

LESSON  
8.2

## Practice A

For use with pages 495–501

Name the property demonstrated by the example.

1.  $\frac{x^5}{x^3} = x^{5-3} = x^2$

2.  $\left(\frac{a}{b}\right)^4 = \frac{a^4}{b^4}$

3.  $\frac{2m^8}{m^6} = 2m^{8-6} = m^2$

Fill in the blanks.

4.  $\frac{3^8}{3^5} = 3^{\square} \square^5$   
 $= 3^{\square}$

5.  $\left(\frac{3}{4}\right)^4 = \frac{3^{\square}}{4^{\square}}$

6.  $\frac{8^6}{8^4 \cdot 8^2} = \frac{8^{\square}}{8^{\square}}$   
 $= 8^{\square}$

Simplify the expression. Write your answer using exponents.

7.  $\frac{4^7}{4^3}$

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

9.  $\frac{3^6}{3^1}$

10.  $\frac{(-5)^4}{(-5)^3}$

11.  $\frac{(-7)^5}{(-7)^1}$

12.  $\left(\frac{1}{4}\right)^5$

13.  $\left(\frac{5}{3}\right)^7$

14.  $\left(\frac{2}{7}\right)^9$

15.  $4^5 \cdot \frac{1}{4^2}$

Simplify the expression.

16.  $\frac{1}{y^5} \cdot y^{11}$

17.  $z^3 \cdot \frac{1}{z^2}$

18.  $\frac{1}{m^4} \cdot m^8$

19.  $\left(\frac{x}{y}\right)^3$

20.  $\left(\frac{a}{b}\right)^{13}$

21.  $\left(\frac{1}{z}\right)^9$

- 22.
- Internet Users**
- The table shows the numbers of Internet users in selected countries in 2001.

Country	Albania	Jamaica	Marshall Islands	Romania
Internet Users	$10^4$	$10^5$	$10^3$	$10^6$

- How many times greater is the number of users from Romania than the number of users from the Marshall Islands?
- How many times greater is the number of users from Albania than the number of users from the Marshall Islands?
- How many times greater is the number of users from Jamaica than the number of users from the Marshall Islands?
- How many times greater is the number of users from Romania than the number of users from Albania?

LESSON  
8.2**Practice B**

For use with pages 495–501

**Simplify the expression. Write your answer using exponents.**

1.  $\frac{6^{14}}{6^8}$

2.  $\frac{14^5}{14^4}$

3.  $\frac{(-5)^7}{(-5)^2}$

4.  $\frac{12^5 \cdot 12^3}{12^4}$

5.  $\frac{8^{17}}{8^3 \cdot 8^7}$

6.  $\left(\frac{3}{4}\right)^5$

7.  $\left(-\frac{1}{5}\right)^6$

8.  $3^8 \cdot \frac{1}{3^1}$

9.  $\left(\frac{1}{4}\right)^5 \cdot 4^{13}$

**Simplify the expression.**

10.  $\frac{1}{y^9} \cdot y^{15}$

11.  $z^{16} \cdot \frac{1}{z^7}$

12.  $\left(\frac{a}{b}\right)^8$

13.  $\left(-\frac{6}{z}\right)^3$

14.  $\left(\frac{a^3}{2b^5}\right)^4$

15.  $\left(\frac{3x^4}{y^6}\right)^5$

16.  $\left(\frac{m^4}{5n^9}\right)^3$

17.  $\left(\frac{3x^7}{2y^{12}}\right)^4$

18.  $\left(\frac{2m^5}{3n^9}\right)^5$

19. **Area** The area of New Zealand is 104,454 square miles and the area of Saint Kitts and Nevis, islands in the Caribbean Sea, is 104 square miles. Use order of magnitude to estimate how many times greater New Zealand's area is than Saint Kitts and Nevis' area.
20. **Cell Phone Subscribers** The table below shows the approximate number of cell phone subscribers in selected countries in 2001.

Country	Algeria	Dominican Republic	Poland	Solomon Islands
Number of subscribers	$10^5$	$10^6$	$10^7$	$10^3$

- a. How many times greater is the number of cell phone subscribers in Poland than in the Solomon Islands?
- b. How many times greater is the number of cell phone subscribers in the Dominican Republic than in the Solomon Islands?
21. **Glass Vase** You are taking a glass-blowing class and have created a vase in the shape of a sphere. The vase will have a hole in the top so you can put flowers in it and it will sit on a stand. The radius of your vase is  $\frac{21}{2}$  inches. Use the formula  $V = \frac{4}{3}\pi r^3$  to write an expression for the volume of your vase.