① $a^2+2a = a^2-4 \Rightarrow \boxed{a=-2}$

② $\frac{x^2+a}{2x-b} \to x=2 \quad \frac{4+a}{4-b}=2 \quad 2x+b \Rightarrow x=2 \quad 4+b=2 \Rightarrow \boxed{b=-1}$
$\hookrightarrow \frac{4+a}{4+1}=2 \Rightarrow \boxed{a=11} \quad f(1)=\frac{1+11}{2-(-1)}=\frac{12}{3}=\boxed{4}$

③ $2-a+b=0 \to b-a=-2 \Rightarrow -3a=9 \to a=-9, b=-8$
$32+4a+b=0 \to b+4a=-32 \quad f(1)=\frac{4+1}{2-9-8}=\boxed{\frac{-5}{15}}$

④ $-4-a+b=0 \quad \Delta=0 \quad a^2+14b=0 \quad b+a=\{-12\}$
$b-a=4 \to b=4+a \quad a^2+14a+49=0 \Rightarrow \boxed{a=-7}, \boxed{b=-3}$

⑤ $x^2+mx+1 \to$ ریشه‌دار $\quad m^2-4<0 \Rightarrow \boxed{-2<m<2}$

⑥ $x \geq \frac{1}{x^2} \to \frac{1}{x^2} \leq 4 \to -2 \leq \frac{1}{x} \leq 2 \Rightarrow \boxed{-\frac{1}{2} \leq x \leq \frac{1}{2}}$

⑦ $f(x)=\sqrt{mx^2+2mx+1} \quad Df=\mathbb{R} \quad mx^2+2mx+1 \to \Delta=0$
$b^2-4ac=0 \to 4m^2-4m=0 \to m=1 \quad a>0 \to m>0$
$mx^2+2mx+1 \to \Delta<0 \to b^2-4ac<0 \to 4m^2-4m<0 \to m<1$
$\boxed{m=(0,1)}$

⑧ $f(x)=\begin{cases} \frac{4x^2-1}{2x-1} & x \neq a \\ 4x+k & x=\frac{1}{2} \end{cases} \quad g(x)=2x+1 \quad a+k=\frac{1}{2}+0=\boxed{\frac{1}{2}}$
$2x-1=0 \Rightarrow x=\frac{1}{2} \Rightarrow a=\frac{1}{2} \quad g(\frac{1}{2})=2 \quad 2+k=2 \Rightarrow k=0$

⑨ $f(x)=\begin{cases} \frac{9x^2-4}{3x+2} & x \neq -\frac{2}{3} \\ 3ax+2 & x=-\frac{2}{3} \end{cases} \quad g(x)=3x+b$
$g(1), f(1) \cdot 3+b, 1 \Rightarrow 3+b=1 \Rightarrow b=-2 \quad f(-\frac{2}{3})=-2a+2 \Rightarrow a=3$
$g(-\frac{2}{3})=-4$
$a-b=3-(-2)=\boxed{5}$

(10)

$$f(x)=\begin{cases}\frac{x^2-4}{x-2} & x\neq 2\\ 2a^2+ax & x=2\end{cases} \qquad g(x)=x+2$$

$$f(2)=2a^2+2a \longrightarrow a^2+a=2 \Rightarrow a=\boxed{-2,\ 1}$$

$$g(2)=4$$