

نام و نام خانوادگی: پاسخنامه تشریحی تکلیف شماره کلاس: $x-1$ x^2

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

$\frac{(x-1)^2 - x^2}{x(x-1)} = \frac{1-2x}{x(x-1)} \geq 0$

$D_f = (-\infty, 0) \cup [\frac{1}{2}, +\infty)$

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

$\frac{1}{x-1} + \frac{1}{x+1} \neq 0$

$\frac{x^2 + x + x^2 - 1}{(x-1)(x+1)} \rightarrow \frac{x^2 + 2x - 1}{(x-1)(x+1)} \neq 0$

$D_f = \mathbb{R} - \{-1, \frac{1}{2}\}$

الف) $f(x) = \sqrt{(\frac{1}{x} - 9)(4x - 4^x)}$

$\frac{1}{x} - 9 \geq 0 \Rightarrow \frac{1}{x} \geq 9 \Rightarrow x \leq \frac{1}{9}$

$D_f = (-\infty, -\frac{1}{9}] \cup [\frac{1}{9}, +\infty)$

ب) $\sqrt{x-1} + \sqrt{9+1} = 4$

$x-1 \geq 0 \Rightarrow x \geq 1$

$D = [1, 17]$

$f(x) = \frac{x^2 - x - 2}{\sqrt{x^2 - 1} + 1}$

$x^2 - x - 2 > 0 \Rightarrow (x-2)(x+1) > 0$

$x^2 - 1 > 0 \Rightarrow (-\infty, -1) \cup (1, +\infty)$

$D_f = (-\infty, -1) \cup (1, +\infty)$

$f(x) = \sqrt{4 + 9x - x^2}$

$[-2, 6]$

$a+b = \frac{p}{q}$

$4 - 2a - 1 = 0 \Rightarrow -2a - 1 = 0$

$a+b = -\frac{1}{2} + \frac{3}{2} = 1$

$4 - \frac{1}{2}x - x^2 = 0 \Rightarrow -x^2 - \frac{1}{2}x + 4 = 0 \Rightarrow x^2 + \frac{1}{2}x - 4 = 0$

$f(x) = \begin{cases} 4x-2 & x > 1 \\ 4x+3 & x < 1 \end{cases}$

$g(x) = \sqrt{f(x) - x}$

$f(x) - x = 4x - 2 - x = 3x - 2 \geq 0 \Rightarrow x \geq \frac{2}{3}$

$f(x) - x = 4x + 3 - x = 3x + 3 \geq 0 \Rightarrow x \geq -1$

$D_g = [-1, +\infty)$

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

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

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

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

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

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

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

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

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

برای همه مقادیر مجاز است

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

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

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

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

$$g(a) = x$$

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

$$f(x+p) = x^p - dx + c$$

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

$$x+p = e \rightarrow x = 1 \Rightarrow f(e) = 1 - d + c = \sqrt{p}$$

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

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

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

$$f \cos^p x + d \cos x = p, d \Rightarrow f \cos^p x + d \cos x - p, d = 0 \Rightarrow \cos^p x + d \cos x - 1 = 0$$

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

$$(\cos x + p)(\cos x - p) = 0$$