

أولاً: $f(x) = \frac{x-1}{x}$

ثانياً: $f(x) = \frac{x-1}{x}$

ثالثاً: $f(x) = \frac{x-1}{x}$

1. $f(x) = \frac{x-1}{x} = \frac{x-1}{x} \rightarrow \frac{(x-1)^2 - x^2}{x^2 - x} \rightarrow \frac{x^2 + 1 - 2x - x^2}{x(x-1)} = \frac{1-2x}{x(x-1)}$

$D_f = (-\infty, 0) \cup [1, +\infty)$

2. $f(x) = \frac{1}{x-1} - \frac{1}{x} \quad (I) \ x \neq -1 \quad (II) \ x \neq 0$

$\frac{1}{x-1} + \frac{1}{x+1} \quad (III) \ \frac{1}{x-1} + \frac{1}{x+1} \neq 0 \rightarrow \frac{x^2 + 1 + x - 1}{(x-1)(x+1)} = \frac{x^2 + x}{(x-1)(x+1)} = \frac{x(x+1)}{(x-1)(x+1)} = \frac{x}{x-1}$

$D_f = \mathbb{R} - \{-1, 0, 1, -\frac{1}{2}, -\frac{1}{3}\}$

3. $f(x) = \sqrt{\left(\frac{1}{x}\right)^2 - 1} \quad (I) \ x \neq 0 \quad (II) \ x \neq \pm 1$

$\left(\frac{1}{x}\right)^2 = 1 \rightarrow x = \pm 1$

$D_f = (-\infty, -1] \cup [1, +\infty)$

4. $f(x) = \sqrt{x-1} + \sqrt{y+1} = 0 \rightarrow \sqrt{y+1} = -\sqrt{x-1} \rightarrow y = -x$

$\sqrt{x-1} \geq 0 \rightarrow x \geq 1$

$\sqrt{y+1} \geq 0 \rightarrow y \geq -1$

$I \cap II = [1, +\infty)$

5. $f(x) = \frac{\log_f(x^2 - x - 1)}{\sqrt{x^2 - 1}} \quad (I) \ x^2 - x - 1 > 0 \rightarrow (x-1)(x+1) > 0$

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

$D_f = (-\infty, -1) \cup (1, +\infty)$

(II) $\sqrt{x^2 - 1} \geq 0 \rightarrow x^2 \geq 1 \rightarrow x \geq 1, x \leq -1$

(III) $\sqrt{x^2 - 1} \neq -1 \rightarrow x^2 - 1 \neq 1 \rightarrow x^2 \neq 2 \rightarrow x \neq \pm \sqrt{2}$

$D_f = (-\infty, -1) \cup (1, +\infty)$

$$\sum_{k=1}^n \left(\frac{1}{k} \right) = \frac{-1 + \frac{1}{n}}{1} \leftarrow \frac{-1 + \frac{1}{n}}{1} \leftarrow \frac{-1 + \frac{1}{n}}{1} \leftarrow \frac{-1 + \frac{1}{n}}{1}$$

$$a+b \text{ des. } \cdot \text{ des. } \left[\left(\frac{1}{n} \right) b \right] \text{ des. } \sqrt{1+a^2-2a} \text{ des. } \left[\left(\frac{1}{n} \right) b \right] \text{ des.}$$

$$1 - 2a - 1 = 0 \rightarrow -1 - 2a = 0 \rightarrow -1 = 2a \rightarrow a = -\frac{1}{2}$$

$$a = -\frac{1}{2} \rightarrow -x^2 - \frac{1}{2}x + 1 > 0 \rightarrow x^2 + \frac{1}{2}x - 1 < 0 \rightarrow \Delta = \frac{1}{4} - (1 \cdot (-1)) \Rightarrow \frac{5}{4}$$

$$x = \frac{-\frac{1}{2} \pm \sqrt{\frac{5}{4}}}{2} \Rightarrow \left(-\frac{1}{2} \right), \left(\frac{1}{2} \right) \quad \frac{-1 \pm \sqrt{5}}{4} \Rightarrow \left[-\frac{1}{2}, \frac{1}{2} \right] \rightarrow b$$

$$g(x) = \sqrt{f(x) - x} \cdot \left[\begin{array}{l} 12x - 1 \\ 12x + 1 \end{array} \right] \left\{ \begin{array}{l} x \geq 1 \\ x < 1 \end{array} \right.$$

$$(I) 12x - 1 > x \rightarrow 11x > 1 \rightarrow x > \frac{1}{11}$$

$$(II) 12x + 1 > x \rightarrow x > -\frac{1}{11}$$

$$(I) \cup (II) = D_f = \left[\frac{1}{11}, +\infty \right)$$

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$$10a + 10 = 9a - 10 \rightarrow 10a = -20 \rightarrow a = \frac{-20}{10}$$

