

نام و نام خانوادگی حسین اعلایی پاسخنامه تشریحی تکلیف شماره کلاس A

الف) $f(n) = \sqrt{x|n|}$ $D_f = [0, +\infty)$ $D_g = \mathbb{R}$ دامنه‌های تابع برابر مساوی نیستند ✓

ب) $f(n) = \frac{(n+1)(n+1)n+1}{n^2+n+1} = \frac{n^2+n+1+n+1}{n^2+n+1} = 1$ $D_f = \mathbb{R}$ $D_g = \mathbb{R}$ دامنه‌ها برابر مساوی هستند ✓

ج) $f(n) = \frac{5 \sin n - 3 \sin n}{5 \sin n - 3} = \frac{2 \sin n}{5 \sin n - 3}$ $g(n) = 5 \sin n$ $D_f = \mathbb{R}$ $D_g = \mathbb{R}$ دامنه‌ها برابر مساوی نیستند ✓

د) $f(n) = \frac{n}{|n|} \Rightarrow$ $D_f = \mathbb{R} - \{0\}$ $g(n) = \frac{|n|}{n} \Rightarrow$ $D_g = \mathbb{R} - \{0\}$ دامنه‌ها برابر مساوی نیستند ✓

الف) $g(n) = [n - [n]]$ $f(n) = \left[\frac{n^2}{n^2+1} \right]$ $D_f = \mathbb{R}$ $D_g = \mathbb{R}$ دامنه‌ها برابر مساوی نیستند ✓

ب) $f(n) = \frac{1}{[n]}$ $g(n) = \frac{1}{\lceil n \rceil}$ $D_f = \mathbb{R} - [0, \frac{1}{2})$ $D_g = \mathbb{R} - [0, 1)$ دامنه‌ها برابر مساوی نیستند ✓

ج) $f(n) = \frac{1}{\sqrt{n-|n|}}$ $g(n) = \frac{1}{\sqrt{|n|-n}}$ $D_f = \emptyset$ $D_g = \mathbb{R}^-$ $D_g = \mathbb{R}^-$ دامنه‌ها برابر مساوی نیستند ✓

د) $f(n) = \begin{cases} \frac{n^2-n}{n-1} & n \neq 1 \\ 2 & n = 1 \end{cases}$ $g(n) = (n^2+n)$ $D_f = \mathbb{R}$ $D_g = \mathbb{R}$ دامنه‌ها برابر مساوی نیستند ✓

الف) $f(n) + g(n) = n^2 + n + 1$ $f(n) - g(n) = n^2 - n + 1$ $2f(n) = 2n^2 + 2$ $f(n) = n^2 + 1$ $g(n) = n$ $f(n) - g(n) = n^2 + 1 - n = n^2 - n + 1$ با اجات ✓

$f(n) = n - \sqrt{n^2 - 4}$ $g(n) = n + \sqrt{n^2 - 4}$ $n^2 - 4 \geq 0$ $n \geq 2$ $n \leq -2$ $f \times g = (n - \sqrt{n^2 - 4})(n + \sqrt{n^2 - 4}) = n^2 - (\sqrt{n^2 - 4})^2 = n^2 - n^2 + 4 = 4$ ✓

$g(n) = \frac{n-b}{n^2-n-a} \times \frac{1}{\frac{1}{n}} = \frac{\frac{n}{n} - \frac{b}{n}}{\frac{n^2}{n} - \frac{n}{n} - \frac{a}{n}} = \frac{a+n}{n^2-n+a} = f(n)$ $a = \frac{1}{n}$ $b = -4$ $m = \frac{1}{n}$ $n = -\frac{a}{n}$ $D_g = \mathbb{R} - \{0, -1\}$ ✓

