۱.
$x^2+2x=ax-4$ در ازای a
$a^2+2a=a^2-4$
$2a=-4$
$\boxed{a=-2}$

۲.
$f(x)=\frac{x^2+a}{2x-b}$, $g(x)=2x+b$
$\frac{x^2+a}{2x-b}=2x+b \xrightarrow{|\cdot 2} \frac{4+a}{4-b}=4+b \Rightarrow 4+a=16-b^2$
$4+a=15$
$\boxed{a=11}$
$|\cdot 2$ ↘ $g(x)=2x+b$
$2=4+b$
$\boxed{-1=b}$
$f(x)=\frac{x^2+12}{2x+1} \rightarrow f(1)=\frac{12}{3}=4$

۳.
$f(x)=\frac{4x+1}{2x^2+ax+b}$ $D_f=R-\{-1,4\}$ $f(1)=?$
-1 و 4 ریشه‌های مخرج
$2x^2+ax+b\neq 0$
$2-a+b=0 \rightarrow 2+10+b=0$
$\boxed{b=-12}$
$32+4a+b=0$
$30+5a=0 \rightarrow \boxed{a=-6}$
$f(x)=\frac{4x+1}{2x^2-6x-12} \rightarrow f(1)=\frac{-5}{-12}$

۴.
$f(x)=\frac{x^2-\sqrt{2}}{-4x^2+ax+b}$ $R-\{1\}$ ریشه مضاعف مخرج
$-4x^2+ax+b=0$
$x=\frac{-b}{2a}=\frac{-a}{-8}=\frac{a}{8}=1 \rightarrow \boxed{a=8}$ $\boxed{a+b=12}$
$-4+a+b=0$
$\boxed{b=4}$

۵.
$f(x)=\frac{2x}{(x-1)(x^2+mx+1)}$ $R-\{1\}$
ریشه x ، ریشه $=1$
$\frac{-m}{2}=1 \Rightarrow m=-2$
$\Delta=m^2-4 \rightarrow m^2-4=0$ ↘ $m^2=4 \rightarrow m=\pm 2$
$m^2-4<0$
$m^2<4$
$-2<m<2$
$-2\leq m<2 \rightarrow m\in[-2,2)$

۶.
$f(x)=\sqrt{4-\frac{1}{x^2}}$ $4-\frac{1}{x^2}\geq 0$ $x\neq 0$
$(2+\frac{1}{x})(2-\frac{1}{x})\geq 0$
$\frac{1}{2}$ $-\frac{1}{2}$ 0 0
$+$ $-$ $+$
$D_f=(-\infty,-\frac{1}{2}]\cup[\frac{1}{2},+\infty)$

۷.
$f(x)=\sqrt{mx^2+2mx+1}$ $mx^2+2mx+1\geq 0$ ↘ $m>0$
$\Delta\leq 0 \Rightarrow 4m^2-4m\leq 0$
$4m(m-1)\leq 0$
0 1
$+$ $-$ $+$
$m\in[0,1]$

۸.
$x=\frac{1}{2} \rightarrow g(x)=f(x)$ $a+8=\frac{1}{2}+0=+\frac{1}{2}$
$2=2+k$
$\boxed{0=k}$
$D_g=R \rightarrow D_f=R_1 \Rightarrow \boxed{a=\frac{1}{2}}$

$g(x) = 3x + b$

$a = 1$
$b = 2$ } $a - b = -1$

$x = \frac{-2}{3} \longrightarrow 3x + b = 3ax + 2$

$-2 + b = -2a + 2$

$a = 1$, $b = 4$

$x = 2 \longrightarrow x + 2 = 2ax + a$

$6 = 2a + 2a$

$6 = a^2 + a - 2$

$0 = (a - 1)(a + 2)$

$a = 1$, $a = -2$

-i-

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