

Unit 3 Lesson 1: Properties of Exponents

1 Which One Doesn't Belong: Exponents and Equations (Warm up)

Student Task Statement

A. $2^3 = 9$

B. $9 = 3^2$

C. $2 \cdot 2 \cdot 2 \cdot 2 = 16$

D. $a \cdot 2^0 = a$

2 Name That Power (Optional)

Student Task Statement

Find the value of each variable that makes the equation true. Be prepared to explain your reasoning.

1. $2^3 \cdot 2^5 = 2^a$

2. $3^b \cdot 3^7 = 3^{11}$

3. $\frac{4^3}{4^2} = 4^c$

4. $\frac{5^8}{5^d} = 5^2$

5. $6^m \cdot 6^m \cdot 6^m = 6^{21}$

6. $(7^n)^4 = 7^{20}$

7. $2^4 \cdot 3^4 = 6^s$

8. $5^3 \cdot t^3 = 50^3$

3 The Power of Zero (Optional)

Student Task Statement

1. Use exponent rules to write each expression as a single power of 2. Find the value of the expression. Record these in the table. The first row is done for you.

expression	power of 2	value
$\frac{2^5}{2^1}$	2^4	16
$\frac{2^5}{2^2}$		
$\frac{2^5}{2^3}$		
$\frac{2^5}{2^4}$		
$\frac{2^5}{2^5}$		
$\frac{2^5}{2^6}$		
$\frac{2^5}{2^7}$		

2. What is the value of 5^0 ?
3. What is the value of 3^{-1} ?
4. What is the value of 7^{-3} ?

4 Matching Exponent Expressions (Optional)

Student Task Statement

Sort expressions that are equal into groups. Some expressions may not have a match, and some may have more than one match. Be prepared to explain your reasoning.

$$2^{-4} \quad \frac{1}{2^4} \quad -2^4 \quad -\frac{1}{2^4} \quad 4^2 \quad 4^{-2} \quad -4^2 \quad -4^{-2} \quad 2^7 \cdot 2^{-3}$$
$$\frac{2^7}{2^{-3}} \quad 2^{-7} \cdot 2^3 \quad \frac{2^{-7}}{2^{-3}} \quad (-4)^2$$