

Chapter 8 Review

1. Simplify, if possible. Write your answer as a power or as a product of powers.

a. $(-2m^4n^6)^2$

b. $\left[(-5xy)^2\right]^5$

c. $\left[(2x+3)^3\right]^2$

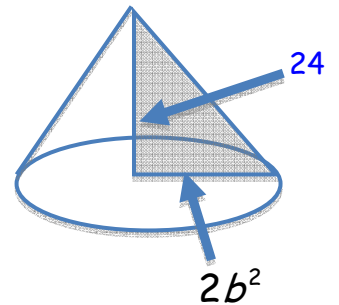
d. $(-2xy)^3(-x^2)$

e. $(-y)^3(-y)^4(-y)^5$

f. $(6a^4)^2\left(\frac{1}{4}a^3\right)^2$

g. $-(r^2st^3)^2(s^4t)^3$

2. The volume of a cone is given by $V = \frac{1}{3}\pi r^2 h$ where r is the radius of the base, h is the height, and $\pi \approx 3.14$. What is the volume of the cone (on the right) in terms of b ?



3. The power generated by a windmill can be modeled by the equation $w = 0.015s^3$, where w is the power measured in watts and s is the wind speed in miles per hour.
- Find the ratio of the power generated by a windmill when the wind speed is 20 miles per hour to the power generated when the wind speed is 10 miles per hour.
 - Write a general statement about how doubling the wind speed affects the amount of power generated by a windmill.

4. Evaluate the exponential expression.

a. $\left(\frac{1}{10}\right)^{-2}$

b. $-6^0 \cdot \frac{1}{3^{-2}}$

c. $(-3^{-2})^{-1}$

5. Rewrite the expression with positive exponents.

a. $x^{-2}y^4$

b. $\frac{1}{9x^{-3}y^{-1}}$

c. $(6a^{-3})^3$

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

6. You started a savings account in 1990. The balance A is modeled by $A = 450(1.06)^t$, where $t = 0$ represents the year 2000. What is the balance in the account in 1990? In 2000? In 2010?

7. Evaluate the expression. Write fractions in simplest form.

a. $\frac{3^3}{3^{-4}}$

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

c. $\frac{5 \cdot 5^4}{5^8}$

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

a. $\left(\frac{y^2}{y^3}\right)^{-2}$

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

c. $\frac{16x^5y^{-8}}{x^7y^4} \cdot \left(\frac{x^3y^2}{8xy}\right)^4$

d. $\left(\frac{2xy^{-2}y^4}{3x^{-1}y}\right) \cdot \left(\frac{4xy}{2x^{-1}y^{-3}}\right)^2$

9. The average rate w (in pounds) of an Atlantic cod t years old can be modeled by the equation $w = 1.16(1.44)^t$.
- Find the ratio of the weight of a 5-year-old cod to the weight of a 2-year-old cod. Express this ratio as a power of 1.44.
 - A 5-year-old cod weighs how many times as much as a 2-year-old cod?
 - According to the model, what is the average weight of an Atlantic cod when it is hatched? How did you get your answers?

10. Rewrite in decimal form.

a. 98×10^{-2}

b. 8.6521×10^3

c. 6.002×10^{-6}

d. 1.1098×10^{10}

11. Rewrite in scientific notation

a. 95.2

b. 370.207

c. 0.0000288

d. 0.0422

12. Evaluate the expression without using a calculator. Write the result in scientific notation and also in decimal form.

a. $(6 \times 10^5) \cdot (2.5 \times 10^{-1})$

b. $\frac{8 \times 10^{-3}}{5 \times 10^{-5}}$

c. $(3.0 \times 10^{-3})^2$

d. $(9 \times 10^3)^2$

13. Stanley Falls in Congo, Africa, has an average flow of about 1.7×10^4 cubic meters per second. How much water goes over Stanley Falls in a typical 30-day month?

14. Use the table below which shows the population and the number of local telephone calls made in five states in 1994 to find the number of local calls made per person in each state.

State	Local Calls	Population
Texas	3.9×10^{10}	1.8×10^7
Minnesota	7.0×10^9	4.6×10^6
Pennsylvania	1.9×10^{10}	1.2×10^7
Vermont	4.7×10^8	5.8×10^5
California	5.6×10^{10}	3.1×10^7

15. You deposit \$1400 in an account that pays 6% interest compounded yearly. Find the balance of the account in 12 years.

16. How much must you deposit in an account that pays 3.4% interest compounded yearly to have a balance of \$400 after 6 years?

17. A business had a \$10,000 profit in 1990. Then the profit increased by 25% per year for the next 10 years. Write an exponential growth model for the business.

18. You buy a used truck for \$20,000. It depreciates at the rate of 15% per year. Write an exponential decay model to represent this situation. Find the value of the truck in 12 years.

19. A summer youth camp had a declining enrollment from 1995 to 2000. The enrollment in 1995 was 3220 people. Each year for the next five years, the enrollment decreased by 2%. Complete the table below showing the enrollment for each year. Sketch a graph of the results.

Year	1995	1996	1997	1998	1999	2000
Enrollment						

20. In 1996, you started your own business. In the first year, your sales totaled \$88,500. Then each year for the next 4 years, your sales increased by 20%. Write an exponential growth model to represent this situation. Then estimate your sales in 2001.