

## Laws of exponents

Student Activity Sheet 3; use with *Exploring* “The multiplication law”

---

1. Use what you know about exponents to show that  $x^2 \cdot x^3 = x^5$ .

2. Use what you know about exponents to simplify  $x \cdot x^3$ .

3. Use what you know about exponents to simplify  $y^2 \cdot y^4$ .

4. Complete these tables by evaluating each expression.

Problem	$2^2 \cdot 2^8$	$2^3 \cdot 2^7$	$2^4 \cdot 2^6$	$2^5 \cdot 2^5$	$2^6 \cdot 2^4$	$2^7 \cdot 2^3$	$2^8 \cdot 2^2$	$2^{10}$
Value								

Problem	$5^3 \cdot 5^4$	$5^2 \cdot 5^5$	$5^1 \cdot 5^6$	$5^7$
Value				

## Laws of exponents

Student Activity Sheet 3; use with *Exploring* “The multiplication law”

5. Use what you know about exponents to express each of these products using a single base and exponent.

a.	$\left(\frac{1}{3}\right)^2 \cdot \left(\frac{1}{3}\right)^3$	
b.	$3^{-5} \cdot 3^2$	
c.	$4^{-2} \cdot 4^{-1}$	

## Laws of exponents

Student Activity Sheet 3; use with *Exploring* “The multiplication law”

6. Apply what you have learned about exponents to complete this table.

Problem	Value
$2^2 \cdot 2^8$	
$3^2 \cdot 3^{12}$	
$5^0 \cdot 5^4$	
$5^{-2} \cdot 5^2$	
$y^3 \cdot y^4$	
$y^{16} \cdot y^{-4}$	

7. State a general rule for multiplying expressions that involve exponents.

base	exponent	multiply	add	quotient	product	sum	difference
------	----------	----------	-----	----------	---------	-----	------------

When you  two exponential expressions with the same , the  is an exponential expression with the same  and an  that is the  of the two exponents of the initial expressions.

8. Complete this statement of the Law of Exponents for Multiplication:

For any number  $x$ , except zero,

$$\underline{\hspace{2cm}} \cdot \underline{\hspace{2cm}} = \underline{\hspace{2cm}}.$$

9. The center of the Milky Way is 27,000 light years away from the Sun. A light year (9.5 trillion kilometers or 9,500,000,000,000 kilometers) is the distance a beam of light travels in one year. Express each of these numbers in scientific notation.

## Laws of exponents

Student Activity Sheet 3; use with *Exploring* “The multiplication law”

10. How would you find the distance in kilometers from our galactic center to the Sun?

11. What is the justification for each step outlined below?

Step	Justification
$2.7 \times (10^4 \times 9.5) \times 10^{12}$	
$2.7 \times (9.5 \times 10^4) \times 10^{12}$	
$(2.7 \times 9.5) \times (10^4 \times 10^{12})$	

12. Perform the final computations to express the distance from the center of the Milky Way to the Sun in kilometers. Be sure to express your final answer in scientific notation.

13. **REINFORCE**  $12^2 \cdot 12^4 = 12^6 =$  \_\_\_\_\_

14. **REINFORCE**  $z^{10} \cdot z^5 =$  \_\_\_\_\_

15. **REINFORCE**  $a^2b^3c \cdot ab^2 =$  \_\_\_\_\_