NAME _____ DATE _____

Parent Guide for Student Success

For use with Chapter 9

Chapter Overview One way that you can help your student succeed in Chapter 9 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*
9.1: Inverse and Joint Variation	Write and use inverse and joint variation models.	• Oceanography • Home Repair • Astronomy
9.2: Graphing Simple Rational Functions	Graph simple rational functions and use the graph of a rational function to solve real-life problems.	• Business • Lightning • Economics
9.3: Graphing General Rational Functions	Graph general rational functions and use the graphs to solve real-life problems.	• Manufacturing • Energy Expenditure • Hospital Costs
9.4: Multiplying and Dividing Rational Expressions	Multiply and divide rational expressions and use rational expressions to model real-life situations.	• Skydiving • Heat Generation • Farmland
9.5: Addition, Subtraction, and Complex Fractions	Add and subtract rational expressions. Simplify complex fractions.	• Statistics • Photography • Electronics
9.6: Solving Rational Equations	Solve rational equations and use rational equations to solve real-life problems.	• Chemistry • Football Statistics • Fuel Efficiency

Study Strategy

Making a Function Dictionary is the study strategy featured in Chapter 9 (see page 532). You may want to suggest that your student look back over the review material in previous chapters to identify the different types of functions to include in his or her function dictionary. Be sure your student includes the general form, a specific example, and a graph. If possible, provide graph paper to make it easier for your student to draw the graphs. Your student can add to this dictionary while working through Chapters 9–14.

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

Lesson	*Exercise*
9.1	The weight of an object varies inversely as the square of its distance from the center of Earth. Suppose that at sea level, about 4000 miles from the center of Earth, a person weighs 120 pounds. How much would the person weigh in the space shuttle 200 miles above sea level?
9.2	Describe the graph of the rational function $f(x) = \dfrac{3x - 1}{6x - 9}$.
9.3	Name the x-intercepts, vertical asymptotes, and horizontal asymptote(s) of the function $f(x) = \dfrac{x^2 + 4x - 5}{x^2 + 5x + 6}$.
9.4	A falling object accelerates until reaching terminal velocity. The greater the ratio of the object's volume to its cross-sectional surface area, the larger the terminal velocity. Suppose you need to drop an x-by-x-by-$3x$-meter box. Which option results in the lighter impact, dropping it with the x-by-$3x$ side down or with the square side down?
9.5	Perform the indicated operation and simplify. $\dfrac{x + 5}{x^2 + x - 6} - \dfrac{5}{x + 3}$
9.6	Elizabeth set a goal of saving an average of \$10 per week. In the first six weeks, she was only able to save an average of \$7 per week. How many weeks does Elizabeth need to save an average of \$12 per week to raise the overall average to her goal of \$10 per week?

Home Involvement Activity

You Will Need: Open trash can, ball of paper, tape measure
Directions: Measure 5 ft along the floor from the edge of a trash can. Stand at this distance and try to shoot the paper into the trash can. Make 10 tries. Record how many "baskets" you make. Repeat 3 times and find the average number of "baskets" you make. Find the average at 10 ft and 15 ft. The average number of baskets you make varies directly with the number you shoot and inversely with the distance you shoot from the basket. Write a variation model. Use the model to predict the average number of baskets you should make at 12 ft. Test your prediction.

Answers

9.1: about 109 lb **9.2:** *Sample answer:* The graph is a hyperbola through the points $\left(0, \frac{1}{9}\right)$, $\left(2, \frac{5}{3}\right)$, $\left(\frac{1}{3}, 0\right)$, and $\left(\frac{8}{3}, 1\right)$, with vertical asymptote $x = \frac{3}{2}$ and horizontal asymptote $y = \frac{1}{2}$.
9.3: x-intercepts: 1, -5; vertical asymptotes: $x = -3$ and $x = -2$; horizontal asymptote: $y = 1$
9.4: with the x-by-$3x$ side down **9.5:** $\dfrac{-4x + 15}{(x + 3)(x - 2)}$ **9.6:** 9 weeks

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