$am - bn = \left(\frac{1}{n} \times \frac{1}{n}\right) - (-4 \times (-\frac{1}{n})) = \frac{1}{n^2} - 4 = -4\frac{1}{n^2} = -4\frac{1}{25}$ ✓

$$D_g = D_f \Rightarrow D_f = \mathbb{R} - \{a\} \quad f(n) = \frac{bn+r}{\lambda n+b} \quad \begin{cases} \lambda n \neq -b \\ n = -\frac{b}{\lambda} \end{cases}$$

$$g(n) = \textcircled{c} \rightarrow \text{باید به صورت } \frac{cn+d}{en+f}$$

$$b=\varepsilon \rightarrow c = \frac{\varepsilon n+r}{\lambda n+\varepsilon} = \frac{1}{\lambda} \quad \left\{ \begin{array}{l} b=-\varepsilon \rightarrow c = \frac{-\varepsilon n+r}{\lambda n-\varepsilon} = -\frac{1}{\lambda} \\ a = \frac{1}{\lambda} \end{array} \right.$$

$$\left(\frac{ab}{c} \right) = \frac{-\frac{1}{\lambda} \times \varepsilon}{\frac{1}{\lambda}} = \textcircled{-\varepsilon}$$

$$\left(\frac{ab}{c} \right) = \frac{\frac{1}{\lambda} \times -\varepsilon}{-\frac{1}{\lambda}} = \textcircled{\varepsilon}$$

✓

$$\begin{aligned} \lambda f - 1 &= k \\ f &= \frac{k+1}{\lambda} \end{aligned} \Rightarrow f = \left\{ (-1, 2), (2, \varepsilon), (3, -2), (0, \frac{1}{\lambda}) \right\}$$

✓

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

$$R_{\frac{\lambda g}{f+g}} = \{1, \varepsilon, 2\}$$

✓

$$f = \{(2, a), (-3, 2a-2b), (c, d), (2, d)\} \quad g = \{(2, -1), (a-2b, 2), (-2, 1)\}$$

$$\boxed{a=d=-1}$$

$$\begin{aligned} 2a-2b &= 1 \\ -2a-2b &= 1 \end{aligned}$$

$$\boxed{b=-2}$$

$$c = a-2b$$

$$c = -1-2(-2)$$

$$\boxed{c=3}$$

$$c+d = 2-1 = \boxed{\varepsilon}$$

✓

✓

$$f(n) = \sqrt{-n^2+n-m} \quad a, b \text{ max}$$

$$D_g = D_f = a \quad \left\{ \begin{array}{l} \text{باید به صورت } \frac{bn+r}{cn+d} \\ \text{و } a, b \text{ max} \end{array} \right\} \rightarrow$$

$$b^2 - \varepsilon ac = 0$$

$$1^2 - \varepsilon(-1 \times (-m)) = 0$$

$$1 - \varepsilon m = 0 \Rightarrow \boxed{m = \frac{1}{\varepsilon}}$$

$$\Rightarrow f(n) = \sqrt{-n^2+n-\frac{1}{\varepsilon}}$$

✓

✓

$$\text{مشتق: max} \quad \left\{ \begin{array}{l} \frac{-1}{+2(-1)} = \frac{1}{2} \\ 0 \end{array} \right\} \quad \begin{aligned} a &= \frac{1}{2} \\ b &= 0 \end{aligned}$$

$$\boxed{a+b = \frac{1}{2}} \rightarrow \text{جواب}$$

$$D_g = D_f = \mathbb{R} - \{c\}$$

باید به صورت $\frac{bn+r}{cn+d}$ باشد

$$f(n) = \frac{\lambda n+a}{n^2+9n+b} = \frac{\lambda n+a}{(n+3)^2}$$

$$\Delta = 0 \Rightarrow 9^2 - \varepsilon(1 \times b) = 0 \Rightarrow \varepsilon b = 81 \Rightarrow \boxed{b=9}$$

✓

✓

$$\frac{\lambda n+a}{(n+3)^2} = \frac{\lambda(n+\frac{a}{\lambda})}{(n+3)(n+3)} = \frac{\lambda}{n+3} = g(n)$$

$$\left. \begin{aligned} n-c &= n+3 \\ n+\frac{a}{\lambda} &= n+3 \end{aligned} \right\}$$

$$\boxed{c=-3}$$

$$\boxed{a=9}$$

$$a+b+c = 9+9+(-3) = \boxed{15}$$