Lesson 10 Practice Problems

1. A store receives 2,000 decks of popular trading cards. The number of decks of cards is a function, d, of the number of days, t, since the shipment arrived. Here is a table showing some values of d.

t	$d(t)$
0	2,000
5	1,283
10	823
15	528
20	338

Calculate the average rate of change for the following intervals:

a. day 0 to day 5

b. day 15 to day 20

2. A study was conducted to analyze the effects on deer population in a particular area. Let f be an exponential function that gives the population of deer t years after the study began.

If $f(t) = a \cdot b^t$ and the population is increasing, select **all** statements that must be true.

A. $b > 1$

B. $b < 1$

C. The average rate of change from year 0 to year 5 is less than the average rate of change from year 10 to year 15.

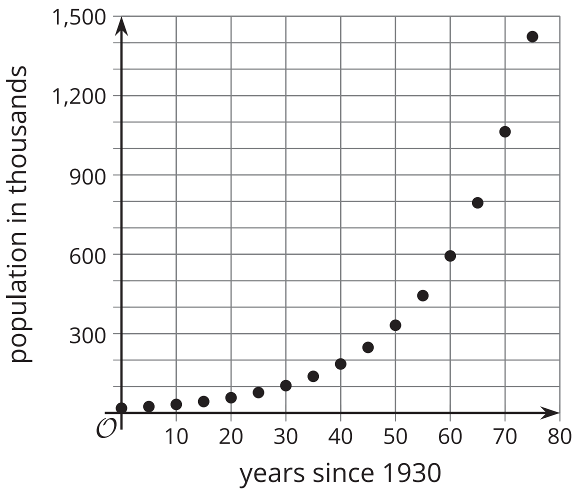
D. The average rate of change from year 0 to year 5 is greater than the average rate of change from year 10 to year 15.

E. $a > 0$

3. Function f models the population, in thousands, of a city t years after 1930.

   The average rate of change of f from $t = 0$ to $t = 70$ is approximately 14 thousand people per year.

   Is this value a good way to describe the population change of the city over that time period? Explain or show your reasoning.



4. The function, f, gives the number of copies a book has sold w weeks after it was published. The equation $f(w) = 500 \cdot 2^w$ defines this function.

   Select **all** domains for which the average rate of change could be a good measure for the number of books sold.

   A. $0 \leq w \leq 2$

   B. $0 \leq w \leq 7$

   C. $5 \leq w \leq 7$

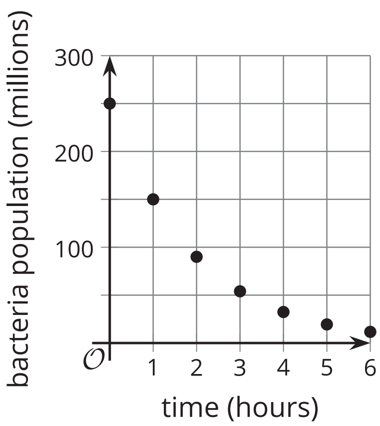
   D. $5 \leq w \leq 10$

   E. $0 \leq w \leq 10$

5. The graph shows a bacteria population decreasing exponentially over time.

   The equation $p = 100{,}000{,}000 \cdot \left(\frac{2}{3}\right)^h$ gives the size of a second population of bacteria, where h is the number of hours since it was measured at 100 million.

   Which bacterial population decays more quickly? Explain how you know.



(From Unit 5, Lesson 6.)

6. *Technology required.* A moth population, p, is modeled by the equation $p = 500{,}000 \cdot \left(\frac{1}{2}\right)^w$, where w is the number of weeks since the population was first measured.

    a. What was the moth population when it was first measured?

    b. What was the moth population after 1 week? What about 1.5 weeks?

    c. Use technology to graph the population and find out when it falls below 10,000.

(From Unit 5, Lesson 9.)

7. Give a value for r that would indicate that a line of best fit has a positive slope and models the data well.

(From Unit 3, Lesson 7.)

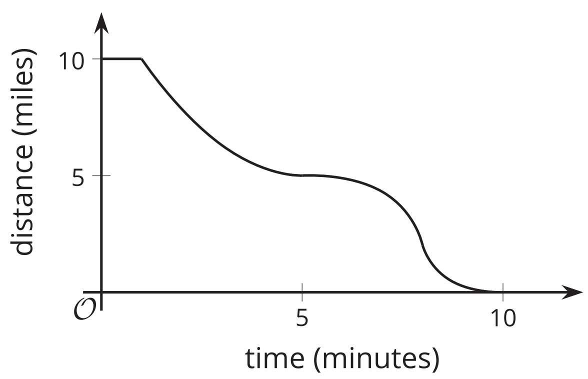
8. The size of a district and the number of parks in it have a weak positive relationship.

    Explain what it means to have a weak positive relationship in this context.

(From Unit 3, Lesson 8.)

9. Here is a graph of Han's distance from home as he drives.

    Identify the intercepts of the graph and explain what they mean in terms of Han's distance from home.



(From Unit 4, Lesson 6.)