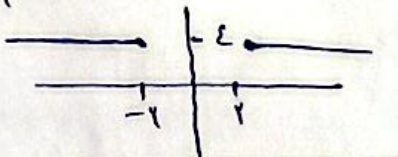


(۱) $D_f = \mathbb{R} - \{0\}$ $D_g = \mathbb{R} - \{0\}$ $f(a) = g(a)$ تقاطع با هم برابر اند	$\sin a \neq \frac{3}{4} \Rightarrow a \rightarrow D_f = \mathbb{R}$ $D_g = \mathbb{R}$ $f(a) = 2 \sin a (2 \sin a - 3)$ $f(a) = g(a) = 2 \sin a$ تقاطع با هم برابر هستند	(۲) $D_f = \mathbb{R}, D_g = \mathbb{R}$ $f(a) = a^2 + 2a + 3 + a + 2$ $f(a) = \frac{a^2 + 6a + 5}{a^2 + 6a + 5} = 1$ $f(a) = g(a) = 1$ تقاطع با هم برابر اند.	(الف) $D_f = \mathbb{R} \cup \{0\}$ $D_g = \mathbb{R}$ $D_g \neq D_f$ تقاطع با هم برابر نیستند
$D_f = \mathbb{R}$ $D_g = \mathbb{R}$ $f(a) = a(a+1)(a+1)$ $f(a) = a^2 + a$ $f(a) = g(a)$ تقاطع با هم برابر هستند.	(ج) $D_f = \begin{matrix} \oplus a \\ \ominus a \end{matrix} \Rightarrow \emptyset$ $D_g = \begin{matrix} \oplus 2 \\ \ominus 2 \end{matrix} \Rightarrow \mathbb{R}^+$ $D_f \neq D_g \Rightarrow$ تقاطع با هم برابر نیستند	(ب) $[2a] \neq 0 \Rightarrow 0 < a < \frac{1}{2}$ $D_f = \mathbb{R} - [0, \frac{1}{2})$ $[2a] \neq 0 \Rightarrow 0 < a < 1$ $D_g = \mathbb{R} - [0, 1)$ $D_f \neq D_g \Rightarrow$ تقاطع با هم برابر نیستند.	(الف) $D_f = \mathbb{R}$ $D_g = \mathbb{R}$ $f(a) = g(a) = 0$ تقاطع با هم برابر اند
۳ $\begin{cases} f(a) + g(a) = a^2 + a + 1 \\ f(a) - g(a) = a^2 - a + 1 \end{cases}$ $2f(a) = 2a^2 + 2 \Rightarrow f(a) = a^2 + 1$ $g(a) = a$ $f^2(a) + g^2(a) = a^4 + 2a^2 + 1 + a^2 = a^4 + 3a^2 + 1$			
۴ $f \cdot g = (a - \sqrt{a^2 - 2})(a + \sqrt{a^2 - 2}) = a^2 - (a^2 - 2) = 2$ $f \cdot g = 2$ $\Rightarrow D_f = \begin{cases} a \geq 2 \\ a \leq -2 \end{cases} \Rightarrow D_f = [2, +\infty) \cup (-\infty, -2]$ 			
۵ $g(a) \Rightarrow 2a^2 - 3a - 6 \Rightarrow a^2 - 3a - 3 = 0 \Rightarrow a = \frac{3 \pm \sqrt{9 + 12}}{2} = \frac{3 \pm \sqrt{21}}{2}$ $f(a) = \frac{a^2 + 2}{a^2 - \frac{3}{2}a - \frac{6}{2}} \Rightarrow m = \frac{3}{2}, n = -\frac{6}{2} \Rightarrow 2a^2 - 3a - 6 = 2(a^2 - \frac{3}{2}a - 3)$ $g(a) = \frac{a - b}{(2a - 6)(a + 1)} \begin{cases} a \neq -1 \\ a \neq \frac{6}{2} \end{cases} \Rightarrow D_g = \mathbb{R} - \{-1, \frac{6}{2}\} \Rightarrow \frac{a - b}{2a^2 - 3a - 6} = \frac{a^2 + 2}{a^2 - \frac{3}{2}a - \frac{6}{2}}$ $2a^2 + 2 = a - b \begin{cases} a = 0 \Rightarrow -b = 2 \Rightarrow b = -2 \\ a = 1 \Rightarrow 2a + 2 = 6 \Rightarrow a = 2 \end{cases} \Rightarrow am - bn = \frac{1}{2} \cdot \frac{3}{2} - (-2)(-\frac{6}{2}) = \frac{3}{4} - 6 = -\frac{21}{4}$ $\frac{3}{4} - \frac{21}{4} = -\frac{18}{4} = -\frac{9}{2}$			

