Unit 7 Lesson 8: Combining Bases

1 Same Exponent, Different Base (Warm up)

Student Task Statement

1. Evaluate $5^3 \cdot 2^3$

2. Evaluate 10^3

2 Power of Products

Student Task Statement

1. The table contains products of expressions with different bases and the same exponent. Complete the table to see how we can rewrite them. Use the "expanded" column to work out how to combine the factors into a new base.

expression	expanded	exponent
$5^3 \cdot 2^3$	$(5 \cdot 5 \cdot 5) \cdot (2 \cdot 2 \cdot 2) = (5 \cdot 2)(5 \cdot 2)(5 \cdot 2)$ $= 10 \cdot 10 \cdot 10$	10^3
$3^2 \cdot 7^2$		21^2
$2^4 \cdot 3^4$		
		15^3
		30^4
$2^4 \cdot x^4$		
$a^n \cdot b^n$		
$7^4 \cdot 2^4 \cdot 5^4$		

2. Can you write $2^3 \cdot 3^4$ with a single exponent? What happens if neither the exponents nor the bases are the same? Explain or show your reasoning.

3 How Many Ways Can You Make 3,600? (Optional)

Student Task Statement

Your teacher will give your group tools for creating a visual display to play a game. Divide the display into 3 columns, with these headers:

$$a^n \cdot a^m = a^{n+m} \qquad\qquad \frac{a^n}{a^m} = a^{n-m} \qquad\qquad a^n \cdot b^n = (a \cdot b)^n$$

How to play:

When the time starts, you and your group will write as many expressions as you can that equal a specific number using one of the exponent rules on your board. When the time is up, compare your expressions with another group to see how many points you earn.

- Your group gets 1 point for every *unique* expression you write that is equal to the number and follows the exponent rule you claimed.

- If an expression uses negative exponents, you get 2 points instead of just 1.

- You can challenge the other group's expression if you think it is not equal to the number or if it does not follow one of the three exponent rules.