

نام و نام خانوادگی آریضیا / زری پاسخنامه تشریحی تکلیف شماره ۱. کلاس (مهم) B

الف) $f(x) = \sqrt{x|x|}$, $g(x) = x \Rightarrow f(x) = \sqrt{x|x|} \Rightarrow x \geq 0$

$g(x) = x \Rightarrow x \in \mathbb{R} \quad X$

ب) $f(x) = \frac{(x+3)(x+1) + x + 4}{x^2 + 4x + 4}$ و $g(x) = 1 \Rightarrow f(x) = \frac{x^2 + 4x + 4}{x^2 + 4x + 4} = 1$

$f(x) = g(x) \checkmark$

ج) $f(x) = \frac{4 \sin^2 x - 4 \sin x}{4 \sin x}$ و $g(x) = 2 \sin x$ $g(x) \Rightarrow x \in \mathbb{R} \quad X$

د) $f(x) = \frac{x}{|x|}$, $g(x) = \frac{\sin x}{x} \Rightarrow \frac{x}{|x|} = \frac{\sin x}{x} \Rightarrow \frac{1}{x} = \frac{\sin x}{x^2} \Rightarrow x^2 = \sin x \quad X$

$f(x) = x \in \mathbb{R} - \{ \frac{1}{x}, \frac{1}{x^2}, \frac{1}{x^3}, \dots \}$

الف) $f(x) = \left[\frac{x^2}{x+1} \right]$ و $g(x) = [x - [x]] \Rightarrow \left[\frac{x^2}{x+1} \right] = 0$ و $[x - [x]] = [-x]$

$\Rightarrow x = -1 \Rightarrow \left[\frac{x^2}{x+1} \right] = 0$ و $[x - [x]] = -2 \quad X$

ب) $f(x) = \frac{1}{[x]}$ و $g(x) = \frac{1}{2[x]}$ $\Rightarrow f(x) \Rightarrow 2x \geq 1 \Rightarrow x \geq \frac{1}{2}$ و $g(x) \Rightarrow x \geq 1 \quad X$

ج) $f(x) = \frac{1}{\sqrt{x-|x|}}$ و $g(x) = \frac{1}{\sqrt{|x|-x}}$ $\Rightarrow f(x) = \frac{1}{\sqrt{-x}}$ و $g(x) = \frac{1}{\sqrt{x}}$ X

د) $f(x) = \begin{cases} \frac{x^2 - x}{x-1} & ; x \neq 1 \\ 2 & ; x = 1 \end{cases}$ و $g(x) = x^2 + x \Rightarrow x = 1 \Rightarrow g(x) = f(x) \checkmark$

$\begin{cases} f(x) + g(x) = x^2 + x + 1 \\ f(x) - g(x) = x^2 - x + 1 \end{cases} \Rightarrow 2f(x) = 2x^2 + 2 \Rightarrow f(x) = x^2 + 1$ و $g(x) = x$

$f^2(x) - g^2(x) = (x^2 + 1)^2 - x^2$
 $\Rightarrow x^4 + 2x^2 + 1 - x^2 = x^4 + x^2 + 1$

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

$f(x) = \frac{ax + 4}{x^2 - mx + n} = \frac{x - b}{x^2 - 3x - 4} \Rightarrow \begin{cases} 1a x^2 - 3a x^2 - 4a x + 4x^2 - 4x - 10 \\ = x^2 - mx^2 + nx - b x^2 + m b x - b n \end{cases}$

$g(x) = \frac{x - b}{x^2 - 3x - 4}$

$a = \frac{1}{4}$
 $m = \frac{3}{4}$
 $n = -4$
 $b = -4$

$a m - b n = \frac{1}{4} - 10 = -9 \frac{3}{4}$
 $\Rightarrow -9 \frac{3}{4}$

$$f(n) = \frac{bn+r}{\lambda n+b} \quad n \Rightarrow 1 \Rightarrow \frac{b+r}{\lambda+b} \Rightarrow b=r \Rightarrow \lambda a = -r \Rightarrow a = -\frac{r}{\lambda} = -\frac{1}{r}$$

$$g(n) = c \quad c = \frac{1}{r} = \frac{b+r}{\lambda+b} = \frac{1}{r}$$

$$Dg = \mathbb{R} - \{a\} \Rightarrow \lambda a + b = 0$$

$$\frac{ba}{c} \quad \frac{r \times -\frac{1}{r}}{\frac{1}{r}} = \frac{-1}{\frac{1}{r}} = \boxed{-r}$$

$$\frac{rg}{f+g} \quad rg-1 = \{(-1, 3), (2, \sqrt{2}), (3, -4), (0, 0)\}$$

$$f = \{(-1, 2), (2, 4), (3, -2), (0, \frac{1}{r})\}$$

$$g = \{(2, 4), (3, 5), (-1, -4), (0, 0)\}$$

$$rg = \{(2, 1), (3, 12), (-1, -1), (0, 0)\}$$

$$\frac{rg}{f+g} = \frac{\{(2, 1), (3, 12), (-1, -1)\}}{\{(2, \frac{1}{r}), (3, \frac{1}{r}), (-1, -\frac{1}{r})\}} = \{(2, 1), (3, 3), (-1, -r)\}$$

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

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

$$a = -1 = d$$

$$3a-2b = 1 \Rightarrow -3-1 = 2b \Rightarrow b = -2 \quad d+c = -1+d = r$$

$$a-3b = c \Rightarrow -1-(-6) = c$$

$$\sqrt{-(n-\frac{1}{r})^2} \Rightarrow a = n = \frac{1}{r} \quad b = 0 \quad \frac{1}{r} + 0 = \frac{1}{r}$$

$$f(n) = g(n) \Rightarrow \frac{rn+a}{n^2+\lambda n+b} = \frac{r}{n+c} \Rightarrow \frac{rn^2+rn+a}{n^2+\lambda n+b} = \frac{rn^2+rn+rc}{n^2+\lambda n+b}$$

$$(n-c)^2 = n^2+c^2-2nc$$

$$-2nc = \lambda n \Rightarrow c = -\frac{\lambda}{2}$$

$$n=0 \Rightarrow \frac{r}{c} = \frac{a}{b} \quad n=1 \Rightarrow \frac{1}{c} = \frac{r+a}{\lambda+b} = \frac{r+a}{\lambda+b}$$

$$\begin{cases} rb-3a=0 \\ -ra-rb-3=0 \\ a=3, b=9 \end{cases} \quad a+b+c = 3+9-3 = \boxed{9}$$