Assignment

Write

Define the term *half-life* in your own words.

Remember

The general form of an exponential equation is $y = a \cdot b^x$ where $b > 0$ and $b \neq 1$.

Practice

1. Wildlife biologists are studying the coyote populations on 2 wildlife preserves to better understand the role climate plays in population change. The table displays the coyote populations on both preserves for each year of the study. The Year 0 corresponds to the date of the biologists' initial observations.

Year	Alaska Preserve	Tennessee Preserve
0	200	80
1	220	100
2	242	125
3		
4		

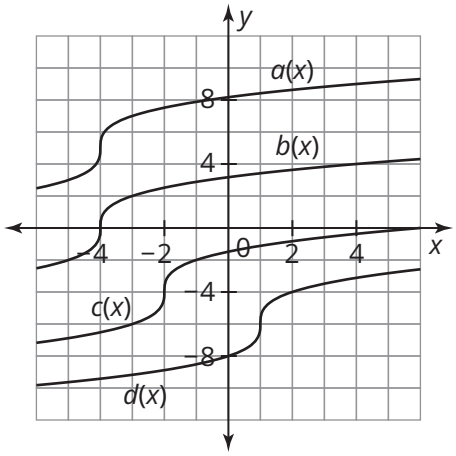
   a. Can the population be represented by an arithmetic or a geometric sequence? Explain your reasoning.
   b. For each wildlife preserve, write a sequence to represent the coyote population in a given year.
   c. For each wildlife preserve, write a function to represent the coyote population as a function of the year of the study.
   d. Use the functions you wrote in part (c) to complete the table. Round all answers to the nearest whole number.
   e. Graph and label the functions you wrote in part (c).
   f. Do the populations represent examples of exponential decay, exponential growth, or neither? Explain your reasoning.
   g. Will the coyote population on the Tennessee preserve ever exceed the coyote population on the Alaska preserve? If so, when will this occur?
   h. Make a hypothesis about the role the climate plays on coyote populations based on the results of the study, assuming all other population growth factors are equal. Explain your reasoning.

Stretch

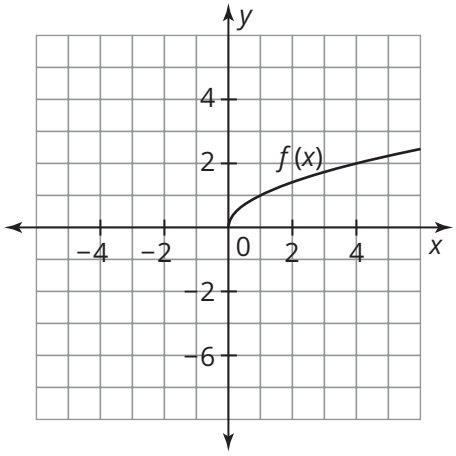
A sheet of paper is approximately 0.1 mm thick. Suppose you could fold the paper in half as many times as you wished, doubling the thickness each time, without tearing the paper. How many times would you need to fold the paper in order for its thickness to reach the Moon?

Review

1. Each of the four curves shown on the graph are transformations of $f(x) = \sqrt[3]{x}$ with a restricted domain.
   a. Describe each of the four transformations of $f(x) = \sqrt[3]{x}$ that were used to create the four functions in the design.
   b. Write each function used in the design. For each function, write the domain as an inequality.



2. The graph of $f(x) = \sqrt{x}$ is shown with the restricted domain of $0 \leq x \leq 6$.
   a. Sketch a function $g(x)$ to represent the reflection of $f(x)$ across the x-axis. Write the function $g(x)$.
   b. Sketch the functions $f'(x)$ and $g'(x)$ to represent reflections of the $f(x)$ and $g(x)$ across the x-axis. Write the functions $f'(x)$ and $g'(x)$.



3. Identify the extrema, zeros, and intercepts of the graph of $p(x)$.