Lesson 9 Practice Problems

1. The number of people with the flu during an epidemic is a function, f, of the number of days, d, since the epidemic began. The equation $f(d) = 50 \cdot \left(\frac{3}{2}\right)^d$ defines f.

   a. How many people had the flu at the beginning of the epidemic? Explain how you know.

   b. How quickly is the flu spreading? Explain how you can tell from the equation.

   c. What does $f(1)$ mean in this situation?

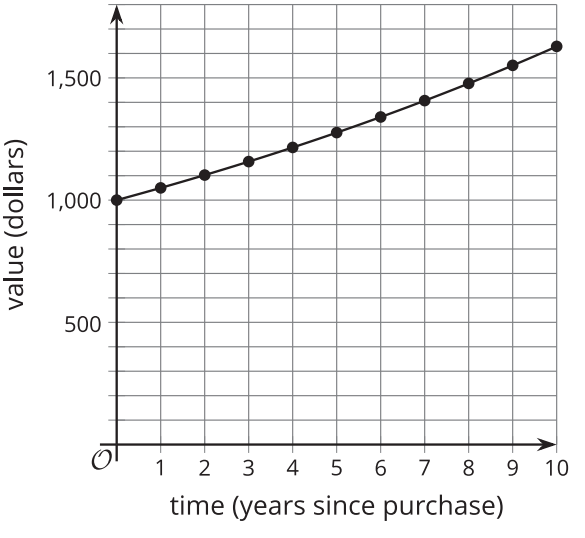
   d. Does $f(3.5)$ make sense in this situation?

2. The function, f, gives the dollar value of a bond t years after the bond was purchased. The graph of f is shown.

   a. What is $f(0)$? What does it mean in this situation?

   b. What is $f(4.5)$? What does it mean in this situation?

   c. When is $f(t) = 1500$? What does this mean in this situation?



3. *Technology required*. A function f gives the number of stray cats in a town t years since the town started an animal control program. The program includes both sterilizing stray cats and finding homes to adopt them. An equation representing f is $f(t) = 243\left(\frac{1}{3}\right)^t$.

   a. What is the value of $f(t)$ when t is 0? Explain what this value means in this situation.

   b. What is the approximate value of $f(t)$ when t is $\frac{1}{2}$? Explain what this value means in this situation.

   c. What does the number $\frac{1}{3}$ tell you about the stray cat population?

   d. Use technology to graph f for values of t between 0 and 4. What graphing window allows you to see values of $f(t)$ that correspond to these values of t?

4. Function g gives the amount of a chemical in a person's body, in milligrams, t hours since the patient took the drug. The equation $g(t) = 600 \cdot \left(\frac{3}{5}\right)^t$ defines this function.

   a. What does the fraction $\frac{3}{5}$ mean in this situation?

   b. Sketch a graph of g.

   c. What are the domain and range of g? Explain what they mean in this situation.

5. The dollar value of a moped is a function of the number of years, t, since the moped was purchased. The function, f, is defined by the equation $f(t) = 2{,}500 \cdot \left(\frac{1}{2}\right)^t$.

   What is the best choice of domain for the function f?

   A. $-10 \leq t \leq 10$

   B. $-10 \leq t \leq 0$

   C. $0 \leq t \leq 10$

   D. $0 \leq t \leq 100$

6. A patient receives 1,000 mg of a medicine. Each hour, $\frac{1}{5}$ of the medicine in the patient's body decays.

   a. Complete the table with the amount of medicine in the patient's body.

   b. Write an equation representing the number of mg of the medicine, m, in the patient's body h hours after receiving the medicine.

   c. Use your equation to find m when $h = 10$. What does this mean in terms of the medicine?

hours since receiving medicine	mg of medicine left in body
0	
1	
2	
3	
h	

(From Unit 5, Lesson 4.)

7. The trees in a forest are suffering from a disease. The population of trees, p, in thousands, is modeled by the equation $p = 90 \cdot \left(\frac{3}{4}\right)^t$, where t is the number of years since 2000.

   a. What was the tree population in 2001? What about in 1999?

   b. What does the number $\frac{3}{4}$ in the equation for p tell you about the population?

   c. What is the last year when the population was more than 250,000? Explain how you know.

(From Unit 5, Lesson 7.)

8. All of the students in a classroom list their birthdays.

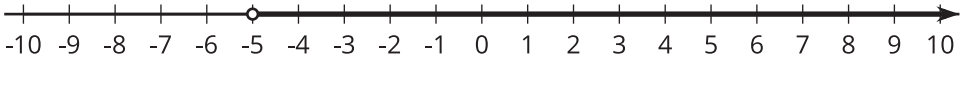
   a. Is the birthdate, b, a function of the student, s?

   b. Is the student, s, a function of the birthdate, b?

(From Unit 5, Lesson 8.)

9. Mai wants to graph the solution to the inequality $5x - 4 > 2x - 19$ on a number line. She solves the equation $5x - 4 = 2x - 19$ for x and gets $x = -5$.

   Which graph shows the solution to the inequality?

A.


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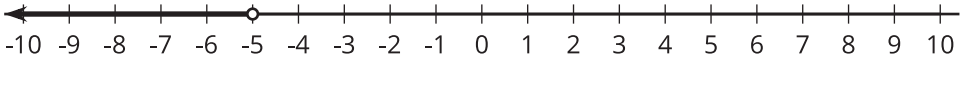

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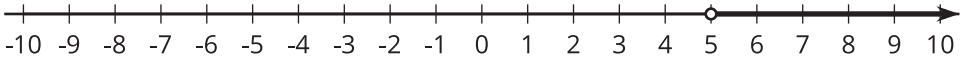

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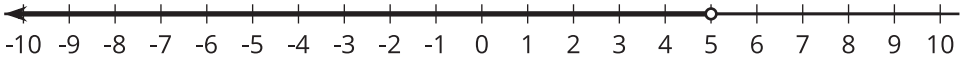

(From Unit 2, Lesson 19.)