

Mavzu: Ko'paytmaning, bo'linmaning va darajaning logarifmi

Xossalari (x, y, a, b, c musbat sonlar)

$$1. \log_a a = 1 \quad 2. \log_a 1 = 0 \quad 3. \log_a (x \cdot y) = \log_a x + \log_a y$$

$$4. \log_a (x / y) = \log_a x - \log_a y \quad 5. \log_a x^n = n \cdot \log_a x$$

$$6. \log_a = \frac{\log_c x}{\log_c a}$$

$$7. a^{\log_a N} = N$$

$$8. \log_a b = \log_{a^k} b^k$$

$$9. \log_a b = \log_{a^k} b^n = \frac{n}{k} \log_a b$$

$$10. \log_a \sqrt[m]{x^n} = \frac{n}{m} \log_a x$$

$$11. a^{\log_c b} = b^{\log_c a}$$

$$12. \log_a b = \frac{1}{\log_b a}$$

$$13. a^{\sqrt{\log_c b}} = b^{\sqrt{\log_c a}}$$

9. Ҳисобланг:

1) $\log_8 12 - \log_8 15 + \log_8 20$;

2) $\log_9 15 + \log_9 18 - \log_9 10$;

3) $\frac{1}{2} \log_7 36 + \log_7 14 - 3 \log_7 \sqrt[3]{21}$;

4) $2 \log_{\frac{1}{3}} 6 - \frac{1}{2} \log_{\frac{1}{3}} 400 + 3 \log_{\frac{1}{3}} \sqrt[3]{45}$.

10. Ҳисобланг:

1) $\frac{\log_3 8}{\log_3 16}$;

2) $\frac{\log_5 27}{\log_5 9}$;

3) $\frac{\log_5 36 - \log_5 12}{\log_5 9}$;

4) $\frac{\log_7 8}{\log_7 15 - \log_7 30}$.

11. Ҳисобланг:

1) $\frac{\log_2 24 - \frac{1}{2} \log_2 72}{\log_3 18 - \frac{1}{3} \log_3 72}$;

2) $\frac{\log_7 14 - \frac{1}{3} \log_7 56}{\log_6 30 - \frac{1}{2} \log_6 150}$;

3) $\frac{\log_2 4 + \log_2 \sqrt{10}}{\log_2 20 + 3 \log_2 2}$;

4) $\frac{3 \log_7 2 - \frac{1}{2} \log_7 64}{4 \log_5 2 + \frac{1}{3} \log_5 27}$.

12. Ҳисобланг:

$$1) 36^{\log_6 5} + 10^{1 - \log_{10} 2} - 8^{\log_2 3};$$

$$2) (81^{\frac{1}{4} - \frac{1}{2} \log_9 4} + 25^{\log_{125} 8}) \cdot 49^{\log_7 2}.$$

$$3) \log_{36} 2 - \frac{1}{2} \log_{\frac{1}{6}} 3;$$

$$4) 2 \log_{25} 30 + \log_{0,2} 6.$$

$$5) 4 \log_{\frac{1}{2}} 3 - \frac{2}{3} \log_{\frac{1}{2}} 27 - 2 \log_{\frac{1}{2}} 6;$$

$$6) \frac{2}{3} \lg 0,001 + \lg \sqrt{1000} - \frac{3}{5} \lg \sqrt{100000}$$

13. Ҳисобланг:

$$1) 2 \log_2 3 \cdot \log_3 2 \cdot \log_3 1/81;$$

$$2) \sqrt{25^{\frac{1}{\log_6 5}} + 49^{\frac{1}{\log_8 7}}};$$

$$3) 36^{\log_6 5} + 10^{1 - \lg 2} - 3^{\log_6 36};$$

$$4) \frac{\lg(7 - 4\sqrt{3})}{\lg(2 - \sqrt{3})};$$

$$5) 0,2^{\log_5(4 + 1 + 1/4 + \dots)};$$

$$6) (0,125)^{\log_{2\sqrt{2}} \left(\frac{1}{4} - \frac{1}{8} + \frac{1}{16} - \frac{1}{32} + \dots \right)};$$

$$7) \frac{\log_3 256 \cdot \log_2 \frac{1}{81}}{\log_5 \frac{1}{16} \cdot \log_4 125};$$

$$8) \log_5 2 \cdot \log_4 243 \cdot \log_2 5 \cdot \log_3 4; \quad 9) \frac{3 \lg 2 + 3 \lg 5}{\lg 1300 - \lg 13};$$

$$10) \frac{\log_5 30}{\log_{30} 5} - \frac{\log_5 150}{\log_6 5};$$

$$11) \log_3^{-1} \sqrt[3]{\sqrt[3]{\sqrt[3]{3}}};$$

$$12) \log_{128} \left((0,25)^{\log_{16} \left(\frac{1}{3} + \frac{1}{9} + \frac{1}{27} + \dots \right)} \right);$$

$$1) \frac{\log_2 24 - \frac{1}{2} \log_2 72}{\log_3 18 - \frac{1}{3} \log_3 72};$$

$$2) \frac{\log_7 14 - \frac{1}{3} \log_7 56}{\log_6 30 - \frac{1}{2} \log_6 150};$$

$$3) \frac{\log_2 4 + \log_2 \sqrt{10}}{\log_2 20 + 3 \log_2 2};$$

$$4) \frac{3 \log_7 2 - \frac{1}{2} \log_7 64}{4 \log_5 2 + \frac{1}{3} \log_5 27}.$$

*. Ҳисобланг:

$$1) 36^{\log_6 5} + 10^{1 - \log_{10} 2} - 8^{\log_2 3};$$

$$2) (81^{\frac{1}{4} - \frac{1}{2} \log_2 4} + 25^{\log_{125} 8}) \cdot 49^{\log_7 2}.$$