رضا قاسمی

۱-

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

$-x+1=0 \Rightarrow \boxed{x=1}$, $x=0$

	0		1	
-	0	+	0	-

$\Rightarrow [0,1]$

۲-

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

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

$x \geq 2$: $-2 \geq 0$ غ ق ق

۳-

	-4		1		2		3	
-	*	+	0	-	*	+	*	

④ ③ ② ①

$\Rightarrow [-4,1] \cup (2,3)$

۴-

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

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

ریشه ندارد

$3x^2 + ax + b$

$\Rightarrow a=-1 , b=-3$

$\Rightarrow \cancel{\dots} \Rightarrow -1 \times -3 = 3$

۵-

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

$x^3 - \frac{64}{x^3}$

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

$x^2 = 4$

$\Rightarrow x = \pm 2$

	-2		2	
+		-		+

$\Rightarrow D = R - (-2,2)$

6 -

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

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

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

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

7 -

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

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

$\Rightarrow \frac{-20}{10} = -2$

8 -

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

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

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

b c a

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

9 -

c) $D_{f \cap g} = (2,1)$

$f(2) = -4$

$f(5) = \frac{2}{3}$

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

10 -

الف) $\{(\frac{1}{2}, 2)(\frac{3}{2}, -1)(2, 2)(-\frac{1}{2}, 6)\}$

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) $\{(1,-4)(3,-1)\}$