تکلیف شماره ۲۱

Subject:

Year: Month: Date:

سارینا زارع

دهم دختر A

① $f(a) = a^2 + 2a = a^2 - 4 \rightarrow 2a = -4 \rightarrow \boxed{a = -2}$

② $g(2) = 4 + b = 3 \rightarrow \boxed{b = -1}$

$f(2) = \frac{4+a}{4-b-1} = 3 \rightarrow 4 + a = 15 \rightarrow \boxed{a = 11}$

$f(x) = \frac{x^2 + 11}{2x + 1} \rightarrow f(1) = \frac{1+11}{2+1}$

$f(1) = 4$

③ $f(x) = \frac{4x+1}{2x^2 + ax + b} \rightarrow D_f = \mathbb{R} - \{-1, 4\}$

$2(-1)^2 + a(-1) + b = 0 \rightarrow b = a - 2$

$2(4)^2 + a(4) + b = 0 \rightarrow b = -32 - 4a$

$a - 2 = -32 - 4a \rightarrow -5a = 30 \rightarrow \boxed{a = -6}$

$b = a - 2 \Rightarrow -6 - 2 = -8 = b$

$f(x) = \frac{4x+1}{2x^2 - 6x - 8} \rightarrow f(1) = \frac{4+1}{2-6-8} = -\frac{5}{12}$

④ $f(x) = \frac{x^3 - \sqrt{3}}{-4x^2 + ax + b}$, $D_f = \mathbb{R} - \{-1\}$

$-4x^2 + ax + b = k(x+1)^2 \rightarrow k(x^2 + 2x + 1) = kx^2 + 2kx + k \rightarrow k = -4$

$k = -4$, $a = -8$, $-4 = b$

$a + b = -8 - 4 = -12$

⑤ $f(x) = \frac{2x}{(x-1)(x^2 + mx + 1)}$, $D_f = \mathbb{R} - \{1\}$

$\Delta = m^2 - 4 \rightarrow \Delta < 0 \rightarrow m^2 - 4 < 0 \rightarrow -2 < m < 2$ ☆۱

حالت ۲: $1^2 + m(1) + 1 = 0 \rightarrow m = -2$ ☆۲

☆۱ ∪ ☆۲ $\Rightarrow$ $\boxed{-2 \leq m < 2}$

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$4 - \frac{1}{x^2} \geq 0 \xrightarrow{\text{مخرج مشترک}} \frac{4x^2-1}{x^2} \geq 0 \rightarrow 4x^2-1 \geq 0 \rightarrow x^2 \geq \frac{1}{4} \rightarrow$ (۶)

$x \neq 0$

$-\frac{1}{2} \geq x \geq \frac{1}{2} \rightarrow D_f = (-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, +\infty)$

$f(x) = \sqrt{mx^2+2mx+1}$ (۷)

حالت ۱ : $m=0 \rightarrow f(x)=1 \rightarrow D_f = \mathbb{R}$ ✶۱

حالت ۲ : $m \neq 0 \longrightarrow a>0 \rightarrow m>0$ ✶۲

$\Delta \leq 0 \rightarrow 4m^2-4m \leq 0 \rightarrow 4m(m-1) \leq 0$ ← $m=0$, $m=1$ } شیب‌ها

✶۳ $0 \leq m \leq 1$

✶۲ ∩ ✶۳ = $0 < m \leq 1$ ✶۴ → ✶۱ ∪ ✶۴ => $0 \leq m \leq 1$

$\frac{4x^2-1}{2x-1} = \frac{(2x-1)(2x+1)}{2x-1} = 2x+1 \rightarrow a = \frac{1}{2}$ (۸)

$2x-1 \rightarrow x \neq \frac{1}{2}$

$f(\frac{1}{2}) = \frac{1}{2} \times 4 + k \Rightarrow 2+k$

$g(\frac{1}{2}) = \frac{1}{2} \times 2 + 1 = 2$ } $2+k=2 \rightarrow k=0$

$a+k = \frac{1}{2}+0 = \frac{1}{2}$

$\frac{9x^2-4}{3x+2} = \frac{(3x-2)(3x+2)}{3x+2} = 3x-2$ (۹)

$f(0) = -2$, $g(0) = b \rightarrow b = -2$

$f(-\frac{2}{3}) = -2a+2$, $g(-\frac{2}{3}) = 3 \times -\frac{2}{3} + b = -4 \rightarrow -2a+2 = -4 \rightarrow a = 3$ } $a-b = 3-(-2) =$

گزینه ۵

$g(2) = 4$, $f(2) = 2a^2+2a \rightarrow 2a^2+2a = 4 \rightarrow 2a^2+2a-4 = 0$ (۱۰)

$a^2+2a-8=0 \rightarrow (a+4)(a-2)=0 \longrightarrow a = \frac{-4}{2} = -2$

$\hookrightarrow a = \frac{2}{2} = 1$

به ازای ۲- و ۱ دو تابع با هم برابرند.