

۱. تابع زوج است

۲. تابع فرد است

۳. تابع زوج است

$f(x) \sim x \Rightarrow a=1 \Rightarrow x > 0 \Rightarrow f(x) = (x+1)(x+1) = x(x+1)$

$f(-x) \sim x \Rightarrow a=-1 \Rightarrow x < 0 \Rightarrow f(-x) = 1-x \Rightarrow x f(x) = f(-x) + a$

$x \times x(x+1) = 1-x + a \Rightarrow \frac{va+v}{a-a} = \frac{va-v}{a-a} \Rightarrow \frac{va+v}{0} = \frac{va-v}{0} \Rightarrow \frac{-9}{0}$

$(x-\sqrt{x})(x+\sqrt{x}) = 1 \Rightarrow \lim_{x \rightarrow 0} \frac{1}{x} = \infty$

$f(\frac{1}{x}) = \sqrt{\frac{1}{x}} + \frac{1}{\sqrt{\frac{1}{x}}} + x = \frac{1}{\sqrt{x}} + \sqrt{x} + x = f(x) \Rightarrow f(x) = f(\frac{1}{x})$

$f(x+\sqrt{x}) = f(\frac{1}{\frac{1}{x+\sqrt{x}}}) = f(x-\sqrt{x})$  ,  $f(x-\sqrt{x}) + f(x+\sqrt{x}) = x f(x-\sqrt{x})$

$f(x) = \frac{1}{\sqrt{x}} + \sqrt{x} + x = k + x = a + \frac{1}{a} + x = (x-\sqrt{x}) + (x+\sqrt{x}) + x = x+x+x = 3x \Rightarrow k = \sqrt{4}$

$I(x-\sqrt{x}) = \sqrt{4} + x \Rightarrow f(x-\sqrt{x}) + f(x+\sqrt{x}) = x(\sqrt{4} + x) = \sqrt{4x} + x^2$

$\begin{cases} x f(x) - x f(-x) = f(x^2) - x \\ x f(-x) - x f(x) = f(x^2) + x \end{cases} \Rightarrow \begin{cases} x f(x) - 4 f(-x) = x^2 - x \\ 4 f(x) - 9 f(-x) = x^2 + x \end{cases} \rightarrow -2 f(x) = 10x^2 + x$

$f(x) = -5x^2 - \frac{x}{2}$

$x=0 \Rightarrow x f(x) = x^2 - 1$

$x=-1 \Rightarrow +4 f(0) = 14 + 2x + x^2 - 1 = 18 + 2x$

$x f(0) = 2 + \frac{1}{2} x$

$x^2 - 1 = 2 + \frac{1}{2} x \Rightarrow \frac{x}{2} = 4 \rightarrow x = \frac{8}{2} \Rightarrow x f(0) = 2 \times \frac{8}{2} - 1 = 8 - 1 = 7$

$f(0) = \frac{7}{2} \times \frac{1}{2} = \frac{7}{4} = 1.75$

$f(x) = ax + b \Rightarrow f(\frac{1}{x}) = \frac{a}{x} + b$

$f(0) \xrightarrow{x=-1} f(-1) + f(-1) = \frac{1+1+1}{-1} \Rightarrow 2 f(-1) = -3 \Rightarrow f(-1) = -1.5$

$f(x) = (x-1)\sqrt{1-x} \Rightarrow D_f = 1-x \geq 0 \Rightarrow 1 \geq x \Rightarrow D_f = (-\infty, 1]$

$g(x) = -\frac{\sqrt{(1-x)^3}}{1-x} \Rightarrow \frac{1}{1-x} \Rightarrow D_g = (-\infty, 1]$

$x=-1 \Rightarrow f(-1) = (-1-1)\sqrt{1-(-1)} = -2\sqrt{2}$   
 $g(-1) = -\frac{\sqrt{(1-(-1))^3}}{1-(-1)} = -\frac{\sqrt{8}}{2} = -\sqrt{2}$

