Potenzen mit ganzzahligen Exponenten * Potenzgesetze

Wiederholungsaufgaben

1. $a^m a^n = a^{m+n}$ **2.** $a^m : a^n = a^{m-n}$ **3.** $a^n b^n = (ab)^n$

4. $a^n : b^n = (a:b)^n$ **5.** $(a^n)^m = a^{nm}$

Definition: $\frac{1}{x^n} =: x^{-n}$ ($a^o = 1$ für jedes $a \neq 0$)

Wichtige binomische Formeln:

$(a + b)^2 = a^2 + 2ab + b^2$; $(a - b)^2 = a^2 - 2ab + b^2$; $a^2 - b^2 = (a - b)(a + b)$

Vereinfachen Sie:

1. $\left(\frac{a^{3n+2}}{b^{m-1}} : \frac{b^3}{c^n} \right)^2 \cdot \left(\frac{a^{2n+2}}{c^{n-1}} : \frac{b^2}{c^{2n-3}} \right)^{-2} = \ldots = a^{2n} b^{-2m} c^4$

2. $\frac{c^{-4} \cdot (a^2 - 4b^2)^3}{(3a + 6b)^2} : \frac{3c^{-5} a}{9(a - 2b)^{-2}} + \frac{2}{3} \cdot c a^{-1} b \cdot (a + 2b) = \ldots = \frac{1}{3}(a + 2b)c$

3. $\frac{(1 + x) \cdot (x - 1)^{-2}}{(1 - x)^{-2}} - x \cdot (1 + 2x + x^2) = \ldots = 1 - 2x^2 - x^3$

4. $\frac{b(a^2 + 4a + 4)^3}{(5a + 10)^2} : (5^{-2} \cdot (ab + 2b)^2) - b^{-1} \cdot (a^2 + 4) = \ldots = \frac{4a}{b}$

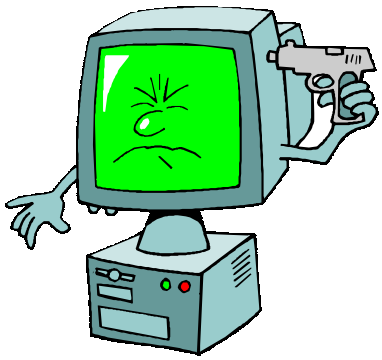
5. $\left[\left(\frac{x^{a-11}}{6y^{3m-12}} \right)^{-1} : \left(\frac{3x^{a+1}}{2y^{m+2}} \right)^3 \right] \cdot \left(\frac{4y^{3m-2}}{3x^{2a-4}} \right)^{-2} = \ldots y^{-2}$

6. $\frac{3s^{k-2} - s^k}{s^{k+2} - 6s^k + 9s^{k-2}} = \ldots \frac{1}{3 - s^2}$

7. $\frac{1}{x^{n-1}} - \frac{1 + x^{n+2}}{x^{2n}} + (1 - x^{-1}) \cdot x^{2-n} = \ldots - x^{-2n}$

8. $\left(\frac{p^{3n+2}}{q^{m-1}} : \frac{q^3}{s^n} \right) : \left(\frac{(-p)^{2n+2}}{s^{n-1}} : \frac{q^2}{(-s)^{2n-3}} \right) = \ldots - p^n q^{-m} s^2$

9. $\frac{x^6}{y^{-5}} \cdot \left[\frac{(-z)^3}{x^{-5}} : \left(\frac{y^{-3}}{x^4} \right)^{-2} \right] = \ldots - x^3 y^{-1} z^3$



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