۱۷,۷۵

[illegible] قاسمی

۱ـ (۲)

$x^3 \times \left(\left(\frac{1}{2}\right)^{x-1} - 1\right) = x^3 \times \left(2^{-x+1} - 1\right)$

$-x+1=0 \Rightarrow x=1$ ، $x=0$

$\Rightarrow [0,1]$ ✓

۲ـ (۲)

$-x + |-x+2| \geq 0$:

$x<2$: $-2x+2 \geq 0 \Rightarrow 2x \leq 2 \Rightarrow x \leq 1$ ✓

$x \geq 2$: غ ق ق

۳ـ (۲)

Sign table: $-4,\ 1,\ 2,\ 3$

۴ ۳ ۲ ۱

$\Rightarrow [-4,1] \cup (2,3)$ ✓

۴ـ (۲)

$9x^4 - 7x^2 - 4x - 3 = (9x^4 - 6x^2 + 1) - (x^2 + 4x + 4)$

$= (3x^2-1)^2 - (x+2)^2 = (3x^2+x+1)(3x^2-x-3)$

$\Delta < 0$ همواره

$3x^2 + ax + b \Rightarrow a=-1,\ b=-3$ ✓

$\Rightarrow \dots = 2$ ✓

۵ـ (۱,۵)

$x^3 + x - \frac{64}{x^3} - \frac{4}{x} = \left(x-\frac{4}{x}\right)\left(x^2+4+\frac{16}{x^2}\right) + \left(x-\frac{4}{x}\right)$

$\left(x^3 - \frac{64}{x^3}\right)$

$\frac{x^2-4}{x}$; Sign table: $-2,\ 0,\ 2$

$= \left(x-\frac{4}{x}\right)\left(x^2+5+\frac{16}{x^2}\right) \geq 0$ ، $\Delta<0$

$x^2 = \frac{4}{x} \Rightarrow x = \pm 2$

$\Rightarrow D = R - (-2,2)$ (crossed out in green)

۶-

$x^3 + x = 10 \Rightarrow (x-2)(x^2+2x+4) + (x-2) = 0$ (۲)

$\Rightarrow (x-2)(\underbrace{x^2+2x+5}_{\Delta<0}) = 0 \Rightarrow x = 2 \Rightarrow f(10) = 7$

$x^3 + x - 2 = 0 \Rightarrow (x-1)(\underbrace{x^2+x+2}_{\Delta<0}) = 0 \Rightarrow \boxed{x=1}$

$\Rightarrow f(2) = 1 \Rightarrow 1 + 7 = \boxed{8}$ ✓

۷- (۲)

$(x-2)^3 + 8 \Rightarrow (\sqrt[3]{2})^3 + 8 = 10$

$(x+3)^3 - 27 \Rightarrow (\sqrt[3]{7})^3 - 27 = -20$

$\Rightarrow \frac{-20}{10} = -2$ ✓

۸- (۲)

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

$g(x) = \sqrt{(\sqrt{x-4} - 2)^2} = \sqrt{x-4} - 2$ یا $2 - \sqrt{x-4}$

$\Rightarrow f(x) + g(x) \Rightarrow 2\sqrt{x-4} + 0 \Rightarrow \frac{2}{-4} = \boxed{-\frac{1}{2}}$ ✓

b, c, a

$\Rightarrow 4 \Rightarrow \frac{4}{-4} = \boxed{-1}$

۹- (۴) $D_{f\cap g} = (2, 5)$

$D_f = \mathbb{R} - \{1, 3\}$

$f(2) = -4$, $f(5) = \frac{2}{3}$ $\Rightarrow \frac{f}{g} = \{(2, -\frac{1}{4}), (5, \frac{2}{3})\}$ ✓

دقت! ۰/۲۵

۱۰- (۲)

الف) $\{(\frac{1}{2}, 2), (\frac{3}{2}, -1), (2, 2), (-\frac{1}{2}, 4)\}$ ✓

ب) $\{(1, 2), (-1, 2), (\sqrt{2}, -1), (-\sqrt{2}, -1), (2, 2), (-2, 2)\}$ ✓

ج) $\{(-2, 19), (1, 3), (3, 9), (-1, 1)\}$ ✓

د) $\{(1, -4), (3, -1)\}$ ✓