

$$\left. \begin{aligned} F(\Delta) &= (\alpha+1)(\Delta+r) = V(\alpha+1) \\ F(-r) &= r\alpha + r(-r) = r\alpha - r \end{aligned} \right\} \rightarrow rF(\Delta) = F(-r) + \alpha = r(V(\alpha+1)) = r\alpha - r + \alpha \Rightarrow 1r\alpha + 1r = r\alpha - r \Rightarrow$$

$$10\alpha = -1\lambda \Rightarrow \boxed{\alpha = -\frac{1}{10}\lambda}$$

$$\left. \begin{aligned} f(y+\sqrt{x}) &= \sqrt{y+\sqrt{x}} + \frac{1}{\sqrt{y+\sqrt{x}}} + y \\ f(y-\sqrt{x}) &= \sqrt{y-\sqrt{x}} + \frac{1}{\sqrt{y-\sqrt{x}}} + y \end{aligned} \right\} \Rightarrow \sqrt{y+\sqrt{x}} + \sqrt{y-\sqrt{x}} + y + \frac{1(\sqrt{y+\sqrt{x}})}{\underbrace{(\sqrt{y-\sqrt{x}})(\sqrt{y+\sqrt{x}})}_{\frac{\sqrt{y+\sqrt{x}}}{\sqrt{1}}}} + \frac{1(\sqrt{y-\sqrt{x}})}{\underbrace{(\sqrt{y+\sqrt{x}})(\sqrt{y-\sqrt{x}})}_{\frac{\sqrt{y-\sqrt{x}}}{\sqrt{1}}}} \Rightarrow$$

$$\begin{aligned} & \gamma F(x) - \gamma F(-x) = \gamma x^r - x \times \gamma \\ & \xrightarrow{\text{if } x = -x} \gamma F(-x) - \gamma F(x) = \gamma x^r + x \times \gamma \end{aligned} \quad \Rightarrow \quad \begin{aligned} & \gamma F(x) - \gamma F(-x) = \gamma x^r - \gamma x \\ & \gamma F(-x) - \gamma F(x) = \gamma x^r + \gamma x \\ & -\Delta F(x) = \gamma_0 x^r + x \Rightarrow \\ & F(x) = \frac{\gamma_0 x^r + x}{\Delta} = \gamma x^r + \frac{1}{\Delta} x \Rightarrow \boxed{F(x) = \gamma x^r + \frac{1}{\Delta} x} \end{aligned}$$

$$\begin{aligned} F(x) = F(0) &\Rightarrow x=0 \Rightarrow (0+r)F(0) - r^m(0)F(0+r) = r^m(0)F(0) + r^{m-1} \Rightarrow rF(0) = r^{m-1} \Rightarrow F(0) = \frac{r^{m-1}}{r} \\ F(x+r) = F(0) &\Rightarrow x=-r \Rightarrow \underbrace{(-r+r)}_0 F(-r) - r(-r)F(-r+r) = r^m(-r)F(-r) + r^{m-1} \Rightarrow \\ rF(0) &= \Delta m + 1 \Delta \Rightarrow F(0) = \frac{\Delta m + 1 \Delta}{r} \\ \Rightarrow F(0) &= \frac{\Delta m + 1 \Delta}{r} = \frac{r^m - 1}{r} = \frac{r^m - r^0}{r} \Rightarrow r^m - r^0 = \Delta m + 1 \Delta \Rightarrow r^m - 1 = \Delta m + 1 \Delta \Rightarrow \boxed{m = r, \Delta} \\ \Rightarrow F(0) &= \frac{r \times r, \Delta - 1}{r} = \frac{1r, \Delta}{r} = r, \Delta \Rightarrow \boxed{F(0) = r, \Delta} \end{aligned}$$

$$\begin{aligned} F(-1) &= 0 \Rightarrow F(-1) + F\left(\frac{1}{-1}\right) = \frac{3(-1) - 12(-1) + 7}{(-1)} \Rightarrow 2F(-1) = \frac{-1}{-1} \Rightarrow F(-1) = \frac{-1}{2} = \boxed{-\frac{1}{2}} \quad ; \textcircled{2} \\ F(x) &= ax + b \quad \left. \begin{aligned} F(x) + F\left(\frac{1}{x}\right) &= ax + b + \frac{a}{x} + b = \frac{ax^2 + 2bx + a}{x} = \frac{3x^2 - 12x + 7}{x} \end{aligned} \right\} \Rightarrow \textcircled{2} \\ F\left(\frac{1}{x}\right) &= \frac{a}{x} + b \end{aligned}$$

