

***Умножение и деление.
Возведение алгебраической
дроби в степень***



$$\frac{a}{b} \cdot \frac{c}{d} = \frac{ac}{bd}$$

$$\frac{a}{b} \div \frac{c}{d} = \frac{a}{b} \cdot \frac{d}{c} = \frac{ad}{bc}$$

$$\left(\frac{a}{b} \right)^n = \frac{a^n}{b^n}$$

Например:

$$1) \frac{a^3}{4e^2} \cdot \frac{6e}{a^2} = \frac{a}{2e} \cdot \frac{3}{1} = \frac{3a}{2e}$$

$$2) \frac{a^3}{2e} \cdot 3e^4 = \frac{a^3}{2e} \cdot \frac{3e^4}{1} = \frac{a^3}{2} \cdot \frac{3e^3}{1} = \frac{3a^3e^3}{2} = \frac{3}{2}a^3e^3$$

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

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

$$5) \frac{x+a}{x-a} \cdot (x^2-a^2) = \frac{x+a}{x-a} \cdot \frac{(x-a)(x+a)}{1} = (x+a)^2$$

$$6) \frac{5x+5y}{x-y} \cdot \frac{x^2-y^2}{10x} = \frac{5(x+y)}{x-y} \cdot \frac{(x+y)(x-y)}{10x} = \frac{x+y}{1} \cdot \frac{x+y}{2x} = \frac{(x+y)^2}{2x}$$

$$\begin{aligned}
 7) \quad & \frac{7a^3e^5}{3a-3e} \cdot \frac{6e^2-12ae+6a^2}{49a^4e^5} = \\
 & = \frac{7a^3e^5}{3(a-e)} \cdot \frac{6(a-e)^2}{49a^4e^5} = \frac{1}{1} \cdot \frac{2(a-e)}{7a} = \frac{2(a-e)}{7a}
 \end{aligned}$$

$$8) \quad \frac{7a^2}{e^3} : \frac{14a}{e} = \frac{7a^2}{e^3} \cdot \frac{e}{14a} = \frac{a}{e^2} \cdot \frac{1}{2} = \frac{a}{2e^2}$$

$$9) \quad \frac{x-2}{x} : \frac{x+1}{x+2} = \frac{x-2}{x} \cdot \frac{x+2}{x+1} = \frac{x^2-4}{x(x+1)}$$

$$10) \frac{a^2 - 9}{3y} : (a + 3) = \frac{(a - 3)(a + 3)}{3y} \cdot \frac{1}{a + 3} = \frac{a - 3}{3y}$$

$$11) \frac{x^3 - 1}{8y} : \frac{x^2 + x + 1}{16y^2} =$$

$$\frac{(x - 1)(x^2 + x + 1)}{8y} \cdot \frac{16y^2}{x^2 + x + 1} =$$

$$= \frac{x - 1}{1} \cdot \frac{2y}{1} = 2y(x - 1)$$

$$12) \frac{a^4 - b^4}{ab + 2b - 3a - 6} : \frac{b - a}{a + 2} =$$

$$= \frac{(a^2 - b^2)(a^2 + b^2)}{b(a + 2) - 3(a + 2)} \cdot \frac{a + 2}{b - a} =$$

$$= \frac{(a - b)(a + b)(a^2 + b^2)}{(a + 2)(b - 3)} \cdot \frac{a + 2}{b - a} =$$

$$= - \frac{(a + b)(a^2 + b^2)}{b - 3}$$

$$13) \left(\frac{2a^3}{e^4} \right)^3 = \frac{8a^9}{e^{12}}$$

$$14) \left(\frac{0,5e^8a^4}{4a^9e^3} \right)^2 = \left(\frac{5e^5}{40a^5} \right)^2 = \left(\frac{e^5}{8a^5} \right)^2 = \frac{e^{10}}{64a^{10}}$$

$$\begin{aligned}
15) & \left(\frac{x+2}{3x^2-6x} \right)^3 : \left(\frac{x^2+4x+4}{x^2-4x+4} \right)^2 = \\
& = \left(\frac{x+2}{3x(x-2)} \right)^3 \cdot \left(\frac{(x-2)^2}{(x+2)^2} \right)^2 = \\
& = \frac{(x+2)^3}{27x^3(x-2)^3} \cdot \frac{(x-2)^4}{(x+2)^4} = \frac{1}{27x^3} \cdot \frac{x-2}{x+2} = \\
& = \frac{x-2}{27x^3(x+2)}
\end{aligned}$$