Properties of Exponents

Algebra 1 •Section 7.1

Name: _____	Date: _____	Score: _____ / 12

Quick Review and Helpful Hints

Polynomial work is pattern work. Keep like terms together, apply exponent rules only when the bases match, and check factoring by multiplying the factors back together.

▷ **Example:** Factor $x^2 + 9x + 20$.

Work: Look for two numbers that multiply to 20 and add to 9. The numbers are 4 and 5.

★ **Answer:** $(x + 4)(x + 5)$

Practice Problems

Solve each problem. Show enough work that another student could follow your thinking.

1. Simplify $x^3 \cdot x^5$.

2. Simplify $\frac{a^9}{a^4}$.

3. Simplify $(m^2)^4$.

4. Simplify $(3x^2)^3$.

5. Simplify y^0 for $y \neq 0$.

6. Simplify 2^{-3}.

7. Simplify $\frac{12x^5}{3x^2}$.

8. Simplify $(ab^2)^3$.

9. Write 0.00042 in scientific notation.

10. Write 6.1×10^5 in standard form.

Word Problems

11. A population is 3.2×10^6. Another is 4×10^5. Which is larger?

12. A file size doubles three times from 5 MB. Write using exponents and evaluate.

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Answer Keys

1. x^8
2. a^5
3. m^8
4. $27x^6$
5. 1
6. $\frac{1}{8}$
7. $4x^3$
8. a^3b^6
9. 4.2×10^{-4}
10. $610{,}000$
11. 3.2×10^6
12. $5 \cdot 2^3 = 40$ MB

Step-by-Step Explanations

1. Same base and you're multiplying? Just add the exponents — the factors all pile together.
2. Dividing like bases cancels matching factors, so you subtract: $9 - 4$ leaves a^5.
3. A power of a power means you're repeating that group, so multiply the exponents together.
4. The outside power hits everything inside: 3 becomes 27 and x^2 becomes x^6.
5. Think of it as y^3/y^3 — everything cancels, so any nonzero base to the zero is 1.
6. A negative exponent just flips the power downstairs, turning 2^3 into $\frac{1}{8}$.
7. Handle the numbers and variables separately: $12 \div 3 = 4$, and subtracting exponents gives x^3.
8. Every factor inside the parentheses gets cubed, so a and b^2 each take the power.
9. Slide the decimal four spots right to land on 4.2; going right makes the exponent negative.
10. A positive five tells you to walk the decimal five places right, filling in zeros.
11. Check the powers of ten first — 10^6 beats 10^5, so millions win.
12. Each doubling multiplies by 2, so three of them is $2^3 = 8$, landing on 40 MB.

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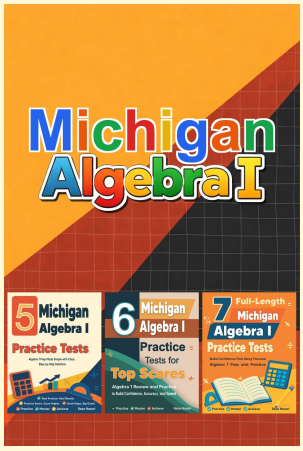

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