Problem-Based Task: Population Growth

Coaching Sample Responses

a. What is the general equation that you can use to estimate this population?

$$y = y_0 \bullet (1+r)^{\frac{t}{10}}$$

b. What do each of the variables in the equation represent, and what are their values?

y is the population in 8 years, y_0 is the population today, r is the 10-year growth rate, and t is the time in years. The value of y is unknown, y_0 is 42,000, r is 0.35, and t is 8.

c. What is the specific equation that models this situation?

$$y = 42{,}000 \bullet (1+0.35)^{\frac{8}{10}}$$

d. How can you further simplify this equation before you estimate the population?

The rational exponent can be simplified. Note that the original root is even; therefore, the solution must be positive.

$$y = 42{,}000 \bullet (1+0.35)^{\frac{8}{10}}$$

$$y = 42{,}000 \bullet (1+0.35)^{\frac{4}{5}}$$

e. What will be the town's approximate population 8 years from today?

Use a calculator to find the town's approximate population 8 years from today.

$$y = 42{,}000 \bullet (1+0.35)^{\frac{4}{5}}$$

$$y = 42{,}000 \bullet (1.35)^{\frac{4}{5}}$$

$$y \approx 42{,}000 \bullet (1.27136)$$

$$y \approx 53{,}397$$

The town's approximate population will be 53,397 people 8 years from today.

Recommended Closure Activity

Select one or more of the essential questions for a class discussion or as a journal entry prompt.