

أشكال: $\frac{1}{x^2-1}$

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

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

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

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

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

3. $f(x) = \sqrt{\left(\frac{1}{x^2} - 1\right)(x^2 - x^2)} \rightarrow \frac{-x}{x^2 - x^2} \rightarrow \frac{-x}{0}$ $D_f = [-\infty, -1] \cup [1, +\infty)$

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

4. $\sqrt{x-1} + \sqrt{y+1} = 1 \rightarrow \sqrt{y+1} = 1 - \sqrt{x-1} \rightarrow 1 - \sqrt{x-1} \geq 0 \rightarrow 1 \geq \sqrt{x-1}$

$\frac{x}{x-1} \geq 1$ (I) $x \leq 1$ (II) $\sqrt{x-1} \geq 0 \rightarrow x \geq 1$

$I \cap II = [1, 1]$

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

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

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

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

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

$$kf(a+1) = w_a - f + a$$

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

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

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

[illegible]

$f(x) = \frac{1}{x}$ $f'(x) = -\frac{1}{x^2}$ $f''(x) = \frac{2}{x^3}$ $f'''(x) = -\frac{6}{x^4}$ $f^{(4)}(x) = \frac{24}{x^5}$ $f^{(5)}(x) = -\frac{120}{x^6}$ $f^{(6)}(x) = \frac{720}{x^7}$ $f^{(7)}(x) = -\frac{5040}{x^8}$ $f^{(8)}(x) = \frac{40320}{x^9}$ $f^{(9)}(x) = -\frac{362880}{x^{10}}$ $f^{(10)}(x) = \frac{3628800}{x^{11}}$ $f^{(11)}(x) = -\frac{42336000}{x^{12}}$ $f^{(12)}(x) = \frac{548160000}{x^{13}}$ $f^{(13)}(x) = -\frac{7321920000}{x^{14}}$ $f^{(14)}(x) = \frac{113145600000}{x^{15}}$ $f^{(15)}(x) = -\frac{1901472000000}{x^{16}}$ $f^{(16)}(x) = \frac{34426496000000}{x^{17}}$ $f^{(17)}(x) = -\frac{644103430400000}{x^{18}}$ $f^{(18)}(x) = \frac{13526172032000000}{x^{19}}$ $f^{(19)}(x) = -\frac{286047572672000000}{x^{20}}$ $f^{(20)}(x) = \frac{6441034304000000000}{x^{21}}$ $f^{(21)}(x) = -\frac{145703766784000000000}{x^{22}}$ $f^{(22)}(x) = \frac{3442649600000000000000}{x^{23}}$ $f^{(23)}(x) = -\frac{82623590400000000000000}{x^{24}}$ $f^{(24)}(x) = \frac{2065589760000000000000000}{x^{25}}$ $f^{(25)}(x) = -\frac{51639744000000000000000000}{x^{26}}$ $f^{(26)}(x) = \frac{1315993600000000000000000000}{x^{27}}$ $f^{(27)}(x) = -\frac{34115833600000000000000000000}{x^{28}}$ $f^{(28)}(x) = \frac{872911673600000000000000000000}{x^{29}}$ $f^{(29)}(x) = -\frac{22183702400000000000000000000000}{x^{30}}$ $f^{(30)}(x) = \frac{554592550400000000000000000000000}{x^{31}}$ $f^{(31)}(x) = -\frac{14114814720000000000000000000000000}{x^{32}}$ $f^{(32)}(x) = \frac{352870368000000000000000000000000000}{x^{33}}$ $f^{(33)}(x) = -\frac{8821759232000000000000000000000000000}{x^{34}}$ $f^{(34)}(x) = \frac{220544030720000000000000000000000000000}{x^{35}}$ $f^{(35)}(x) = -\frac{5513600768000000000000000000000000000000}{x^{36}}$ $f^{(36)}(x) = \frac{137840019200000000000000000000000000000000}{x^{37}}$ $f^{(37)}(x) = -\frac{3446000480000000000000000000000000000000000}{x^{38}}$ $f^{(38)}(x) = \frac{86150012160000000000000000000000000000000000}{x^{39}}$ $f^{(39)}(x) = -\frac{2153750304000000000000000000000000000000000000}{x^{40}}$ $f^{(40)}(x) = \frac{53843757696000000000000000000000000000000000000}{x^{41}}$ $f^{(41)}(x) = -\frac{1346093943040000000000000000000000000000000000000}{x^{42}}$ $f^{(42)}(x) = \frac{33652348576000000000000000000000000000000000000000}{x^{43}}$ $f^{(43)}(x) = -\frac{84130871436800000000000000000000000000000000000000}{x^{44}}$ $f^{(44)}(x) = \frac{2099271785728000000000000000000000000000000000000000}{x^{45}}$ $f^{(45)}(x) = -\frac{524817946432000}{x^{46}}$ $f^{(46)}(x) = \frac{131204486668800}{x^{47}}$ $f^{(47)}(x) = -\frac{32801121667200}{x^{48}}$ $f^{(48)}(x) = \frac{820028041625600}{x^{49}}$ $f^{(49)}(x) = -\frac{205007010406400}{x^{50}}$ $f^{(50)}(x) = \frac{51251752601600}{x^{51}}$ $f^{(51)}(x) = -\frac{128129381504000}{x^{52}}$ $f^{(52)}(x) = \frac{3203234537600}{x^{53}}$ $f^{(53)}(x) = -\frac{80080863436800}{x^{54}}$ $f^{(54)}(x) = \frac{200202158600}{x^{55}}$ $f^{(55)}(x) = -\frac{5005053965000}{x^{56}}$ $f^{(56)}(x) = \frac{12512634912500}{x^{57}}$ $f^{(57)}(x) = -\frac{312815872812500}{x^{58}}$ $f^{(58)}(x) = \frac{7820396820312500}{x^{59}}$ $f^{(59)}(x) = -\frac{195509920507812500}{x^{60}}$ $f^{(60)}(x) = \frac{4887748012695312500}{x^{61}}$ $f^{(61)}(x) = -\frac{122193700317382812500}{x^{62}}$ $f^{(62)}(x) = \frac{30548425079345703125000}{x^{63}}$ $f^{(63)}(x) = -\frac{7637106269836428125000}{x^{64}}$ $f^{(64)}(x) = \frac{19092765674591062500}{x^{65}}$ $f^{(65)}(x) = -\frac{477319141864776562500}{x^{66}}$ $f^{(66)}(x) = \frac{11932978546619414062500}{x^{67}}$ $f^{(67)}(x) = -\frac{2983244636654853515625000000000000$

$f(x) + f\left(\frac{1}{x}\right) = \frac{x^3 + 11x + 10}{x}$ $\Rightarrow$ $f(x) = ax + b$ $\Rightarrow$ $f(-1) = -11$ $\Rightarrow$ $f(1) = -11$ $\Rightarrow$ $f(1) = -11$ $\Rightarrow$ $f(1) = -11$