1) ترسیم ابتدایی

$f(x)=\begin{cases} x^2+2x & : x\geq a \\ ax-4 & : x\leq a \end{cases} \xrightarrow{x=a} a^2+2a=a^2-4$

$a=-2$

2)

$f(x)=\dfrac{x^2+a}{2x-b} \quad g(x)=2x+b \longrightarrow (2,3)$ نقطه مشترک $\xrightarrow[y=3]{x=2} \dfrac{4+a}{4-b}=4+b=3$

$b=-1 \quad \dfrac{4+a}{5}=3 \rightarrow a=11 \quad f(x)=\dfrac{x^2+11}{2x+1} \xrightarrow{x=1} \dfrac{12}{3}=4$

3)

$f(x)=\dfrac{4x+1}{2x^2+ax+b} \quad D_f=\mathbb{R}-\{-1,4\}$ $\xrightarrow{\text{مخرج را صفر ۴ و ۱-}}$

$2x^2+ax+b=0 \rightarrow x^2+ax+2b=0$

$x=-1,4 \qquad (x+2)(x-8)=x^2+ax+2b \rightarrow$

$x^2-6x-16 \Rightarrow a=-6$

$f(x)=\dfrac{4x+1}{2x^2-6x-8} \xrightarrow{x=1} \dfrac{-5}{13} \qquad b=-8$

4)

$f(x)=\dfrac{x^2-\sqrt{3}}{-4x^2+ax+b} \quad D_f=\mathbb{R}-\{-1\}$

$\longrightarrow -4x^2+ax+b=-(2x+2)^2=-4x^2-4-8x$

$\left.\begin{array}{l} a=-8 \\ b=-4 \end{array}\right\} \rightarrow a+b=-12$

5)

$f(x)=\dfrac{2x}{(x-1)\underbrace{(x^2+mx+1)}_{\text{همواره }+}}, D_f=\mathbb{R}-\{1\} \longrightarrow x^2+mx+1>0 \qquad (-2,2)$

$\Delta<0$

$m^2-4<0 \rightarrow -2<m<2 \rightarrow$

6)

$f(x)=\sqrt{4-\dfrac{1}{x^2}} \longrightarrow \sqrt{\left(2-\dfrac{1}{x}\right)\left(2+\dfrac{1}{x}\right)}$

	$\frac{-1}{2}$		$\frac{1}{2}$	
+	0	−	0	+

$\left(2-\dfrac{1}{x}\right)\left(2+\dfrac{1}{x}\right)\geq 0 \qquad x=\dfrac{1}{2} \quad x=\dfrac{-1}{2}$

$\left(-\infty,\dfrac{-1}{2}\right]\cup\left[\dfrac{1}{2},+\infty\right)-\{0\}$

7)

$f(x)=\sqrt{mx^2+2mx+1} \xrightarrow{D_f=\mathbb{R}} mx^2+2mx+1\geq 0$

	0		1	
+	0	−	0	+

$a>0 \rightarrow m>0$

$\Delta\leq 0 \rightarrow 4m^2-4m\leq 0 \rightarrow 4m(m-1)\leq 0 \rightarrow$

$m=0 \quad m=1$

$0\leq m\leq 1$

(8

$$f(x)=\begin{cases}\dfrac{[illegible]}{2x-1} & ; x\neq a\\ 4x+k & ; x=\dfrac{1}{2}\end{cases}\qquad g(x)=2x+1$$

$a+k=?\longrightarrow a=\frac{1}{2}\ \} \rightarrow a+k=\frac{1}{2}$

$2+k=2\rightarrow k=0$

(9

$$f(x)=\begin{cases}\dfrac{9x^2-4}{3x+2} & ; x\neq \dfrac{-2}{3}\\ 3ax+2 & ; x=\dfrac{-2}{3}\end{cases}\qquad g(x)=3x+b$$

$a-b=?$

$x=1\longrightarrow f(x)=1$

$g(x)=3(1)+b=1\rightarrow b=-2$ $\qquad a-b=5$

$3\left(\frac{-2}{3}\right)a+2=3\left(\frac{-2}{3}\right)-2$

$-2a+2=-4$

$a=3$

(10

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

$x=2\longrightarrow 2a^2+2a=4\rightarrow 2a^2+2a-4=0$

$a^2+2a-8=0$

$(a+4)(a-2)=0$ $\qquad a=\frac{-4}{2},\ \frac{2}{2}=$

$1,\ -2$

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