

19, 20

1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20

$$f(n) = \begin{cases} \cot \frac{\pi n}{\varepsilon} & n \leq 1 \\ \sqrt{n^2 + 1} & n > 1 \end{cases} \Rightarrow \cot \frac{\frac{\sqrt{r}}{\varepsilon}}{\frac{\varepsilon}{1}} \rightarrow \cot \frac{\pi}{4} = \sqrt{r}.$$

$$f \circ f \rightarrow f(\sqrt{r}) = \sqrt{r^2 + 1} = r$$

$$a) f\left(\frac{1}{n}\right) = \sqrt{\frac{r n - 1}{n^2}} \quad g(n) = r \cos^n n$$

$$f \circ g\left(\frac{\pi}{r}\right) = ?$$

$$\hookrightarrow g\left(\frac{\pi}{r}\right) = r \cos^r \frac{\pi}{r} = \frac{1}{r} \rightarrow f\left(\frac{1}{r}\right) = F(r) = \frac{\sqrt{r}}{r}$$

$$b) f(n) = [n] \quad g(n) = \frac{n}{1-n}$$

$$f \circ g(\sqrt{r}) = ?$$

$$\hookrightarrow g(\sqrt{r}) = \frac{\sqrt{r}}{1-\sqrt{r}} \times \frac{1+\sqrt{r}}{1+\sqrt{r}} = \frac{\sqrt{r}+r}{1-r} = -\sqrt{r}-r$$

$$f(-\sqrt{r}-r) = [-\sqrt{r}-r] \Rightarrow [\varepsilon, \infty] = \frac{r}{\varepsilon}$$

$$f(n) = \sin n \quad g(n) = n \sqrt{1-n^2}$$

$$g \circ f\left(\frac{\pi}{\varepsilon}\right) = ?$$

$$\hookrightarrow f\left(\frac{\pi}{\varepsilon}\right) = \sin \frac{\pi}{\varepsilon} = \frac{\sqrt{r}}{r} \rightarrow g\left(\frac{\sqrt{r}}{r}\right) = \frac{\sqrt{r}}{r} \sqrt{1-\frac{r}{\varepsilon}} = \frac{1}{r}$$

$$a) f \circ g \rightarrow \{(\varepsilon, 2), (r, 2), (4, 12), (8, 12)\}$$

$$b) g \circ f \rightarrow \sqrt{r}$$

$$c) f \circ f \rightarrow \sqrt{r}$$

$$d) g \circ g \rightarrow \{(\varepsilon, 8), (r, 4), (4, 10)\}$$

Scanned with CamScanner

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

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

$$f \circ g \ni (4,3) \quad g \circ f \ni (4,1)$$

$$(a,b) = ?$$

$$(a,b) = (4,3)$$

مجموعه مقادیر عمل می باشد
 $a = 4$
 $b = 3$

$$f(f(x)) = 2x+1 \quad g(x+1) = x-1 \quad g \circ f(-1) = ?$$

$$\hookrightarrow f(f(x)) = f(ax+b) \rightarrow a^2 = 2 \rightarrow a = \pm \sqrt{2}$$

$$ab+b=1 \rightarrow b(a+1)=1$$

$$a=-1 \rightarrow b=-1 \quad \hookrightarrow a=1 \rightarrow b=1$$

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

$$\hookrightarrow f(x) = x+1 \quad \downarrow \quad -x-1$$

$$f(-1) = -1 \quad \downarrow \quad f(-1) = -1 \Rightarrow g(-1) = -2 = g \circ f(-1)$$

$$f(x) = \sqrt{x+|x|}$$

$$g(x) = \frac{1}{x^2 - \varepsilon x}$$

$$D g \circ f = ?$$

$$f \text{ is } \rightarrow x+|x| \geq 0 \rightarrow x \geq 0 \quad \mathbb{R}$$

$$g \text{ is } \rightarrow x^2 - \varepsilon x \neq 0 \rightarrow x=0 \text{ or } x=\varepsilon \Rightarrow x \neq \{0, \varepsilon\}$$

$$\text{is } g \circ f \Rightarrow (-\infty, 0) \cup (0, \varepsilon) \cup (\varepsilon, +\infty)$$

$$\sqrt{x+|x|} \neq 0 \rightarrow x > 0$$

$$\sqrt{x+|x|} \neq 1 \rightarrow x \neq 1$$

$$\rightarrow D_{g \circ f} = (0, +\infty) - \{1\}$$

المركب

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

$$f \text{ def } \rightarrow 1-x^2 \geq 0 \rightarrow -1 \leq x \leq 1 \quad g \text{ def } \rightarrow x \geq 0 \quad \text{so } (f+g) \text{ of } f = [0, 1]$$

$$g \text{ def } \rightarrow x \geq 0$$

$$0 \leq f(x) \leq 1 \rightarrow \sqrt{1-x^2} \leq 1 \rightarrow x^2 \geq 0 \text{ always}$$

$$\text{so } (f+g) \text{ of } f \rightarrow [-1, 1]$$

$$\text{الف) } f\left(\frac{x+1}{x-2}\right) = \varepsilon x + d$$

$$\downarrow \quad \rightarrow y = \frac{x+1}{x-2} \rightarrow yx - 2y = x+1 \rightarrow x = \frac{y+1}{y-2}$$

$$f(t) = \frac{\varepsilon(y+1)}{y-2} + \frac{d(y-2)}{y-2} = \frac{\varepsilon y - 1}{y-2} = f(x) = \frac{\varepsilon x - 1}{x-2}$$

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

$$\text{so } x^2 + \frac{1}{x^2} = x^2 + \frac{x^2}{x^4} + \frac{x^2}{x^4} + \frac{1}{x^2}$$

$$\Rightarrow x^2 + \frac{1}{x^2} = \left(x + \frac{1}{x}\right)^2 - 2\left(x + \frac{1}{x}\right)$$

$$: (x + \frac{1}{x}) = y \quad y = \left(x + \frac{1}{x}\right) \quad \text{so } x^2 + \frac{1}{x^2} = y^2 - 2y$$

$$f(y) = y^2 - 2y \rightarrow f(x) = x^2 - 2x$$

$$n = 1, \sqrt{2} \quad f(n) = n\sqrt{n}$$

$$g \text{ of } f(n) = ?$$

$$\hookrightarrow g(x\sqrt{n}) \rightarrow g(\sqrt{2}) = 0 \rightarrow n = 2$$

$$\hookrightarrow g(1) = 0 \rightarrow n = 1$$

$$\text{المجال} = 2 - 1 = 1$$