

Exponents II

1. Refer back to your Day 4 activity. Record the population of each continent in scientific notation rounding to **two decimal places**. Then convert the area of the continent to scientific notation.

Continent	Population in Scientific Notation	Area in Standard Notation (km ²)	Area in Scientific Notation (km ²)
Europe		9,938,000	
Asia		43,998,000	
Africa		29,800,000	
North America		24,250,000	
South America		18,840,000	
Oceania		7,690,000	

Use the factor tiles to create a model for each problem and find the simplified answer.

1. $\frac{x^6}{x^4} =$	2. $\frac{y^5}{y} =$
3. $\frac{6y^4}{4y^2} =$	4. $\frac{3x^5y}{2x^2y} =$
5. $\frac{x}{x^3y^2} =$	6. $\frac{4x^2y^3}{10x^3} =$

7. How would you explain a “shortcut” for dividing expressions with exponents?
8. Use your shortcut to complete the problem discussed earlier in class: What is the population density of Europe?

9. A company needs to move 1.25×10^5 crates of oranges. A single truck can transport 2×10^3 crates. Using your shortcut, how many trucks are needed to transport all of the crates?

An exponent of 0 is difficult to visualize and is unique. To explore this, use tiles to model each of the following expressions and simplify.

10. $\frac{x^3}{x^3}$	11. $\frac{2^3}{2^3}$	12. $\frac{y^4}{y^4}$
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Now use your shortcut from #7 to write each of the expressions as a base raised to a power.

13. $\frac{x^3}{x^3}$	14. $\frac{2^3}{2^3}$	15. $\frac{y^4}{y^4}$
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16. What is the value of any base raised to the 0 power?
Simplify the following expressions.

17. $(9x)^0$	18. $9x^0$	19. $(5x^2y^6)^0$	20. $5(x^2y^6)^0$
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Other types of operations are used with exponents. In the following problems, a power is raised to another power. Use the factor tiles to create a model for each problem and find the simplified answer.

21. $(x^2)^4$	22. $(x^4)^2$
23. $(xy^2)^3$	24. $(x^2yw^2)^3$
25. $(3xy)^2$	26. $3(xy)^2$

27. How would you explain a “shortcut” for raising a power to a power?