

نام و نام خانوادگی نام و نام خانوادگی پاسخنامه تشریحی تکلیف شماره کلاس نام و نام خانوادگی

الف) $F(x) = \sqrt{x|x|} \rightarrow x|x| \geq 0$ $\begin{matrix} \textcircled{+} \sqrt{} \\ \textcircled{-} x \end{matrix}$ $D_f = [0, +\infty)$ $g(x) = x$ $D_g = \mathbb{R}$ دایره مساوی نمی باشند

ب) $F(x) = \frac{(x^2+1)(x+1) + x + 1}{x^2 + \omega x + 1} \rightarrow \Delta = b^2 - 4ac \rightarrow 2\omega - 2\omega = -1^2 \rightarrow$ دایره مساوی هستند $D_f = \mathbb{R}$ $D_g = \mathbb{R}$

ج) $F(x) = \frac{x \sin^2 x - 4 \sin x}{x \sin x - 2} \rightarrow x \sin x - 2 \neq 0 \rightarrow x \sin x \neq 2 \rightarrow -1 < \sin x < 1 \rightarrow -x < x \sin x < x \rightarrow D_f = \mathbb{R}$ $D_g = \mathbb{R}$ دایره مساوی هستند

د) $F(x) = \frac{x}{x \pm 0}$, $g(x) = \frac{|x|}{x} \rightarrow x \neq 0$ $D_f = \mathbb{R} - \{0\}$ $D_g = \mathbb{R} - \{0\}$ دایره مساوی هستند

الف) $F(x) = \left[\frac{x^2}{x^2+1} \right] \rightarrow D_f = \mathbb{R}$, $g(x) = [x - [x]] \rightarrow D_g = \mathbb{R}$ دایره مساوی هستند

ب) $F(x) = \frac{1}{[x]} \rightarrow 0 < x < 1 \rightarrow \frac{1}{x} < 1$ $g(x) = \frac{1}{x[x]} \rightarrow 0 < x < 1 \rightarrow \frac{1}{x} < 1$ دایره مساوی هستند

ج) $F(x) = \frac{1}{\sqrt{x-1|x|}} \rightarrow x-1|x| > 0 \rightarrow x > |x| \rightarrow D_f = \emptyset$ $g(x) = \frac{1}{\sqrt{|x|-x}} \rightarrow |x|-x > 0 \rightarrow x > 0$ $\begin{matrix} \textcircled{+} \sqrt{} \\ \textcircled{-} x \end{matrix}$ دایره مساوی هستند

د) $F(x) = \begin{cases} \frac{x^3-x}{x-1} & x \neq 1 \\ 2 & x = 1 \end{cases} \rightarrow D_f = \mathbb{R}$ $g(x) = x^2+x \rightarrow D_g = \mathbb{R}$ دایره مساوی هستند

$F(x) = x^2 - x + 1 + g(x)$
 $F(x) = x^2 + x + 1 - g(x)$
 $2F(x) = 2x^2 + 2 \rightarrow F(x) = x^2 + 1$, $g(x) = x$
 $F(x) - g(x) = x^2 + 1 - x = x^2 - x + 1$

$F(x) = x - \sqrt{x^2 - 4}$ $\begin{matrix} \textcircled{+} \sqrt{} \\ \textcircled{-} x \end{matrix}$ $\rightarrow x^2 - 4 \geq 0 \rightarrow x \geq 2$ $\rightarrow x \geq 2$ $\rightarrow x \geq 2$
 $F(x) = x + \sqrt{x^2 - 4}$ $\begin{matrix} \textcircled{+} \sqrt{} \\ \textcircled{-} x \end{matrix}$ $\rightarrow x^2 - 4 \geq 0 \rightarrow x \geq 2$ $\rightarrow x \geq 2$ $\rightarrow x \geq 2$
 $F \times g \rightarrow D_f \cap D_g = (-\infty, -2] \cup [2, +\infty)$
 $(x+y)(x-y) = x^2 - y^2 = x^2 - x^2 + 4 = 4$