$f(x) = \sqrt{x} + \frac{1}{\sqrt{x}} + x$ می باشد
 $\underbrace{f(2-\sqrt{2})}_{(I)} + \underbrace{f(2+\sqrt{2})}_{(II)}$ در دو حد است.
 عکس اندازند $(2-\sqrt{2})(2+\sqrt{2}) = 1$

$$(E) \sqrt{x - \sqrt{y}} + \frac{1}{\sqrt{x - \sqrt{y}}} + y$$

$$\rightarrow \lambda(I) + (III) \Rightarrow \underbrace{r(\sqrt{r+\sqrt{r}} + \sqrt{r-\sqrt{r}})}_A + r'$$

$$A^T y$$

$$(II) \sqrt{r+\sqrt{r}} + \frac{1}{\sqrt{r+\sqrt{r}}} + r$$

$$\hookrightarrow 1\sqrt{4} + 1$$

[illegible]

$\xi \neq 1$

فرض $f(x) = x^2 - mx + m - 1$ دایره جیبست آویز.

$$\xrightarrow{r \rightarrow 0} \psi(r=0) = 0 \Rightarrow r f'(0) = \psi_{m-1} \rightarrow f'(0) = \left(\frac{\psi_{m-1}}{r} \right) \xrightarrow{m=9/4} \frac{rV}{r} - \frac{p}{r} = \frac{rA}{r}$$

$$\xrightarrow{x=-1} \psi_f(\cdot) = 1a + \omega m \rightarrow f(\cdot) = \frac{\omega m + 1a}{4}$$

$$\frac{r_m - 1}{r} = \frac{am + 1a}{a} \Rightarrow 11m - 4 = 10m + 10 \Rightarrow 11m = 14$$

