Name: **Date:**

Practice: Rational and Irrational Numbers and Their Properties B

Use the properties of exponents to simplify the expressions. Do not evaluate.

1. $\dfrac{n^{\frac{10}{11}}}{n^{\frac{1}{2}}}$

2. $\left(15^{\frac{8}{5}}\right)^{\frac{9}{2}}$

3. $20^{\frac{1}{3}} \bullet 20^{\frac{10}{4}}$

Simplify each expression, and then determine whether each answer is rational or irrational.

4. $12+\sqrt[3]{27}$

5. $\sqrt[3]{81}+\dfrac{1}{3}$

6. $7^{\frac{1}{2}} \bullet \sqrt{16}$

continued

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Solve each equation for the given variable.

7. $w^{\frac{2}{3}} = 49$

8. $\sqrt[5]{m^9} = -21$

Use the information given in each scenario to solve the problems.

9. Rumors in a school can spread exponentially. The equation $y = 3 \cdot n^d$ can estimate the total number of students who have heard a rumor, y, after d days of being spread. n is the number of people who are told the rumor by each person. If after 1.5 days, 24 people have heard the rumor, what is the value of n?

10. A store has seen an increase in sales after advertising on a local billboard. The store's total daily sales, y, can be estimated using the equation $y = 600 \cdot s^w$, where w is the number of weeks after putting up the billboard. The store discovers that 3 weeks and 2 days, or $3\frac{2}{7}$ weeks, after putting up the billboard, daily sales are approximately \$704.33. Find s, and use it to write an equation to estimate the daily sales for any number of weeks, w.