



Name \_\_\_\_\_ Period \_\_\_\_\_ Date \_\_\_\_\_

## Exponentials

**Product Rule:**  $A^m \times A^n = A^{m+n}$

**Quotient Rule:**  $A^m \div A^n = A^{m-n}$

**Zero Power Rule:**  $A^0 = 1, A \neq 0$

**Power Rule:**  $(A^m)^n = A^{mn}$

**Negative Power Rule:**  $A^{-m} = \frac{1}{A^m}$

**Simplify the following expressions in exponential notation.**

1.  $3^5 \times 3^3 \div 3^6$

2.  $12^0 \times 12^4$

3.  $(7^2)^{-11}$

4.  $\frac{5^{-4}}{5^8}$

5.  $(4^9 6^7)^3$

6.  $\frac{8^9 \times 8^2 \times 8^7}{8}$

7.  $\frac{9 \times 9 \times 9 \times 9}{9^4}$

8.  $\frac{(2^{10})^2 2^3}{2^9}$

9.  $11^4 \times 3^7 \div 3^3$

10.  $13^5 \div (13^6 \times 13^2)$

11.  $\frac{5^8}{7^{-3} 7^7}$

12.  $\frac{6^0}{6^{14}}$

13.  $10^7 \times \frac{1}{10^5}$

14.  $\frac{4^{12} \times 9^4 \times 9^6}{9^8 \times 4^{-3}}$

15.  $(2^{10} \times 5^{-7} \times 2^3)^2$