

$$x^3 f(x+1) > 0 \rightarrow x^3 \left[\left(\frac{1}{x} \right)^{x-1} - 1 \right] > 0 \quad \left(\frac{1}{x} \right)^{x-1} = 1 \rightarrow \left(\frac{1}{x} \right)^{x-1} = 1 \rightarrow x = 1$$

$$D = [0, 1]$$

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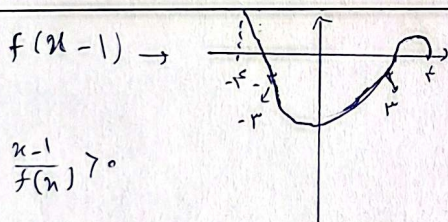
$$f(-x) = \sqrt{-x + |x - x|} \rightarrow -x + |x - x| > 0 \rightarrow |x - x| > x$$

$$\rightarrow (x - x)^2 > x^2 \rightarrow x^2 + x^2 - 2x > x^2 \rightarrow x(1 - x) > 0$$

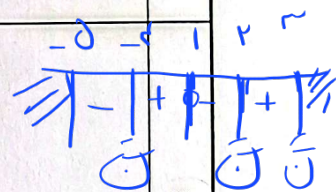
$$D = (-\infty, 1]$$

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$$f(x-1) \rightarrow \begin{cases} -3 \leq x \leq 5 & f(x-1) \geq 1 \\ -3 \leq x \leq 3 & f(x-1) \leq 0 \\ -4 \leq x \leq -3 & f(x-1) > 0 \end{cases}$$



$$D = (1 \cap 4) \cup (2 \cap 5) \cup (3 \cap 6) = [-3, 2]$$

$$D_f = (-3, 1] \cup (1, 3)$$

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$$9x^2 - 4x^2 - 4x - 3 = (3x^2 - 1)^2 - (x+2)^2 = (3x^2 - 1 + x + 2)(3x^2 - 1 - x - 2) =$$

$$(3x^2 + x + 1)(3x^2 - x - 3) \Rightarrow 3x^2 + ax + b = 3x^2 - x - 3$$

$$b^2 - 4ac = 1 - 4(3)(-3) < 0 \rightarrow a = -1 \quad b = -3 \rightarrow \sqrt{-(a+b)} = \sqrt{-(-1-3)} = \sqrt{4}$$

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$$f(x) - f\left(\frac{x}{n}\right) > 0 \quad f(n) = f\left(\frac{x}{n}\right) \rightarrow \frac{x}{n} = n \rightarrow x = n^2 \rightarrow x = \pm 2$$

$$n = 2 \rightarrow f(2) = 4 \cdot 2 + 2 \rightarrow f(2) - f(1) = 4 \cdot 2 + 2 - 2 > 0$$

$$D = [2, +\infty) \cup \{-2\}$$

$$n = -2 \rightarrow f(-2) = -4 \cdot (-2) - 2 \rightarrow f(-2) - f(-1) = -4 \cdot (-2) - 2 - (-1) < 0$$

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$$x^r + u = r \rightarrow u = 1 \rightarrow f(r) = r - 1 = 1 \rightarrow v + 1 = \boxed{1}$$

$$x^r + u = 1 \rightarrow u = r \rightarrow f(1) = r(r^r) - 1 = v$$

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$$f(u) = x^r - 9u^r + 17u - 1 + 1 = (u-4)^r + 1$$

$$g(u) = x^r + 9u^r + 17u + 17 - 17 = (u+3)^r - 17$$

$$g(\sqrt[3]{v}-3) = (\sqrt[3]{v}-3)^r - 17 = v - 17 \sqrt[3]{v} = v - 17 \sqrt[3]{-2} \rightarrow \frac{g(\sqrt[3]{v}-3)}{f(\sqrt[3]{v}+2)} = \frac{-17}{1} = \boxed{-17}$$

$$f(\sqrt[3]{v}+2) = (\sqrt[3]{v}+2)^r + 1 = 1 + 1 = 2 \rightarrow \frac{g(\sqrt[3]{v}-3)}{f(\sqrt[3]{v}+2)} = \frac{-17}{2} = \boxed{-\frac{17}{2}}$$

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$$f(u) = \sqrt{(\sqrt{n-4}+2)^r} = \sqrt{n-4} + 2$$

$$g(u) = \sqrt{(\sqrt{n-4}-2)^r} = |\sqrt{n-4}-2|$$

$$a + b\sqrt{n+c} = r\sqrt{n-4} \rightarrow \begin{matrix} a=0 \\ b=r \\ c=-4 \end{matrix} \rightarrow \frac{a+b}{c} = \frac{0+r}{-4} = \boxed{-\frac{1}{4}}$$

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$$f(r) = \frac{r}{r-1+r} = -\frac{r}{r} \quad \frac{g}{f} = \left\{ (r, -\frac{r}{r}), (0, 1) \right\}$$

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

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

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

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$$f(rn) = \left\{ \left(\frac{1}{2}, 2\right), \left(\frac{3}{2}, -1\right), (2, 2), \left(\frac{5}{2}, 4\right) \right\}$$

$$f(x) = (1, 2)(-1, 2)(\sqrt{3}, -1)(-\sqrt{3}, -1)(r, 2)(-r, 2)$$

$$r g^r(u) + 1 = \left\{ (-2, 19)(1, 3)(3, 9)(-1, 1) \right\}$$

$$\frac{f}{g} = \left\{ (1, -2), (3, -\frac{1}{2}), (-1, \frac{4}{3}) \right\} \rightarrow \frac{f}{g} = \left\{ (1, -4)(3, -1) \right\}$$

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$$\frac{(a^{\frac{1}{2}}r)(a^{\frac{1}{2}}r+14)}{a^{\frac{1}{2}}} \gg \cdot \quad Df = [-r, \cdot) \cup (r, +\infty)$$

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$$\begin{array}{c} -\frac{1}{2} \quad \quad \quad \frac{1}{2} \\ \hline -\frac{1}{2} + \frac{1}{2} \quad \quad -\frac{1}{2} + \frac{1}{2} \end{array}$$