$$F(-1) = -9$$

$$\begin{aligned} f(x) &= (x-1)\sqrt{1-x} & D_f &= x \leq 1 = (-\infty, 1] & R_f &= (-\infty, 0] \\ g(x) &= -\sqrt{(1-x)^3} \Rightarrow & D_g &= x \leq 1 = (-\infty, 1] & R_g &= (-\infty, 0] \end{aligned}$$

$(1-x)^3 \geq 0 \Rightarrow 1-x \geq 0 \Rightarrow x \leq 1$

$$\frac{-\sqrt{(1-x)^3}}{g(x)} = \frac{-\sqrt{(1-x)^3(1-x)}}{-\sqrt{(1-x)^3(1-x)}} = \frac{-|1-x|\sqrt{1-x}}{-\sqrt{(1-x)^3(1-x)}} = \frac{-(1-x)\sqrt{1-x}}{-(1-x)\sqrt{1-x}} = \frac{f(x)}{f(x)}$$

$g(x) = f(x)$

تابع زوج و دایره میسر است

$$\begin{aligned} f(x) &= x\sqrt{x} & D_f &= [0, +\infty) & R_f &= [0, +\infty) \\ g(x) &= \sqrt{x^3} & D_g &= [0, +\infty) & R_g &= [0, +\infty) \end{aligned}$$

$x \geq 0 \Rightarrow x^3 \geq 0 \Rightarrow x \geq 0$

$$\frac{\sqrt{x^3}}{g(x)} = \frac{\sqrt{x \cdot x \cdot x}}{\sqrt{x^3}} = \frac{|x|\sqrt{x}}{\sqrt{x^3}} = \frac{x\sqrt{x}}{x\sqrt{x}} = \frac{f(x)}{f(x)}$$

$g(x) = f(x)$

تابع زوج و دایره میسر است

$$\begin{aligned} f(x) &= [\sqrt{x} - \sqrt{x}] & D_f &= [0, +\infty) & R_f &= \{0\} \\ g(x) &= \sqrt{x-x} & D_g &= [0, +\infty) & R_g &= \{0\} \end{aligned}$$

$x \geq 0 \Rightarrow x-x \geq 0 \Rightarrow x \geq 0$

$g(x) = f(x)$

تابع زوج و دایره میسر است

برای دایره دو تابع با هم برابر هستند

اگر منظور از $(\frac{f+g}{f-g})(1)$ باشد می شود $\frac{f(1)+g(1)}{f(1)-g(1)}$ و اگر منظور از آن ضرب $(\frac{f+g}{f-g})(1)$ در $(\frac{f+g}{f-g})(1)$ باشد می شود $\frac{f(1)+g(1)}{f(1)-g(1)} \cdot \frac{f(1)+g(1)}{f(1)-g(1)}$

الف) $\frac{f+g}{f-g}(1) = \frac{f(1)+g(1)}{f(1)-g(1)} = \frac{2+1}{2-1} = 3$

ب) $\frac{f+g}{f-g}(2) = \frac{f(2)+g(2)}{f(2)-g(2)} = \frac{2+2}{2-2} = \frac{4}{0} = \text{غیر تعریف}$

ج) $f(0)g(-1) = 0 \times 1 = 0$

فرض کنیم $x = \frac{k+1}{3}$

الف) $g(x) = f(3x-1) \Rightarrow g(x) = \left\{ \left(\frac{2x+1}{3}, 1 \right), \left(\frac{1-x}{3}, 2 \right), \left(\frac{2x+1}{3}, 5 \right), \left(\frac{1-x}{3}, 2 \right), \left(\frac{2x+1}{3}, -1 \right) \right\}$

ب) $h(x) = f(1/x) \Rightarrow h(x) = \left\{ (2, 1), (1, 4), (5, 0) \right\}$