

Practice A

For use with pages 462–468

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

Simplify the quotient.

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. Use only positive 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

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

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.

Practice B

For use with pages 462–468

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. $\left(\frac{c^7}{d^{10}}\right)^4$

Simplify the quotient.

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. Use only positive 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.