Name_____ Date _____

10.4 Zero and Negative Exponents

For use with Activity 10.4

Essential Question How can you evaluate a nonzero number with an exponent of zero? How can you evaluate a nonzero number with a negative integer exponent?

1 ACTIVITY: Using the Quotient of Powers Property

Work with a partner.

a. Complete the table.

Quotient	Quotient of Powers Property	Power
$\frac{5^3}{5^3}$		
$\frac{6^2}{6^2}$		
$\frac{(-3)^4}{(-3)^4}$		
$\frac{(-4)^5}{(-4)^5}$		

b. **REPEATED REASONING** Evaluate each expression in the first column of the table. What do you notice?

c. How can you use these results to define a^0 where $a \neq 0$?

Name _____ Date _____

10.4 Zero and Negative Exponents (continued)

2 ACTIVITY: Using the Product of Powers Property

Work with a partner.

a. Complete the table.

Product	Product of Powers Property	Power
$3^0 \bullet 3^4$		
$8^2 \bullet 8^0$		
$(-2)^3 \bullet (-2)^0$		
$\left(-\frac{1}{3}\right)^0 \bullet \left(-\frac{1}{3}\right)^5$		

b. Do these results support your definition in Activity 1(c)?

3 ACTIVITY: Using the Product of Powers Property

Work with a partner.

a. Complete the table.

Product	Product of Powers Property	Power
$5^{-3} \bullet 5^3$		
$6^2 \bullet 6^{-2}$		
$(-3)^4 \bullet (-3)^{-4}$		
$(-4)^{-5} \bullet (-4)^5$		

b. According to your results from Activities 1 and 2, the products in the first column are equal to what value?

10.4 Zero and Negative Exponents (continued)

c. REASONING How does the Multiplicative Inverse Property help you to rewrite the numbers with negative exponents?

d. STRUCTURE Use these results to define a^{-n} where $a \neq 0$ and n is an integer.

4 ACTIVITY: Using a Place Value Chart

Work with a partner. Use the place value chart that shows the number 3452.867.

Place Value Chart

thousands	hundreds	tens	ones	and	tenths	hundredths	thousandths
10^3	10^2	10^1	$10^{\square}$		$10^{\square}$	$10^{\square}$	$10^{\square}$
3	4	5	2	.	8	6	7

a. REPEATED REASONING What pattern do you see in the exponents? Continue the pattern to find the other exponents.

b. STRUCTURE Show how to write the expanded form of 3452.867.

What Is Your Answer?

5. IN YOUR OWN WORDS How can you evaluate a nonzero number with an exponent of zero? How can you evaluate a nonzero number with a negative integer exponent?