LESSON 8

NAME _____ DATE _____

Parent Guide for Student Success

For use with Chapter 8

Chapter Overview **One way that you can help your student succeed in Chapter 8 is by discussing the lesson goals in the chart below. When a lesson is completed, ask your student to interpret the lesson goals for you and to explain how the mathematics of the lesson relates to one of the key applications listed in the chart.**

Lesson Title	*Lesson Goals*	*Key Applications*
8.1: Exponential Growth	Graph exponential growth functions and use exponential growth functions to model real-life situations.	• Internet Hosts • Compound Interest • Wind Energy
8.2: Exponential Decay	Graph exponential decay functions and use exponential decay functions to model real-life situations.	• Automobiles • Radioactive Decay • Record Albums
8.3: The Number *e*	Use the number *e* as the base of exponential functions and use the natural base *e* in real-life situations.	• Endangered Species • Mount Everest • Rate of Healing
8.4: Logarithmic Functions	Evaluate and graph logarithmic functions.	• Slope of a Beach • Seismology • Tornadoes
8.5: Properties of Logarithms	Use properties of logarithms and apply them to solve real-life problems.	• Acoustics • Photography • Energy in Living Cells
8.6: Solving Exponential and Logarithmic Equations	Solve exponential and logarithmic equations.	• Cooking • History • Oceanography
8.7: Modeling with Exponential and Power Functions	Model data using exponential functions and power functions.	• Communications • United States Stamps • Cities of Argentina
8.8: Logistic Growth Functions	Evaluate and graph logistic growth functions. Use logistic growth functions to model real-life quantities.	• Biology • Owning a VCR • Economics

Study Strategy

Using a Study Group is the study strategy featured in Chapter 8 (see page 464). Encourage your student to get together with other students to form a study group. Help your student find ways to meet with other group members either during the school day or at other times. If more is not feasible, two students can form a study group with telephone discussions.

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Key Ideas **Your student can demonstrate understanding of key concepts by working through the following exercises with you.**

Lesson	*Exercise*
8.1	At the beginning of an experiment, 10,000 bacteria are put in a solution. They grow at a rate of 20% per minute. Write a model giving the population p of the bacteria t minutes after the experiment starts. Use a graph to estimate when there will be 40,000 bacteria in the solution.
8.2	A certain type of rubber ball bounces up to a height of 65% of the height from which it falls. Write a model giving the height h the ball bounces on the nth bounce if it is initially dropped from a height of 5 feet. Use a graph to estimate how many bounces it takes for the ball to first reach a height of less than 1 foot.
8.3	Use a calculator to evaluate $e^{2.1}$.
8.4	Simplify $\log_2 8^x$.
8.5	Condense the expression $3 \log_7 2 + 5 \log_7 x - 4 \log_7 2$.
8.6	You deposit \$1000 in an account that pays 5% interest compounded semiannually. How long will it take for the balance to reach \$1160? (*Hint:* For help in writing an equation to model the situation, see Lesson 8.1. To solve the equation, you can take $\log_{10}$ of each side.)
8.7	A car was worth \$18,000 in 1999 and \$14,400 in 2000. Write an exponential function $y = ab^x$ to fit the data, where x is the number of years after 1998. Use the function to estimate the value of the car in 2002.
8.8	Evaluate $f(0)$ for the function $f(x) = \dfrac{9}{1 + 2e^{-x}}$.

Home Involvement Activity

Directions: Find data on the population of your city or state in 1970, 1980, 1990, and 2000. Decide whether an exponential model fits the points by plotting the natural logarithms of the y-values against the x-values and seeing whether the points $(x, \ln y)$ fit a linear pattern. If appropriate, write an exponential model for the data and use it to predict the population in 2010.

Answers

8.1: $p = 10{,}000(1.2)^t$; about 8 minutes **8.2:** $h = 5(0.65)^n$; 4 bounces **8.3:** about 8.166

8.4: $3x$ **8.5:** $\log_7\left(\dfrac{x^5}{2}\right)$ **8.6:** 3 years **8.7:** $y = 22{,}500(0.8)^x$; \$9216 **8.8:** 3

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