

Lesson 8 Practice Problems

1. For an experiment, a scientist designs a can, 20 cm in height, that holds water. A tube is installed at the bottom of the can allowing water to drain out.

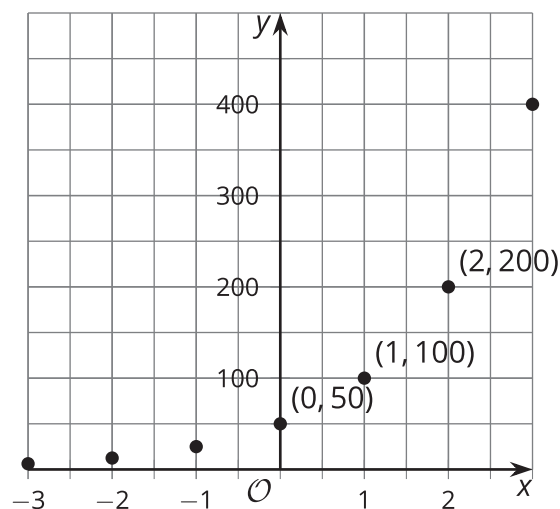
At the beginning of the experiment, the can is full. Every minute after the start of the experiment $\frac{2}{3}$ of the water is drained.

- Explain why the height of the water in the can is a function of time.
 - The height, h , in cm, is a function f of time t in minutes since the beginning of the experiment, $h = f(t)$. Find an expression for $f(t)$.
 - Find and record the values for f when t is 0, 1, 2, and 3.
 - Find $f(4)$. What does $f(4)$ represent?
 - Sketch a graph of f by hand or use graphing technology.
 - What happens to the level of water in the can as time continues to elapse? How do you see this in the graph?
2. A scientist measures the height, h , of a tree each month, and m is the number of months since the scientist first measured the height of the tree.
- Is the height, h , a function of the month, m ? Explain how you know.
 - Is the month, m , a function of the height, h ? Explain how you know.

3. A bacteria population is 10,000. It triples each day.
 - a. Explain why the bacteria population, b , is a function of the number of days, d , since it was measured to be 10,000.
 - b. Which variable is the independent variable in this situation?
 - c. Write an equation relating b and d .
4.
 - a. Is the position, p , of the minute hand on a clock a function of the time, t ?
 - b. Is the time, t , a function of the position of the minute hand on a clock?
5. The area covered by a city is 20 square miles. The area grows by a factor of 1.1 each year since it was 20 square miles.
 - a. Explain why the area, a , covered by the city, in square miles, is a function of t , the number of years since its area was 20 square miles.
 - b. Write an equation for a in terms of t .

6. The graph shows an exponential relationship between x and y .

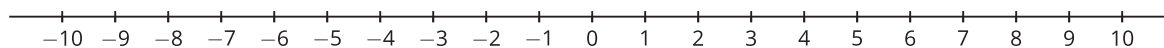
- a. Write an equation representing this relationship.
- b. What is the value of y when $x = -1$?
Label this point on the graph.
- c. What is the value of y when $x = -2$?
Label this point on the graph.



(From Unit 5, Lesson 7.)

7. Here is an inequality: $3x + 1 > 34 - 4x$.

Graph the solution set to the inequality on the number line.



(From Unit 2, Lesson 19.)

8. Here are the equations that define three functions.

$$f(x) = 4x - 5$$

$$g(x) = 4(x - 5)$$

$$h(x) = \frac{x}{4} - 5$$

a. Which function value is the largest: $f(100)$, $g(100)$, or $h(100)$?

b. Which function value is the largest: $f(-100)$, $g(-100)$, or $h(-100)$?

c. Which function value is the largest: $f(\frac{1}{100})$, $g(\frac{1}{100})$, or $h(\frac{1}{100})$?

(From Unit 4, Lesson 4.)