$$m = \frac{14}{11} = \frac{9}{r}$$

$f(x) = \frac{1}{x^2}$, $f'(x) = -\frac{2}{x^3}$, $f''(x) = \frac{6}{x^4}$, $f'''(x) = -\frac{24}{x^5}$, $f^{(4)}(x) = \frac{120}{x^6}$, $f^{(5)}(x) = -\frac{720}{x^7}$, $f^{(6)}(x) = \frac{5040}{x^8}$, $f^{(7)}(x) = -\frac{35280}{x^9}$, $f^{(8)}(x) = \frac{282240}{x^{10}}$, $f^{(9)}(x) = -\frac{2520000}{x^{11}}$, $f^{(10)}(x) = \frac{25200000}{x^{12}}$, $f^{(11)}(x) = -\frac{277200000}{x^{13}}$, $f^{(12)}(x) = \frac{3326400000}{x^{14}}$, $f^{(13)}(x) = -\frac{43243200000}{x^{15}}$, $f^{(14)}(x) = \frac{584179200000}{x^{16}}$, $f^{(15)}(x) = -\frac{8218508800000}{x^{17}}$, $f^{(16)}(x) = \frac{123277632000000}{x^{18}}$, $f^{(17)}(x) = -\frac{2096903040000000}{x^{19}}$, $f^{(18)}(x) = \frac{40750169600000000}{x^{20}}$, $f^{(19)}(x) = -\frac{815003392000000000}{x^{21}}$, $f^{(20)}(x) = \frac{16300067840000000000}{x^{22}}$, $f^{(21)}(x) = -\frac{326001356800000000000}{x^{23}}$, $f^{(22)}(x) = \frac{6520027136000000000000}{x^{24}}$, $f^{(23)}(x) = -\frac{130400542720000000000000}{x^{25}}$, $f^{(24)}(x) = \frac{2608010854400000000000000}{x^{26}}$, $f^{(25)}(x) = -\frac{52160217088000000000000000}{x^{27}}$, $f^{(26)}(x) = \frac{1043204341760000000000000000}{x^{28}}$, $f^{(27)}(x) = -\frac{20864086835200000000000000000}{x^{29}}$, $f^{(28)}(x) = \frac{417281736704000000000000000000}{x^{30}}$, $f^{(29)}(x) = -\frac{8345634734080000000000000000000}{x^{31}}$, $f^{(30)}(x) = \frac{166912694681600000000000000000000}{x^{32}}$, $f^{(31)}(x) = -\frac{3338253893632000000000000000000000}{x^{33}}$, $f^{(32)}(x) = \frac{66765077872640000000000000000000000}{x^{34}}$, $f^{(33)}(x) = -\frac{1335301557452800000000000000000000000}{x^{35}}$, $f^{(34)}(x) = \frac{26706031149056000000000000000000000000}{x^{36}}$, $f^{(35)}(x) = -\frac{534120622981120000000000000000000000000}{x^{37}}$, $f^{(36)}(x) = \frac{10682412459622400000000000000000000000000}{x^{38}}$, $f^{(37)}(x) = -\frac{213648249192448000000000000000000000000000}{x^{39}}$, $f^{(38)}(x) = \frac{4272964983848960000000000000000000000000000}{x^{40}}$, $f^{(39)}(x) = -\frac{85459299676979200000000000000000000000000000}{x^{41}}$, $f^{(40)}(x) = \frac{1709185993539584000000000000000000000000000000}{x^{42}}$, $f^{(41)}(x) = -\frac{34183719870791680000000000000000000000000000000}{x^{43}}$, $f^{(42)}(x) = \frac{683674397415833600000000000000000000000000000000}{x^{44}}$, $f^{(43)}(x) = -\frac{13673487948316672000000000000000000000000000000000}{x^{45}}$, $f^{(44)}(x) = \frac{273469758966333440000000000000000000000000000000000}{x^{46}}$, $f^{(45)}(x) = -\frac{5469395179326668800000000000000000000000000000000000}{x^{47}}$, $f^{(46)}(x) = \frac{10938790358653337600000000000000000000000000000000000}{x^{48}}$, $f^{(47)}(x) = -\frac{218775807173066752000000000000000000000000000000000000}{x^{49}}$, $f^{(48)}(x) = \frac{4375516143461335040000000000000000000000000000000000000}{x^{50}}$, $f^{(49)}(x) = -\frac{87510322869226700800000000000000000000000000000000000000}{x^{51}}$, $f^{(50)}(x) = \frac{1750206457384534016000000000000000000000000000000000000000}{x^{52}}$, $f^{(51)}(x) = -\frac{350041291476906803200}{x^{53}}$, $f^{(52)}(x) = \frac{7000825829538136064000}{x^{54}}$, $f^{(53)}(x) = -\frac{14001651659076272128000}{x^{55}}$, $f^{(54)}(x) = \frac{28003303318152544256000}{x^{56}}$, $f^{(55)}(x) = -\frac{5600660663630508851200}{x^{57}}$, $f^{(56)}(x) = \frac{11201321327261017702400}{x^{58}}$, $f^{(57)}(x) = -\frac{224026426545220354048000}{x^{59}}$, $f^{(58)}(x) = \frac{44805285309044070809600}{x^{60}}$, $f^{(59)}(x) = -\frac{89610570618088141619200}{x^{61}}$, $f^{(60)}(x) = \frac{1792211412361762832384000}{x^{62}}$, $f^{(61)}(x) = -\frac{358442282472352566476800}{x^{63}}$, $f^{(62)}(x) = \frac{7168845649447051329536000}{x^{64}}$, $f^{(63)}(x) = -\frac{1433769129889410265907200}{x^{65}}$, $f^{(64)}(x) = \frac{28675382597788205318144000}{x^{66}}$, $f^{(65)}(x) = -\frac{5735076519557641063628800}{x^{67}}$, $f^{(66)}(x) = \frac{114701530391152821272576000}{x^{68}}$, $f^{(67)}(x) = -\frac{2294030607823056425451520000000000000000$

$$r_f(-1) \Rightarrow \frac{r + 1r + r}{-1} \Rightarrow -1\lambda = r_f(-1)$$

$$f(-1) = \frac{-1}{1} = -1$$