LESSON 8.3

NAME _____ DATE _____

Practice A

For use with pages 463–469

Use the quotient of powers property to simplify the expression.

1. $\frac{4^2}{4}$
2. $\frac{5^3}{5^5}$
3. $\frac{x^7}{x^3}$
4. $\frac{a^{10}}{a^5}$
5. $\frac{8^3}{8^5}$
6. $\frac{c^4}{c^6}$
7. $\frac{(-2)^3}{(-2)}$
8. $\frac{-(m^4)}{m^4}$

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

9. $\left(\frac{1}{2}\right)^4$
10. $\left(\frac{2}{3}\right)^3$
11. $\left(\frac{4}{x}\right)^2$
12. $\left(\frac{3}{4}\right)^2$
13. $\left(\frac{3}{m}\right)^3$
14. $\left(\frac{x^2}{5}\right)^2$
15. $\left(\frac{3}{4}\right)^{-3}$
16. $\left(\frac{a^3}{b^2}\right)^4$

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

17. $\frac{7^5}{7^3}$
18. $\frac{6^5}{6^7}$
19. $\frac{18^6}{18^6}$
20. $\frac{(-5)^9}{5^9}$
21. $\frac{2^3}{2^{-4}}$
22. $\frac{4^5 \cdot 4^3}{4^6}$
23. $\left(\frac{2}{3}\right)^3$
24. $\left(\frac{3}{2}\right)^{-1}$

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

25. $\left(\frac{x}{3}\right)^4$
26. $\frac{x^7}{x^2}$
27. $\left(\frac{2}{x}\right)^6$
28. $x^5 \cdot \frac{1}{x^8}$
29. $x^{12} \cdot \frac{1}{x^3}$
30. $\left(\frac{x^5}{x^3}\right)^{-1}$
31. $\left(\frac{y^3}{y^5}\right)^{-2}$
32. $\frac{m^4 \cdot m^2}{m^7}$
33. $\frac{(t^3)^2}{(t^2)^3}$
34. $\frac{(2z)^4}{3z^2}$
35. $\frac{(2a^2b)^3}{(2ab^3)^2}$
36. $\left(\frac{3m^2n^4}{2mn^3}\right)^3$

Grade Point Average **In Exercises 37 and 38, use the following information.**

From Carmen's freshman year to her senior year, her grade point average (GPA) increased by approximately the same percentage each year. Carmen's GPA in year t can be modeled by

$\text{GPA} = 2\left(\frac{6}{5}\right)^t$, where $t = 0$ corresponds to her freshman year.

37. Complete the table showing Carmen's GPA throughout her high school career.

Year, t	0	1	2	3
GPA				

38. Find the ratio of Carmen's GPA in her senior year to her GPA in her sophomore year.

LESSON 8.3

NAME _____ DATE _____

Practice B

For use with pages 463–469

Use the quotient of powers property to simplify the expression.

1. $\frac{4^4}{4^2}$
2. $\frac{8^7}{8^9}$
3. $\frac{x^{15}}{x^9}$
4. $\frac{b^8}{b^{12}}$
5. $\frac{y^6}{y^0}$
6. $\frac{(-3)^7}{(-3)^3}$
7. $\frac{6^2 \cdot 6^{11}}{6^{16}}$
8. $\frac{x^{-8}}{x^{-5} \cdot x^{-4}}$

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

9. $\left(\frac{1}{3}\right)^4$
10. $\left(\frac{5}{6}\right)^2$
11. $\left(\frac{4}{x}\right)^5$
12. $\left(\frac{y}{3}\right)^3$
13. $\left(\frac{7}{5}\right)^{-2}$
14. $\left(\frac{2^2}{a^5}\right)^3$
15. $\left(\frac{x^6}{y^3}\right)^8$
16. $\left(\frac{c^7}{d^{10}}\right)^4$

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

17. $\frac{2^8}{2^3}$
18. $\frac{-4^8}{(-4)^8}$
19. $\frac{5^{-2}}{5^{-5}}$
20. $\frac{7^{-2} \cdot 7^6}{(7^2)^2}$
21. $\frac{3^2 \cdot 3}{3^6}$
22. $\left(\frac{6}{7}\right)^{-2}$
23. $\left(\frac{12}{3}\right)^3$
24. $\left(-\frac{3}{8}\right)^2$

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

25. $\left(\frac{2}{x}\right)^5$
26. $\frac{1}{x^8} \cdot x^{20}$
27. $\left(\frac{b^{10}}{b^3}\right)^{-2}$
28. $\frac{r^{-5} \cdot r^5}{r^3}$
29. $\frac{(t^{-4})^9}{(t^{-4})^3}$
30. $\frac{(a^6 \cdot a^3)^3}{a^7}$
31. $\left(\frac{7x^{-2}y}{x^8y^{-5}}\right)^3$
32. $\frac{-10xy^8}{2x^4y^2} \cdot \frac{-5xy^{-2}}{(-y)^3}$
33. $\left(\frac{3x^7y^9}{5x^5y^2}\right)^{-4}$
34. $\frac{3xy^4}{2x^5y} \cdot \frac{6x^{-3}y^2}{4y}$
35. $\frac{2x^2y}{x^3y^2} \cdot \frac{4x^7y^2}{2x^3}$
36. $\left(\frac{4x^2y^{-1}}{6xy}\right)^{-3} \cdot \frac{y^4}{x^6y^2}$

Memory **In Exercises 37 and 38, use the following information.**

Suppose that you memorize a list of 100 German vocabulary words. Each week you forget $\frac{1}{8}$ of the words you knew the previous week. The number of vocabulary words V you remember after t weeks can be modeled by

$$V = 100\left(\frac{7}{8}\right)^t.$$

37. Complete the table showing the number of words you remember each week.

Week, t	0	5	10	15	20	25	30
Words, V							

38. Find the ratio of the number of words you remember in week 10 to the number of words you remember in week 25 without using the table.