

Challenge: Skills and Applications

For use with pages 450–455

In Exercises 1–6, simplify if possible. Write your answer as a power.

1. $k^n \cdot k^3$

2. $x^{4n+5} \cdot x^{2n-3}$

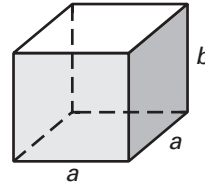
3. $(y^{7m})^3$

4. $(k^{4m})^{3n}$

5. $(x^3y^m)^{2n}$

6. $(x^{4m}y^{6m})^{9n} \cdot x^7$

In Exercises 7–8, use the box shown.

7. Write an expression that gives the volume of the box in terms of a and b .8. Suppose a is halved and b is multiplied by 8. By what factor is the volume of the box multiplied?In Exercises 9–16, for each pair of nonnegative numbers a and b and each positive integer n , calculate the value of $a^n + b^n$ and the value of $(a + b)^n$.

9. $a = 3, b = 4, n = 2$

10. $a = 2, b = 5, n = 3$

11. $a = 4, b = 0, n = 4$

12. $a = 1, b = 1, n = 7$

13. $a = 6, b = 2, n = 1$

14. $a = 3, b = 3, n = 3$

15. $a = 0, b = 10, n = 5$

16. $a = 9, b = 2, n = 1$

17. Based on your answers from Exercises 9–16, under what conditions, if any, on a , b , and/or n , is it true that $a^n + b^n = (a + b)^n$?

18. A test has 8 true-false and 12 multiple choice questions. Each multiple choice question has 4 possible answers. Write an exponential expression for the number of different ways it is possible to answer the 20 questions.

19. Use the fact that $4 = 2^2$ to write the expression from Exercise 18 as a power of 2.