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$$\log_{mn}^{mn} = \log_{mn}^{mn} + \log_{mn}^m = 1 + \log_{mn}^m = b$$

$$\log_{mn}^m = \log_n^m \div \log_n^{mn} = a \div (\log_n^n + \log_n^m) = a \div 1+a = \frac{a}{1+a}$$

$$b = \frac{a}{1+a} \xrightarrow{a>0} 0 < \frac{a}{1+a} < 1 \rightarrow 0 < b < 1 \rightarrow [b] = 0 \text{ صفر}$$

$$\log_{\frac{x}{1}}^x > 0 \xrightarrow{x>0} \log_{\frac{1}{x}}^x > 0 \rightarrow x < \frac{1}{x} \rightarrow x < 1 \rightarrow 0 < x < 1$$

$$x^2 - x - 2 > 0 \rightarrow (x-2)(x+1) \rightarrow \begin{matrix} - & + & - & + \\ 2 & 0 & -1 & +1 \end{matrix} \quad \text{و} \quad x^2 - 1 > 0 \rightarrow \begin{matrix} - & + & - & + \\ 1 & 0 & -1 & +1 \end{matrix}$$

$$\sqrt{x^2 - 1} + 1 \neq 0 \rightarrow \text{همراه برقرار} \Rightarrow \text{استقرار} = (-\infty, -1) \cup (2, +\infty)$$

$$2 \log_c^a + \log_a^c = \frac{2}{c} \log_c^a + \frac{1}{\log_a^c} = 2 \quad \times \log_c^a \rightarrow (\log_c^a)^2 - 2 \log_c^a + 1 = 0$$

$$\log_c^a = t \rightarrow t^2 - 2t + 1 = 0 \rightarrow (t-1)^2 = 0 \rightarrow t = 1 = \log_c^a \rightarrow$$

$$\rightarrow \log_c^a = 1 \rightarrow \boxed{a=c} \checkmark$$

$$\log^1 - \log^2 = \log^{\frac{1}{2}} \quad \left[\log^0 = 1 \cdot 10 = 10 \right] \rightarrow \log^0 - \log^3 = \log^{\frac{0}{3}} = 10 \cdot 10 = 100$$

$$, \log^9 = \log^{c^2} = 2 \log^3 = 2 \cdot 10 \cdot 10 = 200 \quad \left[10 = \log^9 \right], \log^{10} = \log^c + \log^0 =$$

$$= 100 + 10 = 110 = \log^{10} \rightarrow 100x^2 + 10x - 11 = 0 \quad \text{مع ضرایب} \quad x_1 = \frac{11}{10}, x_2 = -\frac{1}{10}$$

$$1 - (-\frac{11}{10}) = 1 + \frac{11}{10} = \frac{21}{10} \checkmark$$

$$\log^0 \times \log^2 = \log^0 = 10 \rightarrow \log^0 + \log^2 = \log^{10} = 100 \quad \text{و} \quad \log^0 + \log^2 = \log^{10} = 100$$

$$\frac{\log^{10}}{\log^0} = \frac{100}{10} = 10 \quad \text{و} \quad \frac{100}{10} = \frac{100}{10} = 10 \quad \text{و} \quad \frac{100}{10} = 10$$

اولی را منفرجه!

$$\log_a \log_r^c = \left[\frac{1}{r/c} \log_a \frac{a}{r} \right] \rightarrow \log_r^a + \log_r^c = \left[\log_r^{10} = 5 \right]$$

