

الف) $\sqrt{m|m|} > 0 \Rightarrow g(m) = m^2 \cdot \begin{cases} 1 & m > 0 \\ -1 & m < 0 \end{cases} \Rightarrow D_f = [0, +\infty) \neq D_g = \mathbb{R} \quad \alpha$

ب) $m^2 + 5m + 7 \Rightarrow \Delta < 0$ / $\frac{1}{D_f} = \frac{1}{D_g} \quad \checkmark$

ج) $D_g = \mathbb{R}, D_f = \mathbb{R} \rightarrow r \sin m - r \neq 0 \Rightarrow \sin m \neq \frac{r}{r} \Rightarrow \mathbb{R}, \frac{r \sin m (r \sin m - r)}{r \sin m - r} \quad \checkmark$

د) $\frac{m}{|m|} \Rightarrow \frac{|m|}{m} \Rightarrow |m| \neq 0 \Rightarrow m \neq 0 \Rightarrow D_f = D_g \quad \checkmark \quad D_f, D_g = \mathbb{R} - \{0\}$

هـ) الف) $f(m) = \left[\frac{m^2}{m^2+1} \right], g(m) = [m - [m]] \Rightarrow D_f = D_g \quad \checkmark$

ب) $f(m) = \frac{1}{[m]}, g(m) = \frac{1}{r[m]} \quad \begin{cases} r[m] \neq 0 \Rightarrow [m] \neq 0 \Rightarrow D_g = \mathbb{R} - \{0\} \\ [m] \neq 0 \Rightarrow D_f = \mathbb{R} - \{0, \frac{1}{r}\} \end{cases} \quad \alpha \quad D_f \neq D_g$

ج) $\sqrt{m-1|m|} > 0 \Rightarrow \sqrt{|m|-m} > 0 \Rightarrow m > |m| \Rightarrow m > m \quad \alpha \quad D_f \neq D_g \quad \alpha$

د) $\frac{m^2-m}{m-1} = \frac{m(m-1)}{m-1} = m \Rightarrow \frac{1}{1-1} \neq \frac{1}{1+1} \Rightarrow m^2+m = m(m+1) \Rightarrow D_f = D_g \quad \checkmark$

هـ) مربع کردن: $(a+b)(a-b) = a^2 - b^2$

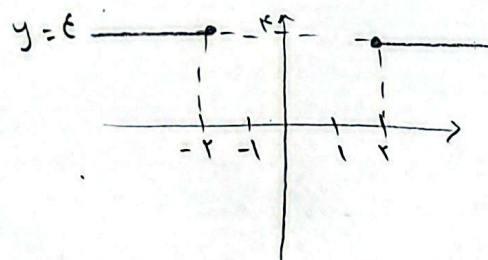
$f^2(m) - g^2(m) = (m^2+m+1)(m^2-m+1) = m^4 + m^2 + m^2 - m^2 - m^2 - m^2 + m^2 + m^2 + 1$

$= m^4 + m^2 + 1$
 $f(m) - g(m) = m^2 - m + 1$
 $f(m) + g(m) = m^2 + m + 1$

$r f(m) = r m^2 + r$
 $f(m) = m^2 + 1 \Rightarrow g(m) = m$

$g(m) \times f(m) \rightarrow (m + \sqrt{m^2-1})(m - \sqrt{m^2-1}) \Rightarrow m^2 - m^2 + 1 = 1$

$m^2 - 1 > 0 \Rightarrow 1 \leq m^2 \Rightarrow \begin{cases} m \leq -1 \\ m \geq 1 \end{cases}$



$g(m) = \frac{m-b}{m^2-m-1} \Rightarrow m^2-m-1=0 \Rightarrow (m-1)(m+2)=0 \Rightarrow \begin{cases} m=1 \\ m=-2 \end{cases} \Rightarrow D_g = \mathbb{R} - \left\{ \frac{1}{2}, -1 \right\} \Rightarrow D_f = D_g$

ب) $f(m) = \frac{am+r}{(m-\frac{a}{r})(m+1)} \rightarrow m^2 - \frac{1}{r}m - \frac{r}{r} \mid g(m) = f(m) \Rightarrow ram^2 - cam^2 - am + ram^2 - am - 1 = 0$

$am - bn = \frac{1}{r} \times 1 \times \frac{r}{1} (-\frac{1}{r} \times \frac{r}{1}) = \frac{r-1}{r} \Rightarrow \begin{cases} b = -1 \\ a = \frac{1}{r} \end{cases}$

$$f(x) = c \xrightarrow{\text{نقطة 1}} \frac{bx+r}{ax} = c \rightarrow bx+r = c(ax+b) \rightarrow ac = b, c = \frac{b}{a}$$

$$bc = r \rightarrow b \times \frac{b}{a} = r \Rightarrow \frac{b^2}{a} = r$$

$$b^2 = 14 \quad b = \pm \sqrt{14}$$

$$\xrightarrow{\text{نقطة 2}} 11a+b=0 \rightarrow a = -\frac{b}{11}$$

$$\xrightarrow{\text{نقطة 3}} \frac{ab}{c} \rightarrow \frac{-\frac{b}{11} \times b}{\frac{b}{11}} = -b \Rightarrow \boxed{+4} \text{ نقطة 4}$$

$$f = \{(-1, 2), (2, 4), (3, -2), (0, \frac{1}{2})\} \quad \leftarrow 2f-1 \text{ نقطة 5}$$

$$2g = \{(2, 1), (3, 1), (-1, -1), (0, 0)\} \rightarrow g = \{(2, \frac{1}{2}), (3, \frac{1}{2}), (-1, -\frac{1}{2}), (0, 0)\}$$

$$g+f = \{(-1, -2), (2, 1), (3, 4)\} \quad \frac{2g}{f+g} = \{(2, 1), (3, 2), (-1, 1)\}$$

$$f = \{(r, a), (-r, a-rb), (c, d), (r, d)\} \quad g = \{(r, -1), (-r, 1), (a-rb, d)\}$$

$$a = -1 \quad ra-rb = 1 \quad c = a-rb$$

$$d = -1 \quad -r-rb = 1 \quad c = -1+d$$

$$b = -2 \quad c = +4$$

$$d+c = -1+d = 4$$

$$f(x) = g(x) \rightarrow \sqrt{-a^2+a-m} = b$$

$$-(a^2-a+m) \xrightarrow{\text{نقطة 1}} m = \frac{1}{r} \rightarrow \sqrt{-(a-\frac{1}{r})^2} = -|a-\frac{1}{r}| = b$$

$$\xrightarrow{\text{نقطة 2}} -a + \frac{1}{r} = b \quad \xrightarrow{\text{نقطة 3}} \underline{a+b = \frac{1}{r}}$$

$$g(x) = f(x) \xrightarrow{\text{نقطة 1}} ng = nf \Rightarrow \text{نقطة 2} \quad \xrightarrow{\text{نقطة 3}} m+r, \frac{b}{a} = (m+r)^r \rightarrow \text{نقطة 4} = -r$$

$$\xrightarrow{\text{نقطة 5}} 11r - \{c\}$$

$$\frac{r}{1-(-1)} = \frac{r+a}{14} \quad m = 1 \text{ نقطة 6} \quad \leftarrow \begin{matrix} c = -r \\ b = 9 \end{matrix}$$

$$2r = 1+ra \rightarrow ra = 2r \rightarrow a = 2$$

$$a+b+c = \boxed{12}$$