$g(x) = \frac{a-b}{x^2 - px - a}$ $F(x) = \frac{ax+p}{x^2 - mx + n}$
 $-r = pm \rightarrow m = \frac{p}{r}$ $-a = rn \rightarrow n = \frac{-a}{r}$ $-b = p \rightarrow b = -p$ $\frac{1}{r} = a$
 $am - bn \Rightarrow \left(\frac{1}{r} \times \frac{p}{r}\right) - \left(-\frac{p}{r} - \frac{a}{r}\right) = \frac{p}{r} - \frac{p}{r} - \frac{a}{r} = -\frac{a}{r}$

$F(x) = \frac{bx+r}{ax+b} \quad g(x) = c \quad dg = R - \sum a_i x^i$ $\frac{bx+r}{ax+b} = \frac{c}{1} \rightarrow bx+r = axc+bc \quad \begin{cases} axc = bx \rightarrow b = ac \\ bc = r \end{cases} \Rightarrow ac \times c = ac^2 = r \rightarrow c^2 = \frac{r}{a}$ $c \rightarrow \frac{1}{r} \rightarrow b = r \quad ax+rx=0 \rightarrow ax=-r \rightarrow x = -\frac{r}{a} = a \quad \checkmark \quad \frac{ab}{c} = \frac{\frac{1}{r} \times r}{\frac{1}{r}} = \frac{1}{\frac{1}{r}} = r \quad c = \pm \frac{1}{r}$ $c \rightarrow -\frac{1}{r} \rightarrow b = -r \quad ax-r=0 \rightarrow ax=r \rightarrow x = \frac{r}{a} = a \quad \checkmark \quad \frac{ab}{c} = \frac{\frac{1}{r} \times -r}{-\frac{1}{r}} = \frac{-1}{-\frac{1}{r}} = r$	6
$F(x) = \{(-1, r), (r, f), (r, -r), (0, \frac{1}{r})\} \quad g(x) = \{(r, f), (r, q), (-1, -f), (a, 0)\}$ $Fg(x) = \{(r, 1), (r, 1/r), (-1, -1), (a, 0)\}$ $\frac{Fg}{F+g} \Rightarrow (-1, f), (r, 1), (r, r) \Rightarrow p = f, 1/r$	7
$g = \{(r, -1), (r, 1), (a-r, b, a)\} \quad F = \{(r, a), (-r, ra-rb), (c, a), (r, d)\}$ $a = -1 \quad ra-rb = 1 \rightarrow -r-rb = 1 \rightarrow rb = -r \rightarrow b = -r$ $d = -1 \quad a-rb = c \rightarrow -1+4 = c \rightarrow c = a$ $d+c \Rightarrow -1+a = r$	8
$F(x) = \sqrt{-x^2 + x - m} \quad g(x) = \{(a, b)\}$ $-x^2 + x - m \rightarrow \Delta = b^2 - 4ac = 1 - 4m = 0 \rightarrow 4m = 1 \rightarrow m = \frac{1}{4}$ $-x^2 + x - \frac{1}{4} \quad x = \frac{-b \pm \sqrt{\Delta}}{2a} \rightarrow \frac{-1 \pm 0}{-2} = \frac{1}{2} = x = a$ $-\frac{1}{4} + \frac{1}{4} - \frac{1}{4} = \frac{-1-1+1}{4} = \frac{-1}{4} = 0 = b$ $a+b = \frac{1}{2} + 0 = \frac{1}{2}$	9
$F(x) = \frac{rx+a}{x^2+4x+b} \quad g(x) = \frac{r}{x-c}$ $(x+r)^2 = x^2+4x+9 \rightarrow b=9$ $(x-c)^2 = x^2+4x+9 \rightarrow (x+\frac{4}{2})^2 \rightarrow c = -2$ $\frac{rx+a}{(x+r)(x+r)} = \frac{r}{x+r} \rightarrow (x+r)(rx+a) = r(x+r)(x+r)$ $rx+a = rx+9 \rightarrow a=9$ $a+b+c = 9+9-2 = 16$	10