

8.3 Practice



Go to BigIdeasMath.com to get HELP with solving the exercises.

► Review & Refresh

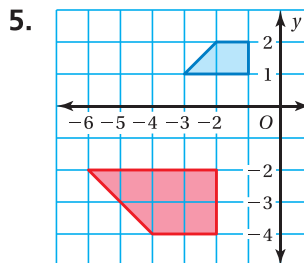
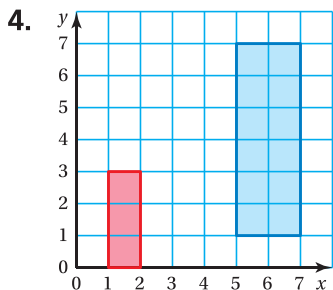
Simplify the expression. Write your answer as a power.

1. $4^2 \cdot 4^3$

2. $(a^5)^5$

3. $(xy)^7$

The red figure is similar to the blue figure. Describe a similarity transformation between the figures.



► Concepts, Skills, & Problem Solving

FINDING QUOTIENTS OF POWERS Write the quotient as repeated multiplication. Then write the quotient as a power. (See Exploration 1, p. 331.)

6. $\frac{7^9}{7^6}$

7. $\frac{(-4.5)^6}{(-4.5)^2}$

8. $\frac{m^{10}}{m^5}$

DIVIDING POWERS WITH THE SAME BASE Simplify the expression. Write your answer as a power.

9. $\frac{6^{10}}{6^4}$

10. $\frac{8^9}{8^7}$

11. $\frac{(-3)^4}{(-3)^1}$

12. $\frac{4.5^5}{4.5^3}$

13. $\frac{64^4}{64^3}$

14. $\frac{(-17)^5}{(-17)^2}$

15. $\frac{(-6.4)^8}{(-6.4)^6}$

16. $\frac{\pi^{11}}{\pi^7}$

17. **MP YOU BE THE TEACHER** Your friend simplifies the quotient. Is your friend correct? Explain your reasoning.

$$\frac{6^{15}}{6^5} = 6^{15/5} = 6^3$$

SIMPLIFYING AN EXPRESSION Simplify the expression. Write your answer as a power.

18. $\frac{7^5 \cdot 7^3}{7^2}$

19. $\frac{6^{13}}{6^4 \cdot 6^2}$

20. $\frac{(-6.1)^{11}}{(-6.1)^7 \cdot (-6.1)^2}$

21. $\frac{\pi^{30}}{\pi^{18} \cdot \pi^4}$

22. $\frac{c^{22}}{c^8 \cdot c^9}$

23. $\frac{z^8 \cdot z^6}{z^8}$

24. **MP MODELING REAL LIFE** The sound intensity of a normal conversation is 10^6 times greater than the quietest noise a person can hear. The sound intensity of a jet at takeoff is 10^{14} times greater than the quietest noise a person can hear. How many times more intense is the sound of a jet at takeoff than the sound of a normal conversation?



SIMPLIFYING AN EXPRESSION Simplify the expression. Write your answer as a power.

25. $\frac{(-4)^8 \cdot (-4)^3}{(-4)^4 \cdot (-4)^2}$

26. $\frac{6^2 \cdot 6^{12}}{6 \cdot 6^8}$

27. $\frac{3^2 \cdot 3^6 \cdot 3^5}{3^2 \cdot 3}$

28. $\frac{z^7 \cdot z^6}{z \cdot z^2}$

29. $\frac{x^5 \cdot x^{13}}{x^4 \cdot x^8}$

30. $\frac{y^8 \cdot y^2}{y^7} \cdot \frac{y^4}{y} \cdot \frac{y^7}{y^2}$

Device	Storage (GB)	Price
A	2^5	\$30
B	2^6	\$50
C	2^7	\$70
D	2^8	\$90
E	2^9	\$110

31. **MP REASONING** The storage capacities and prices of five devices are shown in the table.

- How many times more storage does Device D have than Device B?
- Do storage and price have a linear relationship? Explain.



32. **DIG DEEPER!** Consider the equation $\frac{9^m}{9^n} = 9^{2n}$.

- Find two numbers m and n that satisfy the equation.
- Describe the number of solutions that satisfy the equation. Explain your reasoning.



Milky Way galaxy:
 $10 \cdot 10^{10}$ stars

33. **MP MODELING REAL LIFE** A scientist estimates that there are about 10^{24} stars in the universe and that each galaxy has, on average, approximately the same number of stars as the Milky Way galaxy. About how many galaxies are in the universe?

34. **MP NUMBER SENSE** Find the value of x that makes $\frac{8^{3x}}{8^{2x+1}} = 8^9$ true. Explain how you found your answer.