

$$1) \log_{x-r}^{a-x} \Rightarrow a-x > 0 \Rightarrow x < a \Rightarrow D_f = (r, a) - \{r\}$$

$$x-r > 0 \Rightarrow x > r$$

$$x-r \neq 1 \Rightarrow x \neq r$$

$$2) \log_{x+r}^{x^r-1} \Rightarrow x^r-1 > 0 \Rightarrow x^r > 1 \Rightarrow x > 1, x < -1$$

$$x+r > 0 \Rightarrow x > -r \Rightarrow (-r, -1) \cup (1, +\infty) - \{-r\}$$

$$x+r \neq 1 \Rightarrow x \neq -r$$

$$1) \log_{\frac{x^r-1}{x-r}}^{x^r-1} \Rightarrow \frac{x^r-1}{x-r} > 0 \Rightarrow \frac{(x-r)(x-1)}{x-r} > 0 \Rightarrow \frac{x-1}{1} > 0 \Rightarrow [1, r) \cup (r, +\infty)$$

$$2) \log_{x+a}^{x+r} \Rightarrow \frac{x+r}{x-r} > 0 \Rightarrow \frac{-r}{r} > 0 \Rightarrow (-a, -r] \cup (r, +\infty) - \{-r\}$$

$$x+a > 0 \Rightarrow x > -a$$

$$x+a \neq 1 \Rightarrow x \neq -a$$

$$1) \sqrt{r} - \log_r^{(x-r)} \Rightarrow r - \log_r^{(x-r)} \geq 0 \Rightarrow \log_r^{(x-r)} \leq r \Rightarrow (x-r) \leq r \Rightarrow x \leq 1$$

$$x-r > 0 \Rightarrow x > r \Rightarrow D_f = (r, 1]$$

$$2) \log(r \log_r^x - 1) \Rightarrow r \log_r^x - 1 > 0 \Rightarrow r \log_r^x > 1 \Rightarrow \log_r^x > \frac{1}{r} \Rightarrow x > r^{\frac{1}{r}} \Rightarrow x > \sqrt[r]{r}$$

$$D_f = (\sqrt[r]{r}, +\infty)$$

$$1) \frac{r}{f^x+1} \Rightarrow f^x+1 \neq 0 \Rightarrow f^x \neq -1 \Rightarrow D_f = \mathbb{R}$$

$$2) \frac{r}{f^{x-1}} \Rightarrow f^{x-1} \neq 0 \Rightarrow f^x \neq 1 \Rightarrow x \neq 0 \Rightarrow \mathbb{R} - \{0\}$$

$$3) \frac{r}{f^{x-r}} \Rightarrow f^{x-r} \neq 0 \Rightarrow f^x \neq r \Rightarrow \mathbb{R} - \{\log_r^r\}$$

$$4) \frac{r}{f^{x-r}} \Rightarrow f^{x-r} \neq 0 \Rightarrow f^x \neq r \Rightarrow \mathbb{R} - \{\log_r^r\}$$

$$1) (fx+1)! \Rightarrow fx+1 \in \mathbb{N} \Rightarrow fx \in \mathbb{N}-1 \Rightarrow x \in \frac{\mathbb{N}-1}{f} \Rightarrow \{x \mid x = \frac{k-1}{f}, k \in \mathbb{N}\}$$

$$2) \left(\frac{rx-r}{rx-a} \right)! = \mathbb{N} \Rightarrow rx-r = rxw - aw \Rightarrow rx - rxw = r - aw \Rightarrow$$

$$x(r-rw) = r - aw \Rightarrow x = \frac{r-aw}{r-rw} \Rightarrow \{x \mid x = \frac{r-ak}{r-rk}, k \in \mathbb{N}\}$$