Unit 5 Lesson 3: Properties of Exponents

1 Math Talk: Comparing Expressions (Warm up)

Student Task Statement

Compare each pair of expressions. Are they equal? If not, which is greater?

2^3 and $2 \cdot 3$

5^2 and 2^5

100^1 and 1^{100}

$3 \cdot \frac{8}{2}$ and $\frac{8 \cdot 3}{2}$

2 Reviewing the Properties of Exponents

Student Task Statement

1. Complete the table to explore patterns in multiplying powers of 3.

expression	expanded	single power of 3
$3^2 \cdot 3^4$	$(3 \cdot 3) \cdot (3 \cdot 3 \cdot 3 \cdot 3)$	3^6
$3^5 \cdot 3^2$		
$3^3 \cdot 3^6 \cdot 3^2$		
$3^{17} \cdot 3^{41}$	(you can skip this box)	

2. Use any patterns you found to write an expression equivalent to $3^a \cdot 3^b$

3. Use your rule to write $3^4 \cdot 3^0$ with a single exponent. What does this tell you about the value of 3^0?

4. Complete the table to explore patterns in dividing powers of 3.

expression	expanded	single power of 3
$3^6 \div 3^4$	$\frac{3 \cdot 3 \cdot 3 \cdot 3 \cdot 3 \cdot 3}{3 \cdot 3 \cdot 3 \cdot 3} = \frac{3 \cdot 3 \cdot 3 \cdot 3}{3 \cdot 3 \cdot 3 \cdot 3} \cdot 3 \cdot 3 = 1 \cdot 3 \cdot 3$	3^2
$3^7 \div 3^2$		
$3^5 \div 3^1$		
$3^{100} \div 3^{98}$	(you can skip this box)	

5. Use any patterns you found to write an expression equivalent to $3^a \div 3^b$

6. Use your rule to write $3^7 \div 3^0$ with a single exponent. What does this tell you about the value of 3^0?

3 Use Your Powers!

Student Task Statement

Write each expression using a single exponent. One partner works only on Set A, the other partner works only on Set B. In each row, you should get the same answer. Pause after each problem to check if you got the same answer as your partner. If not, work together to check each other's work and come to agreement.

	Set A	Set B
row 1	$3^2 \cdot 3^7$	$3^5 \cdot 3^4$
row 2	$3^0 \cdot 3^{101}$	$3^{99} \cdot 3^2$
row 3	$x^{20} \cdot x^{17}$	$x^{37} \cdot x^0$
row 4	$\dfrac{3^{10}}{3^4}$	$\dfrac{3^8}{3^2}$
row 5	$\dfrac{b^{19}}{b^{10}}$	$\dfrac{b^{100}}{b^{91}}$
row 6	$3^0 \cdot 3^{10}$	$\dfrac{3^{12}}{3^2}$
row 7	$\dfrac{a^{20}}{a^3}$	$a^{17} \cdot a^0$
row 8	$\dfrac{7^{15}}{7^0 \cdot 7^{10}}$	$\dfrac{7^9 \cdot 7^2}{7^6}$
row 9	$m^4 \cdot \dfrac{m^{12}}{m^9}$	$\dfrac{m^{17}}{m^{10}} \cdot m^0$