

۲. آزمون عالی نوشتی



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

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

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

$$|\sqrt{n-4} + 2| + |\sqrt{n-4} - 2| = 2\sqrt{n-4} \Rightarrow \begin{matrix} a=0 \\ b=2 \end{matrix} \Rightarrow \begin{matrix} c=0 \\ c=-4 \end{matrix} \Rightarrow \begin{matrix} \frac{2+0}{-4} \\ \frac{2-0}{-4} \end{matrix}$$

$$\left(2, \frac{2+2^2}{2-4+3}\right) \left(1, \frac{1+1^2}{1-4+3}\right) \left(1, \frac{1+1^2}{1-4+3}\right) \left(0, \frac{0+0}{0-0+3}\right)$$

$$\left(2, -4\right) \left(0, \frac{4}{3}\right)$$

$$\frac{g}{f} \Rightarrow \left\{ \left(2, \frac{1}{-4}\right) \left(\frac{12}{4}\right) \right\}$$

$$f(n) = \frac{n+2}{n^2-4n+3} \Rightarrow n \neq 1, 3$$

$$g(n) = \left\{ \left(2, 1\right) \left(1, 0\right) \left(3, 0\right) \right\}$$

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

$$f(n^2) = \left\{ (1, 2) (\sqrt{3}, -1) (2, 2) (-1, 2) (-\sqrt{3}, -1) (-2, 2) \right\}$$

$$2 \cdot g^2(n) + 1 \Rightarrow \left\{ (-2, 1) (1, 3) (3, 9) (-1, 1) \right\}$$

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

$$h = 2f + g$$

$$\left\{ \left(2, 2\left(\frac{1}{-4}\right) + 3\right) \left(-2, 2(0) + 4\right) \left(2, 2\left(\frac{1}{-4}\right) + 3\right) \right\}$$

$$\left\{ (2, 5) (-2, 4) (3, 5) \right\}$$

$$g+1 \neq 0$$

$$g \neq -1$$

$$g(n) \rightarrow \text{در صورتی که } 1 - n^2 \text{ مقسوم شود}$$

$$\text{مقسوم بر } 1 - n^2 \text{ به معنی } 1 - n^2 \text{ مساوی 0 می شود}$$

$$f(n) \rightarrow n \neq 1$$

$$n \geq 0 \quad \sqrt{3n} - n$$

$$\sqrt{3n} - n \geq 0 \leftarrow$$

$$\sqrt{3n} \geq n \Rightarrow 3n \geq n^2$$

$$n^2 - 3n \leq 0 \quad n(n-3) \leq 0$$

$$+ \quad - \quad + \quad +$$

$$\Rightarrow D_f = \{0, 3\}$$

$f(n) = \left\{ (1, \sqrt{1-1-k}) (2, \sqrt{1-k-k}) (3, \sqrt{1-k-k}) (\infty, \sqrt{1-k-k}) \right\}$ $\Rightarrow f(n) = \left\{ (1, 0) (2, \sqrt{1}) (3, 0) \right\}$ $h(n) = \left\{ (1, \frac{0}{1}) (2, \frac{\sqrt{1}}{2}) (3, \frac{0}{4}) \right\} \Rightarrow h(n) = \left\{ (1, 0) (2, \frac{\sqrt{1}}{2}) (3, 0) \right\}$	6
الف) $y = n^3 - 3n^2 + 1$ $R_f = \mathbb{R}$ البتة چون برتئين قبل منوه R_f ستوان كنت $y - 1 = (n - 1)^3 \Rightarrow n - 1 = \sqrt[3]{y - 1} \Rightarrow n = \sqrt[3]{y - 1} + 1 \Rightarrow R_f = \mathbb{R}$ ب) $yn^2 - 2yn = 1 \Rightarrow yn^2 - 2yn - 1 = 0 \Rightarrow 4y^2 + 4y \geq 0 \quad / \quad y = 0$ $4y(y + 1) \geq 0 \quad + \quad \frac{-1}{1} \quad R_f = (-\infty, -1] \cup [0, +\infty)$ $\odot \quad \ominus \quad \rightarrow -1 \neq 0$	7
الف) $\frac{-b}{2a} = \frac{-(-4)}{2(1)} = 2 \Rightarrow 4 - 11 + 10 = 4 \Rightarrow a > 0 \Rightarrow \text{Min} \Rightarrow R_f = [4, +\infty)$ ب) $\frac{-b}{2a} = \frac{-(-4)}{2(-1)} = 2 \Rightarrow -4 + 11 + 10 = 17 \Rightarrow a < 0 \Rightarrow \text{Max} \Rightarrow R_f = (-\infty, 17]$ ج) $\frac{-b}{2a} = \frac{-(-4)}{2(1)} = 2 \Rightarrow 4 - 11 - 10 = -17 \Rightarrow R_f = [-17, +\infty)$ د) $\frac{-b}{2a} = \frac{-4}{2(-1)} = 2 \Rightarrow 11 - 9 = 2 \Rightarrow R_f = [0, 3]$	8
الف) $\mathbb{R}$ ب) $\mathbb{R}$ ج) $[0, +\infty)$ د) $[0, +\infty)$	9
الف) $\mathbb{R} - \{3\}$ ب) $\mathbb{R} - \{2\}$	10