

Simplifying Exponential Expressions Practice

Do Now: Simplify each expression. The simplified expression should not contain any negative exponents.

a) $3y^{-2}z^0$ b) $(-xy)^{-3}$ c) $\left(\frac{z^3}{xy}\right)^4$ d) $\frac{4x^5}{9x^3}$ e) $\frac{(x^{-6})^{-3}}{(x^{-6})^2}$

Here are the rules we know....



- **Zero Power and Negative Exponents:** $a^0 = 1, a \neq 0$
 $a^{-n} = \frac{1}{a^n}$ and $\frac{1}{a^{-n}} = a^n, a \neq 0$
- **Product of Powers Property:** $a^m \cdot a^n = a^{m+n}$
- **Power of a Power Property:** $(a^m)^n = a^{m \cdot n}$
- **Power of a Product Property:** $(a \cdot b)^m = a^m \cdot b^m$
- **Quotient of Powers Property:** $\frac{a^m}{a^n} = a^{m-n}, a \neq 0$
- **Power of Quotient Property:** $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$



Now it's time to ... **SIMPLIFY!**

The simplified expression should not contain any negative exponents.

1. 12^{-2} 2. $\left(\frac{2}{5}\right)^{-3}$ 3. $(5^3)^{-1}$ 4. $\frac{6}{18x^{-3}y^9}$ 5. $(7x^8)^{-2}$

6. $\left(\frac{x^6}{x^{12}}\right)^8$

7. $\frac{6x^{-3}y^2}{4y}$

8. $\frac{(a^6 \cdot a^3)^3}{a^7}$

9. $\frac{(2z)^4}{3z^2}$

10. $(-x^2y)(2x^{-4}y^{-1})$

11. $\left(\frac{4x^6y^{-6}}{x^4y^{-3}}\right)^3$

12. $\left(\frac{2x^{-5}y^{12}}{3x^{-14}y^8}\right)^{-6}$

13. $\frac{-3x^5}{x^{13}y} \cdot \frac{2x^{10}y}{15y^2}$

14. $\left(\frac{5xy}{8x^{-1}y^2}\right)^2 \cdot \frac{y^3}{5x^2y^5}$

15. $\frac{-8x^6y^{-3}}{3x^{-2}y^{-5}} \cdot \frac{-6x^{-10}y}{-4x}$

16. $\left(\frac{2x^2y}{3y}\right)^{-1} \cdot \frac{(4y^3)^2}{x^4}$

17. $\left(\frac{7x^4}{8x^3}\right)^2$

18. $\frac{32a^4b^{-2}}{2a^3b^3} \cdot \frac{3a^2b^7}{-2a^5}$

19. $\frac{36a^8b^2}{ab} \cdot \left(\frac{6}{ab^2}\right)^{-1}$

20. $\frac{6x^{-2}y^2}{xy^3} \cdot (4x^2y^{-2})^2$