۱-
$x=a \quad a^2+2a=a^2-4$
$a=-2$

۲-
$f(2)=3 \rightarrow \frac{4+a}{4-b}=3 \rightarrow 4+a=12-3b =$
$a=8+3=11 \qquad g(2)=3 \rightarrow 4+b=3$
$\boxed{b=-1}$
$f(1)=\frac{1+11}{2+1}=4$

۳-
$x=-1 \quad 2-a+b=0 \quad \begin{cases} b-a=-2 \\ b+2a=-22 \end{cases}$
$x=4 \quad 32+4a+b=0$
$3a=-30 \rightarrow a=-9 \rightarrow b=-8$
$f(1) \rightarrow \frac{2+1}{8-9-2}=\frac{-3}{12}$

۴-
$f(x)=\frac{x^2\sqrt{2}}{ax^2+3x+b} \qquad -4(x+1)^2=-4x^2-8x-4$
$a+b=-12$

۵-
$(x-1)^2=x^2+1-2x$
$\frac{m^2-4}{2}<0 \qquad m^2-4<0 \rightarrow -2<m<2$

۶-
$f-\frac{1}{x^2}\geq 0 \rightarrow \left(2-\frac{1}{x}\right)\left(2+\frac{1}{x}\right)=0$
$x=2 \qquad x=-2$
$-\frac{1}{2} \qquad \frac{1}{2}$
$+ \quad \phi \quad - \quad \phi \quad +$
$\rightarrow D_f=(-\infty, -\frac{1}{2}] \cup [\frac{1}{2}, +\infty)$

۷-
$mx^2+2mx+1>0 \rightarrow$ ① $m>0$
② $\Delta<0$
$4m^2-4m<0 \rightarrow 4m(m-1)<0 \rightarrow$
$\frac{1}{4} \qquad 1$
$+ \quad \phi \quad - \quad \phi \quad +$

۸-
$f\left(\frac{1}{2}\right)=2+k \qquad g\left(\frac{1}{2}\right)=2 \rightarrow 2+k=2$
$\gg k=0$
$2x-1\neq 0 \rightarrow x+\frac{1}{2}=\alpha$
$\alpha+k=\frac{1}{2}$

۹-
$f(1)=g(1) \quad \frac{9-4}{3+2}=3+b \rightarrow \frac{5}{5}=3+b$
$1=3+b \rightarrow b=-2$
$f\left(\frac{-2}{3}\right)=g\left(\frac{-2}{3}\right) \rightarrow -2\alpha+2=-4 \rightarrow -2a=-6 \rightarrow a=3$
$a-b=\frac{5}{4}$

۱۰-
$f(2)=g(2) \rightarrow 2a^2+2a=4 \rightarrow \alpha^2-\alpha-2=0$
$(\alpha+1)(\alpha-1)=0 \nearrow \alpha=\cancel{-1}, 1$
$x=2 \longrightarrow 2a^2+2a=4 \rightarrow a^2+a-2=0 \nearrow \underline{a=1}$