^3 - 3t \rightarrow f(x) = x^3 - 3x$$

$$(x-1)(x-\sqrt{11}) \rightarrow x^2 - \sqrt{11}x - x + \sqrt{11}$$

$$(1,0)(\sqrt{11},0) \rightarrow f(x) = x + \sqrt{x} \quad (10-الف)$$

$$\begin{aligned} \sqrt{11} &\rightarrow 0 \rightarrow 0 & (\sqrt{11}, 0) \\ 1 &\rightarrow 0 \rightarrow 0 & (1, 0) \end{aligned}$$

$$\boxed{\sqrt{11}-1} \quad \text{اختلاف طول نقاط}$$

منقطع محوري