$x=-2 \Rightarrow (-2-1)\sqrt{1-(-2)} = -3\sqrt{3} = f(-2)$   
 $-\frac{\sqrt{(1-(-2))^3}}{1-(-2)} = -\frac{\sqrt{27}}{2} = -\frac{3\sqrt{3}}{2} = g(-2)$

دامنه ها برابرند  
 پس باید عددی طبیعی  
 به هر دو آنگاه به هم برابرند  
 برابر شد یعنی این دو تابع به هم برابرند  
 تساوی دو تابع  
 که برابر است

$D_f = x \geq 0 \Rightarrow D_f = [0, +\infty)$

$D_g = [0, +\infty)$

دامنه ها برابرند  
 به هر دو تابع عدد  
 می دهیم تا به هم برابرند

$x=0 \Rightarrow f(0) = 0$

$g(0) = 0$

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

$g(1) = 1$

$x=2 \Rightarrow f(2) = 2\sqrt{2}$

$g(2) = \sqrt{2^3} = 2\sqrt{2}$

کرده اند  
 برابرند  
 تساوی در

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$f(n) = \lceil \sqrt{n} \rceil - \lfloor \sqrt{n} \rfloor \Rightarrow D_f = [0, +\infty)$   
 $g(n) = \sqrt{n-1}$   
 $+ \checkmark$   
 $- \checkmark$   
 $\cdot \checkmark$   
 $\Rightarrow D_g = [0, +\infty)$

$n=0 \Rightarrow f(0) = 0$   
 $g(0) = 0$   
 $n = \frac{1}{4} \Rightarrow \lceil \sqrt{\frac{1}{4}} \rceil - 0 = 1 = f(\frac{1}{4})$   
 $\sqrt{\frac{1}{4}} - \lfloor \frac{1}{4} \rfloor = 0 = g(\frac{1}{4})$   
 $n=1 \Rightarrow f(1) = 0$   
 $g(1) = 0$

$f = \{ (1, 1), (2, 1), (3, 1), (0, 0) \}$  ,  $g = \{ (-1, 1), (1, 1), (2, 1), (3, 1), (0, 0), (\sqrt{0}, 0) \}$

(a)  $\left( \frac{f+g}{f-g} \right)(1) = \frac{f(1)+g(1)}{f(1)-g(1)} = \frac{1+1}{1-1} = \text{undefined}$

(b)  $f(2) = 1$   
 $g(2) = 1 \Rightarrow \frac{1+1}{1-1} = \frac{2}{0} \Rightarrow \text{undefined}$

(c)  $f(0) = 0$   
 $g(-1) = 1 \Rightarrow 0 \times 1 = 0$

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

(a)  $g(n) = f(n-1)$

$n-1 = 1 \Rightarrow n = 2 \rightarrow (2, 1)$   
 $n-1 = -1 \Rightarrow n = 0 \rightarrow (0, 0)$   
 $n-1 = 0 \Rightarrow n = 1 \rightarrow (1, 1)$   
 $n-1 = -2 \Rightarrow n = -1 \rightarrow (-1, 1)$   
 $n-1 = 2 \Rightarrow n = 3 \rightarrow (3, -1)$

$\Rightarrow g(n) = \{ (2, 1), (0, 0), (1, 1), (-1, 1), (3, -1) \}$

(a)  $h(n) = f(|n|)$

$|n| = 1 \Rightarrow (1, 1) \text{ and } (-1, 1)$   
 $|n| = -1 \Rightarrow \text{undefined}$   
 $|n| = 0 \Rightarrow (0, 0)$   
 $|n| = -2 \Rightarrow \text{undefined}$   
 $|n| = 2 \Rightarrow (2, -1) \text{ and } (-2, -1)$

$\Rightarrow h(n) = \{ (1, 1), (-1, 1), (0, 0), (2, -1), (-2, -1) \}$