

**Practice C**

For use with pages 463–469

Use the quotient of powers property to simplify the expression.

1.  $\frac{x^8}{x^{15}}$

2.  $\frac{(-5)^{14}}{(-5)^{11}}$

3.  $\frac{3^3 \cdot 3^9}{3^{17}}$

4.  $\frac{x^{-7}}{x^5 \cdot x^{-14}}$

Use the power of a quotient property to simplify the expression.

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

6.  $\left(\frac{2^4}{x^5}\right)^{-1}$

7.  $\left(\frac{x^4}{y^7}\right)^9$

8.  $\left(\frac{a^{25}}{b^{14}}\right)^4$

Evaluate the expression. Write your answer as a fraction in simplest form.

9.  $\frac{5^{16}}{5^{13}}$

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

11.  $\frac{10^{-6}}{10^{-10}}$

12.  $-\frac{9^{-4} \cdot 9^{-2}}{(9^{-3})^3}$

13.  $\frac{4^4 \cdot 4^{-2}}{4^7}$

14.  $\left(\frac{3^3}{5}\right)^{-2}$

15.  $\left(\frac{36}{4}\right)^2$

16.  $\left(-\frac{2}{4}\right)^5$

Simplify the expression. The simplified expression should have no negative exponents.

17.  $\frac{6}{x^{10}} \cdot \frac{x^{17}}{15}$

18.  $\left(\frac{y^{-5}}{y^9}\right)^{-4}$

19.  $\frac{(a^{13} \cdot a^{-8})^5}{a^{31}}$

20.  $\left(\frac{11x^6y^{-6}}{x^4y^{-3}}\right)^3$

21.  $\left(\frac{2x^{-5}y^{12}}{3x^{-14}y^8}\right)^{-6}$

22.  $\frac{(x^{-6})^{-3}}{(x^{-6})^2}$

23.  $\frac{-12xy}{7x^4} \cdot \frac{21x^5y^2}{4y}$

24.  $\frac{-3x^5}{x^{13}} \cdot \frac{2x^{10}y}{15y^2}$

25.  $\frac{4xy^{11}}{x^7y^6} \cdot \frac{6x^8y}{8x^3}$

26.  $\frac{y^{10}}{2x^3} \cdot \frac{20x^{14}}{xy^6}$

27.  $\frac{5x^{-2}}{3x} \cdot \frac{2y^3}{x^{10}}$

28.  $\left(\frac{5xy}{8x^{-1}y^2}\right)^2 \cdot \frac{26y^3}{5x^2y^5}$

29.  $\frac{-8x^6y^{-3}}{3x^{-2}y^{-5}} \cdot \frac{-6x^{-10}y}{-4x}$

30.  $\frac{4x^{-2}y^{-1}}{3x^{-3}} \cdot \frac{6x^{-3}y^{-2}}{8y^{-7}}$

31.  $\left(\frac{2x^2y}{3y}\right) \cdot \left(\frac{4y^3}{x^4}\right)^2$

**32. Assembly Speed** An assembly-line worker increases the speed at which he can work by approximately the same percentage for the first 7 months of employment. The speed  $s$  (in parts assembled per hour) in  $t$  months can be modeled by  $s = 10(1.01)^t$ , where  $t = 0$  corresponds to the month a worker was hired. Find the ratio of the speed of a worker after 7 months of experience to the speed of a worker after 4 months of experience.

**33. Population** The population  $P$  of California (in thousands) in 1995 projected through 2025 can be modeled by  $P = 30,383(1.0157)^t$ , where  $t = 0$  represents 1995. Find the ratio of the population in 2025 to the population in 2000.

**34. Personal Computers** From 1982 to 1992, the cost of manufacturing a PC has decreased by about the same percentage each year. The cost  $C$  (in dollars) in year  $t$  can be modeled by  $C = 3000\left(\frac{5}{6}\right)^t$ , where  $t = 0$  corresponds to 1992. Find the ratio of the cost in 1990 to the cost in 1985.