

Accelerated 7 • Unit 7 Worksheet

Exponents and Scientific Notation

Name: _____

Date: _____

Part A • Exponent Rules

1. Simplify. Write your answer as a single power.

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

b. $(5^4)^2 =$ _____

c. $7^9 / 7^5 =$ _____

d. $(2 \cdot 3)^4 =$ _____ (you can split this)

2. Explain WHY $3^5 \cdot 3^2 = 3^7$ by writing out what each side means as repeated multiplication.

Part B • Zero and Negative Exponents

3. Find each value WITHOUT a calculator.

a. $5^0 =$ _____ $17^0 =$ _____

b. $2^{-3} =$ _____ $10^{-2} =$ _____

c. $(1/3)^{-2} =$ _____

4. Diego thinks $2^{-3} = -8$. Explain why he's wrong, using the meaning of exponents.

Part C • Scientific Notation

5. Write in scientific notation:

- a. 4,300,000 = _____
- b. 0.00067 = _____
- c. The Earth's mass is about 5,972,000,000,000,000,000,000 kg. = _____

6. Write in standard form:

- a. $3.2 \times 10^5 =$ _____
- b. $7.05 \times 10^{(-4)} =$ _____

Part D • Computing with Scientific Notation

7. Compute. Express your answers in scientific notation.

- a. $(3 \times 10^4) \times (2 \times 10^6) =$ _____
- b. $(6 \times 10^8) \div (3 \times 10^2) =$ _____
- c. $(2 \times 10^5) + (3 \times 10^4) =$ _____
- d. $(7 \times 10^9) \div (1.4 \times 10^5) =$ _____

8. The distance from Earth to the Sun is about 1.5×10^8 km. Light travels at 3×10^5 km/s. How long does sunlight take to reach Earth (in seconds, and in minutes)?

Part E • Thinking Deeply

9. Which is bigger? Show your reasoning.

- a. 2^{10} vs 10^2

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- b. $3.5 \times 10^{(-7)}$ vs $9.2 \times 10^{(-8)}$
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c. $(2^5)^3$ vs $2^5 * 2^3$

10. JUSTIFY why $5^0 = 1$ (not 0). Use the pattern of dividing successive powers of 5.

11. A bacterium divides every 20 minutes. Starting with 1 bacterium at time 0:

a. How many after 20 minutes? After 1 hour? After 4 hours? Express in scientific notation.

b. Write a formula for the number after t hours.

c. After 24 hours, would there be more or fewer than the number of cells in a human body ($\sim 3 * 10^{13}$)?

12. Mai claims that for any base $a \neq 0$, $a^m * a^n = a^{(m+n)}$ even if m and n are negative. Verify with $a = 2$, $m = 3$, $n = -5$. Then verify with $a = 4$, $m = -2$, $n = -3$.