$$\frac{ba+2}{1a+b} \Rightarrow \text{فرض کنیم } a=1 \text{ و } b=1 \Rightarrow b^2=14 \Rightarrow b=\pm 2 \Rightarrow g(a)=f(a) \Rightarrow \frac{ba+2}{1a+b}=c \Rightarrow$$

$$1ac+bc=ba+2 \Rightarrow \begin{cases} b=2 \rightarrow c=\frac{1}{2} \\ b=-2 \rightarrow c=-\frac{1}{2} \end{cases} \Rightarrow a \neq a \Rightarrow$$

$$b=2 \rightarrow 1a+2 \neq 0 \rightarrow (2a+1) \neq 0 \rightarrow a \neq a \neq -\frac{1}{2} \Rightarrow a=-\frac{1}{2} \Rightarrow \frac{ab}{c} = \frac{\frac{1}{2} \cdot 2}{\frac{1}{2}} = 2 \Rightarrow -2$$

$$b=-2 \rightarrow 1a-2 \neq 0 \rightarrow a \neq a \neq \frac{1}{2} \Rightarrow a=\frac{1}{2} \Rightarrow \frac{ab}{c} = \frac{\frac{1}{2} \cdot (-2)}{-\frac{1}{2}} = 2 \Rightarrow 2$$

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

$$f+g = \{(-1, -2), (2, 1), (2, 1)\}$$

$$\frac{fg}{f+g} = \{(-1, 2), (2, 1), (2, 2)\} \Rightarrow R_f = \{1, 2, 3\}$$

$$f(a)=g(a) \Rightarrow a=-1, \quad 2a-2b=1 \Rightarrow -2-2b=1 \rightarrow 2b=2$$

$$b=-1 \Rightarrow a=d=-1 \Rightarrow c=a-2b \Rightarrow c=-1+2=1$$

$$c+d=1-1=0 \Rightarrow \{0\}$$

$$D_f = -a^2 + a - m \geq 0 \Rightarrow -(a^2 - a + m) \geq 0 \Rightarrow a^2 - a + m \leq 0$$

$$a^2 - a + m \leq 0 \Rightarrow 0 = 1 - 4m = 0 \Rightarrow 4m = 1 \Rightarrow m = \frac{1}{4}$$

$$a = \frac{-1}{-2} = \frac{1}{2} \Rightarrow f(a) = \sqrt{-a^2 + a - m} \Rightarrow f(\frac{1}{2}) = \sqrt{-\frac{1}{4} + \frac{1}{2} - \frac{1}{4}} = \sqrt{0} = 0$$

$$\left. \begin{matrix} a=a=\frac{1}{2} \\ b=f(a)=0 \end{matrix} \right\} a+b = \frac{1}{2} + 0 = \frac{1}{2}$$

$$D_g = 12 - 4c \Rightarrow 12 - 4c = 0 \Rightarrow c=3$$

نیز می‌توانیم به روش دیگر

$$12 = 4c \Rightarrow c=3 \Rightarrow f(a) = \frac{2a+a}{a^2+4a+4} = \frac{3a+a}{(a+2)^2} \Rightarrow (a+2)^2 \neq 0 \Rightarrow$$

$$a \neq -2 \Rightarrow D_f = 12 - 4c \Rightarrow D_f = D_g \Rightarrow c=3 \Rightarrow f(a) = g(a)$$

$$\frac{2a+a}{(a+2)(a+2)} = \frac{3}{a+2} \Rightarrow (2a+a)(a+2) = 3(a+2) \Rightarrow$$

$$2a+a=3 \Rightarrow a=1 \Rightarrow a+b+c = 1+2-3=0$$