

$$\sqrt{x^2 f(x+1)} > 0$$

$$\begin{cases} x=0 \\ f(x+1)=0 \rightarrow \left(\frac{1}{x}\right)^{x-1} - 1 = 0 \cdot \left(\frac{1}{x}\right)^{x-1} = 1 \quad x=1 \end{cases}$$

$x > 0$
 $\hookrightarrow x < 1 \quad f(x+1) > 0 \quad \checkmark \rightarrow D_f = [0, 1] \quad \checkmark$
 $x > 1 \quad f(x+1) < 0 \quad \times$
 $x < 0$
 $\hookrightarrow x < -1 \quad f(x+1) > 0 \quad \times$
 $x > -1 \quad \text{و}$

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$$\sqrt{x+|x+2|} \geq 0$$

$$\begin{cases} x \geq -2 & x+2 \geq 0 \\ x < -2 & -x-2 \geq 0 \end{cases} \rightarrow x \geq -1 \rightarrow f(-x) \rightarrow (-x) \leq 1$$

$$D_f = (-\infty, 1] \quad \checkmark$$

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$$\frac{x-1}{f(x)} \geq 0$$

$x \geq 1$
 $\hookrightarrow 1 < x < 2 \quad \ominus$
 $2 < x < 3 \quad \oplus \quad \checkmark$
 $x > 3 \quad \ominus$

$x < 1$
 $-x < 1 \quad -x-2 < 0 \quad \oplus$
 $x < -2 \quad -x-2 > 0 \quad \ominus$
 $x > -2 \quad -x-2 < 0 \quad \oplus$

$$(-2, 1] \cup (2, 3) \quad \checkmark$$

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$$\frac{1}{(x^2-x-3)(x^2+x+1)} \geq 0$$

$$\sqrt{-(a+b)} = \sqrt{-(-1)} = 1 \quad \checkmark$$

$\hookrightarrow x^2+ax+b \quad a=-1 \quad b=-3 \quad \checkmark$

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$$f(x) - f\left(\frac{1}{x}\right) =$$

$$x^2+x - \left(\frac{x^2}{x^2} + \frac{1}{x}\right) = \frac{x^4+x^3-x^2-1}{x^3} \geq 0$$

$$(x^2+x+1)(x^2-1) \geq 0$$

$$\rightarrow 0, -2, 2$$

$$[-2, 0) \cup [2, +\infty) \quad \checkmark$$

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$$L(n^r + m) = n^r - 1$$

$$L(r) \rightarrow n^r + m = r \quad n^r + m - r = 0 \quad (n-1)(n^r + m + r) \quad m=1$$

$$\rightarrow L(r) = 1$$

$$L(1) \rightarrow n^1 + m - 1 = 0 \quad m=1$$

$$L(r) + L(1) = 1 \quad \checkmark$$

$$\rightarrow L(1) = 1$$

$$(a+r)^n - 4(a+r)^r + 17(a+r) = a^n + 11 = 10$$

$$\frac{g}{L} = \frac{-r}{1} = -r \quad \checkmark$$

$$(b-r)^r + 9(b-r) + 17(b-r) = b^r + 17b + 9$$

$$g(\sqrt[n]{v} - r) \rightarrow g(\sqrt[n]{v} - r) = (\sqrt[n]{v} - r + r)^r - rv = v - rv = -rv$$

$$\sqrt{n + \epsilon} \sqrt{n - \epsilon} + \epsilon - \epsilon$$

$$L(a) + L(g) = \sqrt{(a-\epsilon+r)^2} + \sqrt{(a-\epsilon-r)^2} = r\sqrt{a-\epsilon} = a + b\sqrt{a+c}$$

$$\begin{matrix} c = -\epsilon \\ a = 0 \\ b = r \end{matrix} \quad \frac{a+b}{-\epsilon} = -\frac{1}{r} \quad \checkmark$$

$$g = (n-3)(n-1)$$

$$D_L = \mathbb{R} - \{1, 3\}$$

$$\frac{g}{L} \rightarrow \left\{ \left(r, \frac{1}{r} \right), (0, 9) \right\} \quad \checkmark$$

$$L(m) = \left\{ \left(\frac{1}{r}, m \right), (r, m), \left(\frac{m}{r}, -1 \right), \left(-\frac{1}{r}, m \right) \right\} \quad \checkmark$$

$$L(a^r) = \left\{ (1, r), (\sqrt{r}, -1), (-1, r), (-\sqrt{r}, -1), (-r, r), (r, r) \right\} \quad \checkmark$$

$$r g^r(a) + 1 = \left\{ (-r, 19), (1, 3), (r, 9), (-1, 1) \right\} \quad \checkmark$$

$$\frac{rL}{g} = \left\{ (1, -\epsilon), (-1, \epsilon), (r, -1) \right\} \quad \checkmark$$