

LESSON
7.2**Investigating Algebra Activity:**
Quotients and Powers*For use before the lesson "Apply Exponent Properties Involving Quotients"***Materials:** paper and pencil**QUESTION** How can you find the quotient of a power and the power of a quotient?**EXPLORE 1** Find the quotient of a power**STEP 1** Copy and complete the table below.

Expression	Expanded form	Simplified expanded form	Number of factors	Simplified expression
$\frac{5^7}{5^3}$	$\frac{5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5 \cdot 5}{5 \cdot 5 \cdot 5}$	$5 \cdot 5 \cdot 5 \cdot 5$	4	5^4
$\frac{x^6}{x^2}$				

STEP 2 Analyze the results

Find a pattern between the exponents of the expression in the first column and the exponent of the expression in the last column.

EXPLORE 2 Find the power of a quotient**STEP 1** Copy and complete the table below.

Expression	Expanded form	Expression as repeated multiplication	Simplified expression
$\left(\frac{2x^3}{3}\right)^3$	$\left(\frac{2x^3}{3}\right)\left(\frac{2x^3}{3}\right)\left(\frac{2x^3}{3}\right)$	$\frac{2 \cdot 2 \cdot 2 \cdot x^3 \cdot x^3 \cdot x^3}{3 \cdot 3 \cdot 3}$	$\frac{2^3 x^9}{3^3}$
$\left(\frac{5x^3y}{4}\right)^2$			

STEP 2 Analyze the results

Find a pattern between the exponents of the expression in the first column and the exponents of the expression in the last column.

DRAW CONCLUSIONS**Use your observations to complete these statements.**

- If a is a nonzero real number and m and n are positive integers with $m > n$, then $\frac{a^m}{a^n} = \underline{\hspace{1cm}}$.
- If a and b are real numbers with $b \neq 0$ and m a positive integer, then $\left(\frac{a}{b}\right)^m = \underline{\hspace{1cm}}$.