

نام و نام خانوادگی: باسخرامه تشریحی تکلیف شماره کلاس: آفرین عالی نوری

الف) $f(x) = \sqrt{\frac{x-1}{x} - \frac{x}{x-1}}$ $\frac{(x-1)-x^2}{x(x-1)} = \frac{1-2x}{x(x-1)} \geq 0$ $D_f = (-\infty, 0) \cup [\frac{1}{2}, +\infty)$

ب) $f(x) = \frac{\frac{1}{x+1} - \frac{1}{x}}{\frac{1}{x-1} + \frac{1}{x+1}}$ $\frac{1}{x-1} + \frac{1}{x+1} \neq 0$ $\frac{1}{x-1} + \frac{1}{x+1} = 0 \Rightarrow x^2 - 1 = 0 \Rightarrow x = \pm 1$ $D_f = \mathbb{R} - \{-1, 1\}$

الف) $f(x) = \sqrt{(\frac{1}{x} - 9)(4x - 4)}$ $\frac{1}{x} - 9 \geq 0 \Rightarrow \frac{1-9x}{x} \geq 0$ $D_f = (-\infty, -\frac{1}{9}] \cup [\frac{1}{9}, +\infty)$

ب) $\sqrt{x-1} + \sqrt{9+1} = 4$ $x-1 \geq 0 \Rightarrow x \geq 1$ $\sqrt{x-1} \leq 4$ $x-1 \leq 16$ $x \leq 17$ $D = [1, 17]$

$f(x) = \frac{x^2 - x - 2}{\sqrt{x^2 - 1} + 1} \neq 0 \Rightarrow \sqrt{x^2 - 1} \neq -1$ $x^2 - 1 > 0 \Rightarrow (x-1)(x+1) > 0$ $D_f = (-\infty, -1) \cup (1, +\infty)$

$f(x) = \sqrt{4 + 9x - x^2}$ $4 + 9x - x^2 \geq 0$ $x^2 - 9x - 4 \leq 0$ $x = \frac{9 \pm \sqrt{81 + 16}}{2} = \frac{9 \pm \sqrt{97}}{2}$ $D = [\frac{9 - \sqrt{97}}{2}, \frac{9 + \sqrt{97}}{2}]$

$f(x) = \begin{cases} 3x-2 & x > 1 \\ 4x+3 & x < 1 \end{cases}$ $g(x) = \sqrt{f(x) - x}$ $f(x) - x = 3x-2-x = 2x-2 \geq 0 \Rightarrow x \geq 1$ $f(x) - x = 4x+3-x = 3x+3 \geq 0 \Rightarrow x \geq -1$ $D_g = [-1, +\infty)$

$$f(x) = x^p - \sqrt{x}$$

$$f\left(\sin \frac{\pi}{p} + \cos 5\pi\right) = ?$$

$$\frac{\sqrt{p}}{p} + \frac{1}{p} = \frac{\sqrt{p+1}}{p}$$

$$f\left(\frac{\sqrt{p+1}}{p}\right) = p\left(\frac{\sqrt{p+1}}{p}\right)^p - \sqrt{\frac{\sqrt{p+1}}{p}}$$

$$= \frac{p+1}{p} - \frac{\sqrt{p+1}}{p} = \frac{-1}{p}$$

$$\boxed{-\frac{1}{p}}$$

$$f(x) = \frac{x+1}{x-1}$$

$$f(f(a)) = a$$

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

$$f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{\frac{a+1+a-1}{a-1}}{\frac{a+1-a+1}{a-1}} = \frac{2a}{2} = a$$

برای همه مقادیر مجاز است

$$f(x) = x^p - \sqrt{x}$$

$$g(x) = \sqrt{x^p - 1} \rightarrow g(x)^p = x^p - 1 \rightarrow x^p - 1 = f(x^p) \rightarrow x^p = a$$

$$f(g(a)) = -f$$

$$f(g(a)) = (g(a))^p - \sqrt{g(a)} = -f$$

$$g(a) = x$$

$$x^p - \sqrt{x} + f = 0 \rightarrow (x-p)^p = 0 \Rightarrow g(a) = p$$

$$f(x+p) = x^p - \sqrt{x} + p$$

$$f(p) \times f(-p) = ? \Rightarrow p \times \sqrt{p} = \sqrt{p^3}$$

$$x+p = p \rightarrow x = 0 \Rightarrow f(p) = 0 - \sqrt{p} = -\sqrt{p}$$

$$x+p = -p \rightarrow x = -2p \Rightarrow f(-p) = (-2p)^p - \sqrt{-2p} = \sqrt{p}$$

$$f(\cos^p x + d \cos x) = \tan^p x$$

$$f(p, d) = ?$$

$$\cos^p x + d \cos x = p/d \Rightarrow \cos^p x + d \cos x - p/d = 0$$

$$\tan^p x = \frac{\sin^p x}{\cos^p x} \Rightarrow \frac{1 - \cos^2 x}{\cos^2 x} = \frac{1 - \cos^2 x}{\cos^2 x} = \frac{1}{\cos^2 x} = \frac{1}{f}$$

$$\frac{(cos x + p)(cos x - p)}{f} = \frac{1}{f}$$