

10.2 Exploring Laws of Exponents (Day 2)

Power Rule

Complete the table below with a partner. Then answer the questions that follow.

Expression	Expanded Form	Exponential Form
$(5^2)^3$	$(5 \cdot 5) \cdot (5 \cdot 5) \cdot (5 \cdot 5)$	5^6
$(8^5)^4$		
$(x^3)^4$		

- Look at the table above. Compare the first and third column. Describe, using words, the relationship that you see between them.
- Use your observations from the previous question to fill in the box and complete the math sentence below.

$$(a^m)^n = a^{\boxed{}}$$

- The rule you discovered in the question on the previous page is called the "**power rule**." Use it to simplify the questions below.
 - $(7^4)^5$
 - $(k^{17})^2$
 - $(w^{100})^{20}$

Power of a Quotient

Complete the table below with a partner. Then answer the questions that follow.

Expression	Expanded Form	Exponential Form
$\left(\frac{3}{5}\right)^2$	$\frac{3}{5} \cdot \frac{3}{5} = \frac{3 \cdot 3}{5 \cdot 5}$	$\frac{3^2}{5^2}$
$\left(\frac{m}{8}\right)^4$		
$\left(-\frac{a}{9}\right)^2$		

- Look at the table above. Compare the first and third column. Describe, using words, the relationship that you see between them.
- Use your observations from the previous question to complete the math sentence below.

$$\left(\frac{x}{y}\right)^a = \left(\frac{x^{\boxed{}}}{y^{\boxed{}}}\right)$$

- The law you discovered in the question above is called "**power of a quotient**." Use it to simplify the questions below.
 - $\left(\frac{5}{4}\right)^3$
 - $\left(\frac{2x}{y}\right)^7$
 - $\left(-\frac{a}{b}\right)^8$

Powers with Same Exponent Rule

Complete the table below with a partner. Then answer the questions that follow.

Expression	Expanded Form	Exponential Form
$5^3 \cdot 6^3$		
$10^4 \cdot 4^4$		
$2^2 \cdot 5^2$		

1. Look at the table above. Compare the first and third column. Describe, using words, the relationship that you see between them.
2. Use your observations from the previous question to fill in the box and complete the math sentence below.

$$a^m \cdot b^m = \underline{\quad}^m$$

3. Use the rule discovered above to simplify the questions below.

a. $8^2 \cdot 3^2$

b. $(-2)^4 \cdot 6^4$

c. $x^2 \cdot y^2$