

آرین نصیری / یازدهم B (سوال ۵ جدا)

۲. آرین عالی نوشتی

$$f(x) = \sqrt{x + 4\sqrt{x-4}} \quad x \geq 4 \Rightarrow f(x) + g(x) = a + b\sqrt{x+c}$$

$$g(x) = \sqrt{x - 4\sqrt{x-4}} \quad (f+g)^2 = f^2 + g^2 + 2fg \Rightarrow f^2 = x + 4\sqrt{x-4}$$

$$\Rightarrow g^2 = x - 4\sqrt{x-4}$$

$$f^2 + g^2 = 2x \Rightarrow fg = \sqrt{(x + 4\sqrt{x-4})(x - 4\sqrt{x-4})} = \sqrt{x^2 - 16(x-4)} = \sqrt{x^2 - 16x + 64}$$

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

$$\Rightarrow x \geq 4 \Rightarrow \sqrt{(x-4)^2} = x-4$$

$$(f+g)^2 = 2x + 2(x-4) = 4x - 8 = 4(x-2) \Rightarrow f+g = 2\sqrt{x-2} \Rightarrow a=0, b=2, c=-2$$

$$\frac{a+b}{c} = \frac{0+2}{-2} = -1$$

$$f(2) = \frac{4}{2-4+2} = -2 \Rightarrow \frac{g(2)}{f(2)} = -\frac{1}{2}$$

$$f(1) = \frac{2}{1-4+2} = \frac{2}{-1} = -2 \Rightarrow \text{تغییر نشده}$$

$$\frac{g}{f} = \left\{ \left(2, -\frac{1}{2}\right), \left(0, 2\right) \right\}$$

$$f(2) = \frac{4}{2-4+2} = \frac{4}{0} \Rightarrow \text{تغییر نشده}$$

$$f(0) = \frac{2}{-2} \Rightarrow \frac{g(0)}{f(0)} = \frac{4}{\frac{2}{-2}} = -4$$

$$\text{الف) } 2x \in \{1, 2, 4, -1\} \Rightarrow f(2x) \in \left\{ \left(\frac{1}{2}, 2\right), \left(\frac{3}{2}, -1\right), \left(\frac{5}{2}, 2\right), \left(-\frac{1}{2}, 4\right) \right\}$$

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

$$\text{ج) } 2g(x)+1 = \{ (-2, 1), (2, 1), (-1, 3), (1, 3) \}$$

$$\text{د) } \frac{2f}{g} = \{ (1, -4), (2, -1) \}$$

$$h = -2f + g = \{ (2, 0), (3, 0), (-2, 4) \}$$

$$f(1) = \sqrt{5-4-4} = 0$$

$$h(2) = \frac{f(2)}{g(2)} = \left\{ \left(1, 0\right), \left(2, \frac{\sqrt{2}}{2}\right), \left(3, 0\right) \right\}$$

$$f(4) = \sqrt{10-4-4} = \sqrt{2}$$

$$f(4) = \sqrt{10-4-4} = 0$$

$$f(0) = \sqrt{20-20-4} \Rightarrow \text{تغییر نشده}$$

s.a.m

$$f(x) = \frac{\sqrt{rx} - x}{x-r}$$

$$g(x) = [x] + [-x]$$

$$\left(\frac{1}{x+1}\right)(x)$$

$$rx \geq 0 \Rightarrow x \geq 0$$

$$\sqrt{rx} - x \geq 0 \xrightarrow{x \geq 0} \sqrt{rx} \geq x \Rightarrow rx \geq x^2 \Rightarrow x(r-x) \geq 0 \Rightarrow 0 \leq x \leq r$$

$$x-r \neq 0 \Rightarrow x \neq r$$

$$g(x) + 1 \neq 0 \Rightarrow [x] + [-x] = \begin{matrix} 0 \rightarrow x \in \mathbb{Z} \checkmark \\ -1 \rightarrow x \notin \mathbb{Z} \times \end{matrix}$$

$$D_f = \{x \mid x \in \mathbb{Z}, 0 \leq x \leq r, x \neq r\}$$

$$ii) y = x^r - rx^r + rx + 1 \Rightarrow (x-1)^r = x^r - rx^r + rx - 1 \Rightarrow y = \frac{(x-1)^r}{r(x-1)} + 1 \Rightarrow R_f = R \quad \checkmark$$

$$-i) y = \frac{1}{x^r - rx} \Rightarrow x^r y - rx y = 1 \Rightarrow x^r y - rx y - 1 = 0 \quad \textcircled{P}$$

$$y \neq 0 \Rightarrow x = \frac{-b \pm \sqrt{\Delta}}{ra} = \frac{ry \pm \sqrt{r^2 y^2 + 4y}}{ry} \Rightarrow ry(y+1) \geq 0 \quad \checkmark$$

$$iii) y = x^r + rx + 1 \Rightarrow y = \frac{-\Delta}{fa} = \frac{-(b^2 - 4ac)}{f} = \frac{r^2}{f} = \frac{r}{f} \Rightarrow R_f = [4, \infty) \quad \checkmark$$

$$-i) y = -x^r + rx + 1 \Rightarrow y = \frac{-\Delta}{fa} \Rightarrow \frac{-(r^2 - 4(-r))}{-f} = 1 \Rightarrow R_f = (-\infty, 1] \quad \checkmark$$

$$\textcircled{e) y = \sqrt{x^r - rx - r} \quad \Delta = 14 - 4(-r) = 2r \Rightarrow R_f = [0, \infty) \quad \checkmark \quad \left(\frac{-r}{f} = -1 \right)$$

$$> y = \sqrt{x - x^r} \quad \Delta = 34 - \left(\frac{r^2}{f}\right) = 9 \Rightarrow \sqrt{(-\infty, 9]} \Rightarrow R_f = [0, 3] \quad \checkmark$$

$$iv) y = x^r - 2x^r + rx + 1 \Rightarrow R_f = \mathbb{R} \quad \checkmark$$

$$-i) x^r - rx^r + rx + r \Rightarrow R_f = \mathbb{R} \quad \checkmark$$

$$e) y = \sqrt{x^r - rx^r + rx + 1} \Rightarrow \sqrt{R} = [0, \infty) \quad \checkmark$$

$$2) y = \left(\underbrace{x^0 - rx^r + rx + 1}_{R_f = R} \right)^r \Rightarrow (R)^r = [0, \infty) \quad \checkmark$$

$$iv) y = \frac{rx+1}{x-r} \Rightarrow rx+1 = r(x-r)+V \Rightarrow y = r + \frac{V}{x-r} \Rightarrow R_f = R - \{r\} \quad \checkmark$$

$$-i) y = \frac{rx+1}{x+1} \Rightarrow rx+1 = r(x+1)-r \Rightarrow y = r - \frac{r}{x+1} \Rightarrow R_f = R - \{r\} \quad \checkmark$$

s.a.m