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$$\log_r^a - \log_r^c = \log_r^{\frac{a}{c}} = \log_r^c \rightarrow \boxed{\log_r^a = 2/c}$$

$$\frac{\log_r^a}{\log_r^{10}} = \log_{10}^a = \frac{2/c}{5} = \frac{1/c}{5} = \frac{1}{5c} \checkmark$$

$$\log_r^{11} = \log_r^{c^r} + \log_r^r = \frac{r}{c} \log_r^c + \frac{1}{c} = m \rightarrow \frac{r}{c} \log_r^c = m - \frac{1}{c} = \frac{cm-1}{c}$$

$$\rightarrow \boxed{\log_r^c = \frac{cm-1}{r}} \rightarrow \log_r^{12} = \log_r^{\frac{c^3}{r}} + \log_r^r = \frac{1}{r} \log_r^c + 1 = 1 + \frac{cm-1}{r} \times \frac{1}{r}$$

$$= 1 + \frac{cm-1}{r} = \frac{cm+c}{r} \checkmark$$

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$$\left(\frac{r}{a} \right)^{rx-1} = \left(\frac{a}{r^c} \right)^{2x} \rightarrow \frac{r^{rx-1}}{a} = \frac{a^{2x}}{r^{2cx}} \xrightarrow[\text{وسطین}]{\text{طرفین}} a^{cx^2-2x-1} = r^{2cx^2-2x-1}$$

$$\rightarrow a^0 = r^0 \rightarrow cx^2 - 2x - 1 = 0 \xrightarrow[\text{برابر با صفر}]{\text{معادله درجه دوم}} x_1 = 1, x_2 = \frac{1}{c} \checkmark$$

$$\log_1^{(4 \times \frac{1}{c} + 1)} = \log_1^c = \log_r^{\frac{r^2}{c}} = \frac{r}{c} \checkmark$$

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$$\log_r^b = \frac{r}{c} (1 + \log_r^c) = \log_r^{\sqrt{b}^2} = \frac{r}{c} \log_r^{\sqrt{b}} \rightarrow \frac{r}{c} (1 + \log_r^c) = \frac{r}{c} \log_r^{\sqrt{b}} \rightarrow$$

$$\rightarrow \log_r^{\sqrt{b}} = 1 + \log_r^c = \log_r^r + \log_r^c = \log_r^4 \rightarrow \sqrt{b} = 4 \rightarrow b = 16$$

$$\log^{cb-1} = \log^{(1 \cdot 1 - 1)} = \log^{1 \dots} = (2) \checkmark$$

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$$\frac{b+c}{r} = a \rightarrow \frac{-b}{-ra} = \frac{b}{rb+rc} \rightarrow \frac{rb+rc}{b} = \log_r^r \rightarrow r + \frac{rc}{b} = 2 \log_r^r$$

$$\rightarrow r + \frac{rc}{b} = \log_r^r \rightarrow \frac{rc}{b} = \log_r^r - \log_r^{10}$$

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$$m = n^a$$

$$\lg_{mn}^{mr} = b \rightarrow \lg_{n^{a+1}}^{n^{ra+1}} = b \rightarrow \frac{ra+1}{a+1} = b$$

$$b = \frac{ra+1+1}{a+1} - 1 = r - \frac{1}{a+1} \xrightarrow{a > 0} [b] = \boxed{1}$$

$$\lg_{17}^{10} = \frac{\lg_r^{10}}{\lg_r^{17}} = \frac{\lg_r^{10} + \lg_r^r}{\lg_r^r + \lg_r^r} = \frac{r+1}{r, n+1} = \frac{r}{r, n} = \boxed{\frac{18}{19}}$$

$$\lg_r^{10} = \frac{1}{\lg_r^r} = r$$

$$a = \frac{b+c}{r} \rightarrow b = ra - c$$

$$\frac{1}{n_1 + n_2} = \frac{1}{5} = \frac{ra}{b} = \frac{ra}{ra-c} = \lg r = r \lg r \rightarrow \frac{ra}{ra-c} = \lg r$$

$$\xrightarrow{\text{cross}}, \frac{ra-c}{ra} = \lg_r^{10} \rightarrow 1 - \lg_r^{10} = \frac{c}{ra} \rightarrow r - \lg_r^{10} = \frac{c}{a}$$

$$(r^{-\frac{1}{n}})^{\frac{c}{a}} = (r^{\frac{c}{a}})^{\frac{1}{n}} = (r^{r - \lg_r^{10}})^{\frac{1}{n}} = \left(\frac{r}{10}\right)^{\frac{1}{n}} = \omega^{\frac{1}{r}} = \boxed{\sqrt[r]{\omega}}$$