

مسائل

$$\cot \frac{\pi}{4} \times \frac{y}{x} = \cot \left(\frac{\pi}{4} \right) \rightarrow \sqrt{(\sqrt{x})^2 + 1} = x$$

$$r \cos \theta \rightarrow r \times \left(\frac{1}{r} \right)^2 = \frac{1}{r}$$

مسائل

$$f\left(\frac{1}{r}\right) = \sqrt{\frac{r \times r - 1}{r}} = \frac{\sqrt{r^2 - 1}}{r}$$

$$g\left(\frac{1}{r}\right) = \frac{\sqrt{r}}{1 - \sqrt{r}} \times \frac{1 + \sqrt{r}}{1 + \sqrt{r}} \rightarrow \left[\frac{\sqrt{r}}{1 - \sqrt{r}} \right] = \frac{1}{r}$$

$$= \frac{r + \sqrt{r}}{1 - \sqrt{r}} = -r - \sqrt{r} \rightarrow \left[-r - \sqrt{r} \right] = \frac{1}{r}$$

$$\sin \frac{\pi}{4} = \frac{\sqrt{2}}{2}$$

$$\frac{\sqrt{2}}{2} \sqrt{1 - \left(\frac{\sqrt{2}}{2} \right)^2} = \frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{1}{2}$$

$$\frac{\sqrt{2}}{2} \times \frac{\sqrt{2}}{2} = \frac{1}{2}$$

$$\frac{1}{r} \times \frac{\sqrt{r}}{r} = \frac{\sqrt{r}}{r}$$

$$f \circ g(x) = \{(e, d), (r, d), (e, 12), (1, 12)\}$$

$$g \circ f(x) = \{\}$$

$$f \circ f(x) = \emptyset$$

$$g \circ g(x) = \{(r, 1), (1, r), (e, 1)\}$$

سوال ۵

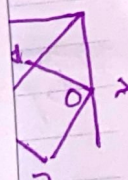
$$f = \{(1,1), (2,2), (3,5), (4,1)\}$$

$$g = \{(1,2), (2,1), (3,3), (4,1)\}$$

$$f \circ g = (f, 2) \rightarrow \text{اگر } f \text{ به } 2 \text{ می‌رسد به } 5 \rightarrow \text{اگر } g \text{ به } 2 \text{ می‌رسد به } 1 \rightarrow \text{اگر } f \text{ به } 1 \text{ می‌رسد به } 1$$

$$g \circ f(1) = 2 \rightarrow \text{اگر } f \text{ به } 1 \text{ می‌رسد به } 1 \rightarrow \text{اگر } g \text{ به } 1 \text{ می‌رسد به } 2$$

$$(a, b) = (f, 5)$$



$$h(b=2)$$

$$f(x) = ax + b \rightarrow f(f(x)) = a(ax+b) + b = f \circ f(x) \quad \text{سوال ۶}$$

$$\rightarrow a^2 = f \rightarrow a = 2 \rightarrow 2b = 2 \rightarrow b = 1 \rightarrow f(x) = 2x + 1$$

$$\rightarrow a = -2 \rightarrow -b = 2 \rightarrow b = -2 \rightarrow f(x) = -2x - 2$$

$$g(2x+1) = 2x-2 \rightarrow 2x+1 = t \rightarrow x = \frac{t-1}{2} \rightarrow g(t) = \frac{2t-1}{2} - 2$$

$$= \frac{2}{2}t - \frac{1}{2} - 2 = t - \frac{5}{2}$$

$$\textcircled{1}: g \circ f(-1) = g(2 \times (-1) + 1) = g(-1) = -\frac{5}{2} - \frac{5}{2} = -5$$

$$\textcircled{2}: g \circ f(-1) = g(-2 \times (-1) - 2) = g(0) = -1$$

سوال ۷

$$x \in D_f \rightarrow x + |x| \geq 0 \rightarrow \text{همواره برقرار}$$

$$f \in D_g \rightarrow \sqrt{x+|x|} \neq 0 \quad x \geq 0 \quad D_f = [0, +\infty) - \{1\}$$

$$x^2 - 1 \neq 0 \quad \sqrt{x+|x|} \neq 1 \quad x \neq 1$$

$$x \neq -1 \quad x \neq 0$$

$$(f+g) \circ f = f(f(x)) + f(g(x)) = \sqrt{1 - (\sqrt{1-x^2})^2} + \sqrt{1-x^2} \quad (1)$$

$$1 - x^2 \geq 0$$

$$\sqrt{1 - 1 + x^2} = |x|$$

$$x^2 \leq 1 - 1 \leq 1 \quad D = [-1, 1]$$

$$2) f\left(\frac{r_{n+1}}{n-r}\right) = r_{n+1} + a$$

$$\frac{r_{n+1}}{n-r} = t \rightarrow n = -\frac{r+1}{t-r} = \frac{r+1}{t-r}$$

$$f(t) = r \times \frac{r+1}{t-r} + a = \frac{r(r+1)}{t-r}$$

$$1) f\left(n + \frac{1}{n}\right) = n^r + \frac{1}{n^r}$$

$$\left(n + \frac{1}{n}\right)^r = n^r + \frac{1}{n^r} + r \times n \times \frac{1}{n} \times \left(n + \frac{1}{n}\right) \xrightarrow{n + \frac{1}{n} = t} t^r = n^r + \frac{1}{n^r} + r t$$

$$\hookrightarrow n^r + \frac{1}{n^r} = t^r - r t$$

$$f(t) = t^r - r t$$

$$g(x) = g(r\sqrt{x}) = g_0 f(n) = g(f(x)) =$$

$$\rightarrow f(n) = 1 \rightarrow n = 1$$

$$\rightarrow f(n) = r\sqrt{x} \rightarrow n = r$$

$$r = 1$$