

نام و نام خانوادگی: راستینی ترکیبی یا سمنانه شریعی تکلیف شماره ۵ کلاس یازدهم پسر A ۱۹, ۵۵ آفرین

۱-
$$\sqrt{\frac{x-1}{x} - \frac{x}{x-1}} \Rightarrow \sqrt{\frac{x^2 - 2x + 1 - x^2}{x^2 - x}} \Rightarrow \sqrt{\frac{-2x+1}{x(x-1)}} \Rightarrow \frac{-2x+1}{x(x-1)}$$

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

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

۱, ۵۵

۲-
$$f(x) = \frac{1}{x+1} - \frac{2}{x} \Rightarrow \frac{x}{x(x+1)} - \frac{2}{x} = \frac{x - 2(x+1)}{x(x+1)} = \frac{-x-2}{x(x+1)}$$

۳-
$$f(x) = \sqrt{\left(\frac{1}{x}\right)^2 - 9} \Rightarrow \left(\frac{1}{x}\right)^2 = 9 \Rightarrow x = -\frac{1}{3}$$

$$D_f = (-\infty, -\frac{1}{3}] \cup [\frac{1}{3}, +\infty)$$

۴-
$$\sqrt{x-1} + \sqrt{y+1} = 2 \Rightarrow \sqrt{x-1} = 2 - \sqrt{y+1} \Rightarrow x-1 = 4 - 4\sqrt{y+1} + y+1 \Rightarrow x = y + 4 - 4\sqrt{y+1} + 2 \Rightarrow x = y + 6 - 4\sqrt{y+1}$$

۵-
$$f(x) = \log_2 \frac{(x^2 - x - 2)}{\sqrt{x^2 - 1} + 1} \Rightarrow D_f = (-\infty, -1) \cup (2, +\infty)$$

$$f(x) = \sqrt{-x^2 + ax + 2} \Rightarrow D_f = [-2, 4]$$

۶-
$$x = -2 \Rightarrow (-2)^2 + a(-2) + 2 = 0 \Rightarrow 4 - 2a + 2 = 0 \Rightarrow -2a = -6 \Rightarrow a = 3 \Rightarrow f(x) = \sqrt{-x^2 + 3x + 2}$$

۷-
$$-x^2 + \frac{1}{2}x + 2 \Rightarrow \frac{c}{a} = -2 \Rightarrow -2 \times b = -2 \Rightarrow b = \frac{1}{2} \Rightarrow a + b = \frac{1}{2} + \frac{1}{2} = 1$$

۸-
$$g(x) = \sqrt{f(x) - x} \Rightarrow f(x) = \begin{cases} 2x-2 & x \geq 1 \\ 2x+3 & x < 1 \end{cases} \Rightarrow f(x) - x \geq 0 \Rightarrow$$

$$x \geq 1 \Rightarrow 2x-2 \geq x \Rightarrow x \geq 2 \Rightarrow x \geq 2$$

$$x < 1 \Rightarrow 2x+3 \geq x \Rightarrow x \geq -3 \Rightarrow -3 \leq x < 1 \Rightarrow D_f = [-3, +\infty)$$

۹-
$$f(x) = 2x^{\frac{1}{2}} - 4x \Rightarrow f\left(\sin \frac{\pi}{6} + \cos \frac{\pi}{6}\right) \Rightarrow f\left(\frac{\sqrt{3}}{2} + 1\right) = f\left(\frac{\sqrt{3}+2}{2}\right) = 2\left(\frac{\sqrt{3}+2}{2}\right)^{\frac{1}{2}} - 4\left(\frac{\sqrt{3}+2}{2}\right) = \frac{\sqrt{3}+2}{\sqrt{2}} - 2(\sqrt{3}+2) = \frac{\sqrt{3}+2}{\sqrt{2}} - 2\sqrt{3} - 4$$

۱۰-
$$f(x) = \frac{x+1}{x-1} \Rightarrow f(f(a)) = a \Rightarrow f(a) = \frac{a+1}{a-1} \Rightarrow a = f(f(a)) = \frac{\frac{a+1}{a-1} + 1}{\frac{a+1}{a-1} - 1} = \frac{a+1+a-1}{a-1-a+1} = \frac{2a}{a-1} \Rightarrow \frac{2a}{a-1} = a \Rightarrow a \neq 1 \Rightarrow D_f = \mathbb{R} - \{1\}$$

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

$$\frac{2a}{a-1} = a \Rightarrow a \neq 1 \Rightarrow D_f = \mathbb{R} - \{1\}$$

$$f(x) = x^2 - 4x \quad g(x) = \sqrt{x^2 - 1} \quad f(g(a)) = -4$$

$$f(g(a)) = (\sqrt{a^2 - 1})^2 - 4\sqrt{a^2 - 1} = -4 \xrightarrow{\sqrt{a^2 - 1} = t} t^2 - 4t + 4 = 0 \Rightarrow (t - 2)^2 = 0$$

$$t = 2 \Rightarrow \sqrt{a^2 - 1} = 2 \Rightarrow a^2 - 1 = 4 \Rightarrow a^2 = 5 \Rightarrow a = \pm\sqrt{5}$$

$$f(x + \sqrt{5}) = x^2 - 5x + 9$$

$$x + \sqrt{5} = 4 \Rightarrow x = 4 - \sqrt{5} \Rightarrow f(4 - \sqrt{5}) = (4 - \sqrt{5})^2 - 5(4 - \sqrt{5}) + 9 = 2$$

$$x + \sqrt{5} = -4 \Rightarrow x = -4 - \sqrt{5} \Rightarrow f(-4 - \sqrt{5}) = (-4 - \sqrt{5})^2 - 5(-4 - \sqrt{5}) + 9 = 12$$

$$f(4 \cos^2 x + 5 \cos x) = \tan^2 x \Rightarrow 4 \cos^2 x + 5 \cos x = \tan^2 x \xrightarrow{\cos x = t} 4t^2 + 5t - \tan^2 x = 0$$

$$-1 \leq \cos x \leq 1 \Rightarrow -\frac{1}{4} \leq t \leq 1$$

$$\cos x = \frac{1}{4} \quad \sin^2 x + \cos^2 x = 1 \Rightarrow \sin^2 x + \frac{1}{16} = 1 \Rightarrow \sin^2 x = \frac{15}{16} \Rightarrow \tan^2 x = \frac{\frac{15}{16}}{\frac{1}{16}} = 15$$

نماینده های مخرج ها نباید در دامنه باشند!

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

$$x + 2 \neq 0 \rightarrow x \neq -2 \quad \frac{x}{x-1} + \frac{1}{x+2} \neq 0 \rightarrow \frac{x^2 + 4 + x - 1}{(x-1)(x+2)} \neq 0 \rightarrow x^2 + x + 3 \neq 0 \rightarrow x \neq -\frac{1}{2}$$

$$D_f = \mathbb{R} - \left\{ -1, 0, 1, -2, -\frac{1}{2} \right\}$$