

19, 10

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$$f(x) = r^{Ax+B} \rightarrow f(1) = r^{A+B} = 1$$

$$f(2) = r^{2A+B} = 9$$

$$\begin{aligned} A+B &= 0 \\ rA+B &= 2 \\ \hline rA &= 2 \rightarrow A=1, B=-1 \end{aligned}$$

$$f(0) = r^{-1} = \left(\frac{1}{r}\right)$$

$$\log_{\frac{1}{r}}(x^n + a) = n + c \rightarrow x^n + a = r^{n+c} \rightarrow r^n - r^{n+c} + a = 0$$

$$(r^n)^r - Ax^r + a = 0 \rightarrow (r^n - c)(r^n - a) = 0 \rightarrow r^n = c \rightarrow n = \log_{\frac{1}{r}} c$$

$$\log_{\frac{1}{r}} c + \log_{\frac{1}{r}} a = \log_{\frac{1}{r}} ca$$

$$\left(\log_{\frac{1}{r}} r\right)^r + \log_{\frac{1}{r}} r \log_{\frac{1}{r}} r = \left(\log_{\frac{1}{r}} r\right)^r + \left(\log_{\frac{1}{r}} r + \log_{\frac{1}{r}} r\right) \left(\log_{\frac{1}{r}} r + r \log_{\frac{1}{r}} r\right)$$

$$\Rightarrow \log_{\frac{1}{r}} r = 1 - \log_{\frac{1}{r}} r$$

$$\left(\log_{\frac{1}{r}} r\right)^r + (r - \log_{\frac{1}{r}} r)(r + \log_{\frac{1}{r}} r) = \left(\log_{\frac{1}{r}} r\right)^r + r - \left(\log_{\frac{1}{r}} r\right)^r = r$$

$$\log_{\frac{1}{r}}(n^r - n + 1) + c \log_{\frac{1}{r}}(1-x) = a$$

$$\log_{\frac{1}{r}}(1-x)^r + c \log_{\frac{1}{r}}(1-x) = a \rightarrow a \log_{\frac{1}{r}}(1-x) = a \rightarrow \log_{\frac{1}{r}}(1-x) = 1$$

$$\Rightarrow 1-x = 1 \rightarrow x = 0$$

$$\log_{\frac{1}{r}}(-x) = \log_{\frac{1}{r}} 1 = 0$$

$$\log_r^r = \frac{a}{\Lambda} \quad \log_{\Lambda}^{\Lambda} = \frac{\log_r^{\Lambda}}{\log_r^{\Lambda}} = \frac{r}{\log_r^a + \log_r^r} \quad (8)$$

$$\rightarrow \frac{r}{r \log_r^r + 1} = \frac{r}{r \times \frac{a}{\Lambda} + 1} = \left(\frac{\Lambda}{\Lambda} \right) \quad (5)$$

$$\log_{1r}^4 = \frac{\log_r^4}{\log_r^{1r}} = \frac{\log_r^r + \log_r^r}{\log_r^r + \log_r^r} \quad (9)$$

$$\rightarrow \frac{1/4 + 1}{1/4 + r} = \left(\frac{1r}{1\Lambda} \right)$$

$$\log_{\Sigma}^r = 0/\Lambda \rightarrow \frac{1}{r} \log_r^r = 0/\Lambda$$

$$\log_r^r = 1/r$$

$$x = -1 \rightarrow a \log_r r - a + b \log_r r = 0 \rightarrow \log_r r = y \quad (10)$$

$$ay - a + by = 0 \rightarrow y - 1 + \frac{b}{a} y = 0 \rightarrow y - \frac{b}{a} = 1$$

$$\rightarrow 1 - \frac{b}{a} = \frac{1}{\log_r r} \rightarrow 1 - \frac{b}{a} = \log_r 1 \rightarrow 1 - \frac{b}{a} = 1 + \log_r a$$

$$\rightarrow \frac{b}{a} = -\log_r a \quad \sqrt{r}^{\frac{b}{a}} = \sqrt{r}^{-\log_r a} = a + \log_r \sqrt{r} = a + \frac{1}{r}$$

$$\frac{1}{\sqrt{a}} = \left(\frac{\sqrt{a}}{a} \right) \quad \sqrt{a}$$