۶

$x^3+x=2 \rightarrow x(x^2+1)=2 \rightarrow x=1 \Rightarrow 2(1^2)-1=1 \quad f(2)=1$

$x^3+x=10 \rightarrow x(x^2+1)=10 \rightarrow x=2 \Rightarrow 2(2)^2-1=7 \quad f(10)=7$

$f(2)+f(1)=1+7=8$

۷

$f(x)=x^3-4x^2+12x \longrightarrow (x-2)^3+8 \qquad f(\sqrt[3]{2}+2)=(\sqrt[3]{2})^3+8=10$

$g(x)=x^3+9x^2+27 \longrightarrow (x+3)^3-27 \qquad g(\sqrt[3]{7}-3)=(\sqrt[3]{7})^3-27=-20$

$\frac{g(\sqrt[3]{7}-3)}{f(\sqrt[3]{2}+2)}=\frac{-20}{10}=-2$

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

$(4\sqrt{x-4})^2=16x-64$

$2x+2\sqrt{x^2-16x-64}=2x+2\sqrt{(x-8)^2}=2x+2|x-8|=4x-16$

$f(x)+g(x)=\sqrt{4x-16}=\sqrt{4(x-4)}=2\sqrt{x-4} \Rightarrow a+b\sqrt{x+c}=2\sqrt{x-4} \Rightarrow a+b=2$

$c=-4$

$\frac{a+b}{c}=\frac{2}{-4}=-\frac{1}{2}$

۹

$f(2)=\frac{4}{4-8+3}=-4, \quad f(1)=\frac{3}{1-4+3}=\frac{3}{0}\times, \quad f(3)=\frac{9}{9-12+3}=\frac{9}{0}\times, \quad f(0)=\frac{2}{3}$

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

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

۱۰

الف) $f(2x)=\{(\frac{1}{4},2),(\frac{3}{4},-1),(2,2),(-\frac{1}{4},4)\}$

ب) $f(x^2)=\{(1,2),(-1,2),(\sqrt{3},-1),(-\sqrt{3},-1),(2,2),(-2,2)\}$

ج) $4g^2(x)+1=\{(-2,19),(1,3),(3,9),(-1,1)\}$

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