

۱۹/۵

در باب حقوق تکلیف در امور دولتی ها

سوال ۱ - ۲

$$f(x) = \left(\frac{1}{x}\right)^{x-2} - 1 \quad y = \sqrt{x^3 f(x+1)}$$

$$\left(\frac{1}{x}\right)^{(x+1)-2} - 1 = 0 \quad x^{-(1+x)} = 1 \Rightarrow x^{-1-x} = 0 \quad x = 1$$

جوابی کنیم باز می بینیم باز می بینیم باز می بینیم

$$\left(\frac{1}{x}\right)^{x-2} - 1 = -1 < 0$$

x	0	1
y	-	+

$D_f = [0, 1]$ ✓

سوال ۲ - ۱, ۷۵

$$f(x) = \sqrt{x + |x + 2|} \quad f(-x) = ?$$

$$f(-x) = \sqrt{-x + |-x + 2|} \Rightarrow \begin{cases} x > 2; -x + (-x + 2) = -2 \times \\ x \leq 2; -x + (-x + 2) = -2x + 2 \geq 0 \rightarrow x \leq 1 \end{cases}$$

$$\Rightarrow D_f = (-\infty, 1]$$

سوال ۳ - ۲

$$y = \sqrt{\frac{x-1}{f(x)}} \quad \begin{array}{c|ccc} x & -2 & 1 & 2 & 3 \\ \hline y & - & + & - & + \end{array} \quad D_f = (-\infty, 1] \cup (2, 3) \quad \checkmark$$

سوال ۲ - ۲

$$y_1 = \frac{1}{4x^k - 5x^k - 6x^k - k} \Rightarrow 9x^k - 5x^k - 6x^k - k = 9x^k - 11x^k - k = -(2x^k + k)$$

$$y_2 = \frac{1}{kx^k + 9x^k + b}$$

$$a = -1 \quad b = -k$$

$$kx^k + 9x^k + b = (2x^k + k)(x^k + 1) \quad \Delta = (1)^2 - 4(1)(k) \Delta < 0$$

$$\Rightarrow \sqrt{-(a+b)} = \sqrt{-(-1+(-k))} = \sqrt{-(1-k)} = 2$$

سوال ۵ - ۲

$$y = \sqrt{f(x) - f\left(\frac{x}{2}\right)} \quad f(x) = x^k + x$$

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

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

$\Delta = (1)^2 - 4(1)(1) = -3 < 0$

$$\begin{array}{c|ccc} x & -2 & 0 & 2 \\ \hline y & - & + & - \end{array} \quad D_f = [-2, 0) \cup [2, +\infty) \quad \checkmark$$

$$f(n^r + n) = r n^r - 1 \quad f(r) + f(1) = ?$$

سوال ٢ -

$$\begin{aligned} &= \sum_{n=1}^r (1)^r + (1) = r \\ &= \sum_{n=r}^r (r)^r + (r) = 1. \end{aligned} \Rightarrow f(r) + f(1) = r(1)^r - 1 + r(r)^r - 1 = r - 1 + 1 - 1 = 1 \quad \checkmark$$

$$\begin{aligned} f(n) &= n^r - 9n^r + 12n \\ g(n) &= n^r + 9n^r + 2\sqrt{n} \end{aligned} \quad \begin{aligned} &g(\sqrt{r} - r) \\ &f(\sqrt{r} + r) \end{aligned}$$

سوال ٢ -

$$\begin{aligned} n^r - 9n^r + 12n - 1 &= (n-r)^r \Rightarrow f(n) = (n-r)^r + 1 \\ n^r + 9n^r + 2\sqrt{n} + 2\sqrt{n} &= (n+r)^r \Rightarrow g(n) = (n+r)^r - 1 \end{aligned} \quad \begin{aligned} &g(\sqrt{r} - r) \\ &f(\sqrt{r} + r) \end{aligned} = \frac{((\sqrt{r} - r + r)^r - 1)}{((\sqrt{r} + r - r)^r - 1)} = \frac{r^r - 1}{r^r - 1} = 1$$

سوال ٢ -

$$f(n) = \sqrt{n + r\sqrt{n-r}} = \sqrt{(n-r) + r\sqrt{n-r} + r} = \sqrt{(\sqrt{n-r} + r)^2} = (\sqrt{n-r} + r)$$

$$g(n) = \sqrt{n - r\sqrt{n-r}} = \sqrt{(n-r) - r\sqrt{n-r} + r} = \sqrt{(\sqrt{n-r} - r)^2} = (\sqrt{n-r} - r)$$

سوال ٢ -

$$f(n) + g(n) = a + b\sqrt{n+c} = (\sqrt{n-r} + r) + (\sqrt{n-r} - r) = 2\sqrt{n-r}$$

$$a=0 \quad b=2 \quad c=-r \Rightarrow \frac{a+b}{c} = \frac{0+2}{-r} = -\frac{2}{r} \quad \checkmark$$

$$f(n) = \frac{n+r}{n^r - r n + r} \quad g(n) = \{(r, 1), (1, 0), (r, 0), (0, 1)\} \quad \frac{g}{f} = ? \quad \text{سوال ٢ -}$$

$$\Rightarrow f(r) = \frac{(r)+r}{(r)^r - r(r) + r} = -r \quad f(1) = \frac{(1)+r}{(1)^r - r(1) + r} = \frac{r}{0} = \text{محدود نیست}$$

سوال ٢ -

$$f(r) = \frac{(r)+r}{(r)^r - r(r) + r} = \frac{0}{0} = \text{محدود نیست} \quad f(0) = \frac{(0)+r}{(0)^r - r(0) + r} = \frac{r}{r}$$

$$\frac{g}{f} = \left\{ \left(r, -\frac{1}{r}\right), \left(0, \frac{r}{r}\right) \right\} \quad \frac{g}{f} = \left\{ \left(r, -\frac{1}{r}\right), \left(0, 1\right) \right\} \quad \checkmark$$

الف - ۱.۷۵

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

$$g(x) = \{(-2, 3), (1, -1), (2, 2), (-1, 0)\}$$

الف) $f(2x) = \left\{ \left(\frac{1}{2}, 2 \right), \left(\frac{2}{2}, -1 \right), \left(\frac{3}{2}, 2 \right), \left(\frac{-1}{2}, 4 \right) \right\}$ ✓

ب) $f(x^2) = \{(1, 2), (\sqrt{3}, -1), (-\sqrt{3}, -1), (2, 2), (-2, 2)\}$ ✓

$(-1, 4) \Rightarrow$ تقریب شده
چون می توان $x^2 = -1$ را هم زد
نه توان

ج) $2g^2(x) + 1 = \{(-2, 19), (1, 3), (2, 9), (-1, 1)\}$ ✓

د) $\frac{f}{g} = \left\{ \left(1, \frac{2}{-1} \right), \left(2, \frac{-1}{2} \right) \right\}$

$x = -1$ - تقریب شده $\Rightarrow g(-1) = 0$

$$\frac{f(1)}{g(1)} = \frac{f(-1)}{0}$$