

Logarithm of a number

Homework

№1. Find the value of an expression:

$$1. \quad \log_3 \log_{\frac{1}{5}} \frac{1}{125};$$

$$3. \quad \frac{\log_7 27 - 2 \log_7 3}{\log_7 45 + \log_7 0.2};$$

$$5. \quad \frac{3 \lg 4 + \lg 0.5}{\lg 9 - \lg 18};$$

$$2. \quad \log_{\frac{1}{3}} \log_4 64;$$

$$4. \quad \frac{\log_9 125 + 3 \log_9 2}{\log_9 1.2 - \log_9 12};$$

$$6. \quad \frac{\lg 625 - 8 \lg 2}{\frac{1}{2} \lg 256 - 2 \lg 5}.$$

№2. Prove the following properties of a logarithm:

$$1. \quad a^{\log_b c} = c^{\log_b a};$$

$$2. \quad \log_b a \cdot \log_d c = \log_b c \log_d a.$$

№3. Find the value of an expression:

$$1. \quad 5^{\frac{4}{\log_{\sqrt{3}} 5} + \frac{1}{2} \log_5 4} + 36 \log_2 \sqrt[4]{2 \sqrt[3]{2}};$$

$$2. \quad 6^{\frac{6}{\log_{\sqrt{2}} 6} + \frac{1}{3} \log_6 27} - 12 \log_7 \sqrt[5]{7 \sqrt[4]{7}}.$$

№4. Simplify:

$$1. \quad \frac{1 - \log_a^3 b}{(\log_a b + \log_b a + 1) \log_a \frac{a}{b}};$$

$$2. \quad \frac{\log_a ab (\log_b a - 1 + \log_a b)}{1 + \log_a^3 b};$$

№5. Prove that the expression's value is equal to a whole number:

$$1. \quad \log_{7+4\sqrt{3}} (7 - 4\sqrt{3});$$

$$2. \quad \log_{9-4\sqrt{5}} (9 + 4\sqrt{5});$$