

№7. Вычисления и преобразования

$$7.1 \text{ (гемо 2023)} \quad 4^{\frac{1}{5}} \cdot 16^{\frac{9}{10}} = 4^{\frac{1}{5}} \cdot (4^2)^{\frac{9}{10}} = 4^{\frac{1}{5}} \cdot 4^{\frac{9}{5}} = 4^{\frac{1}{5} + \frac{9}{5}} = 4^{\frac{10}{5}} = 4^2 = 16$$

$$7.2. \quad \frac{9^{7,5}}{81^{2,25}} = \frac{9^{7,5}}{(9^2)^{2,25}} = \frac{9^{7,5}}{9^{4,5}} = 9^{7,5-4,5} = 9^3 = 81 \cdot 9 = 729$$

$$7.3. \quad 6^9 \cdot 3^8 : 18^7 = \frac{6^9 \cdot 3^8}{18^7} = \frac{6^9 \cdot 3^8}{(6 \cdot 3)^7} = \frac{6^9 \cdot 3^8}{6^7 \cdot 3^7} = \frac{6^9}{6^7} \cdot \frac{3^8}{3^7} = 6^2 \cdot 3 = 36 \cdot 3 = 108$$

$$7.4. \quad 7^7 \cdot 4^9 : 28^6 = \frac{7^7 \cdot 4^9}{28^6} = \frac{7^7 \cdot 4^{7+2}}{28^6} = \frac{7^4 \cdot 4^7 \cdot 4^2}{28^6} = \frac{(7 \cdot 4)^7 \cdot 4^2}{28^6} = \frac{28^7 \cdot 4^2}{28^6} = 28 \cdot 16 = 448$$

$$7.5. \quad (27 \cdot 2^{-4}) \cdot (6 \cdot 5^{-3}) = \frac{27}{2^4} \cdot \frac{6}{5^3} = \frac{27 \cdot 6}{2 \cdot 2^3 \cdot 5^3} = \frac{81}{(2 \cdot 5)^3} = \frac{81}{1000} = 0,081$$

$$7.6 \quad (367^2 - 133^2) : 5000 = (367 - 133)(367 + 133) : 5000 = \frac{234 \cdot 500}{5000} = \frac{234}{10} = 23,4$$

$$7.7 \quad \frac{\left(3^{\frac{7}{3}} \cdot 11^{\frac{77}{33}}\right)^{33}}{33^{77}} = \frac{\left(3^{\frac{7}{3}}\right)^{33} \cdot \left(11^{\frac{77}{33}}\right)^{33}}{33^{77}} = \frac{3^{77} \cdot 11^{77}}{33^{77}} = \left(\frac{3 \cdot 11}{33}\right)^{77} = 1^{77} = 1$$

$$7.8 \quad \frac{(13t)^3 - 13t^2}{t^2 - 169t^3} = \frac{13t^2(13^2 \cdot t - 1)}{t^2(1 - 169t)} = \frac{13(169t - 1)}{-(169t - 1)} = -13$$

$$7.9. \quad \frac{(4p^2)^3 \cdot (7q)^4}{(28p^3q^2)^2} = \frac{4^3 \cdot p^6 \cdot 7^4 \cdot q^4}{28^2 \cdot p^6 \cdot q^4} = \frac{4^3 \cdot 7^4}{(4 \cdot 7)^2} = \frac{4^3 \cdot 7^4}{4^2 \cdot 7^2} = 4 \cdot 7^2 = 4 \cdot 49 = 196$$

$$7.10 \quad \frac{3^{n+2}}{12^{n+3}} = ?, \quad 2^{n+3} = \frac{1}{6}$$

$$\frac{3^{n+2}}{(3 \cdot 4)^{n+3}} = \frac{3^{n+2}}{3^{n+3} \cdot 4^{n+3}} = 3^{n+2-(n+3)} \cdot \frac{1}{(2^2)^{n+3}} =$$

$$= 3^{-1} \cdot \frac{1}{(2^{n+3})^2} = \frac{1}{3} \cdot \frac{1}{\left(\frac{1}{6}\right)^2} = \frac{1}{3} \cdot \frac{36}{1} = 12$$

$$7.11 \quad 4^{3-\sqrt{7}} \cdot 4^{3+\sqrt{7}} = 4^{3-\sqrt{7}+3+\sqrt{7}} = 4^6 = (2^2)^6 = 2^{12} = 2^2 \cdot 2^{10} = 4 \cdot 1024 = 4096$$