### 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.
	1. Explain why the height of the water in the can is a function of time.
	2. The height, $h$ , in cm, is a function $f$ of time $t$ in minutes since the beginning of the experiment, $h=f\left(t\right)$. Find an expression for $f\left(t\right)$.
	3. Find and record the values for $f$ when $t$ is 0, 1, 2, and 3.
	4. Find $f\left(4\right)$. What does $f\left(4\right)$ represent?
	5. Sketch a graph of $f$ by hand or use graphing technology.
	6. What happens to the level of water in the can as time continues to elapse? How do you see this in the graph?
1. 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.
	1. Is the height, $h$, a function of the month, $m$? Explain how you know.
	2. Is the month, $m$, a function of the height, $h$? Explain how you know.
2. A bacteria population is 10,000. It triples each day.
	1. Explain why the bacteria population, $b$, is a function of the number of days, $d$, since it was measured to be 10,000.
	2. Which variable is the independent variable in this situation?
	3. Write an equation relating $b$ and $d$.
	4. Is the position, $p$, of the minute hand on a clock a function of the time, $t$?
	5. Is the time, $t$, a function of the position of the minute hand on a clock?
3. 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.
	1. 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.
	2. Write an equation for $a$ in terms of $t$.
4. The graph shows an exponential relationship between $x$ and $y$.
	1. Write an equation representing this relationship.
	2. What is the value of $y$ when $x=-1$? Label this point on the graph.
	3. What is the value of $y$ when $x=-2$? Label this point on the graph.
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* (From Unit 5, Lesson 7.)
1. Here is an inequality: $3x+1>34−4x$.
* Graph the solution set to the inequality on the number line.
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* (From Unit 2, Lesson 19.)
1. Here are the equations that define three functions.
* $f\left(x\right)=4x−5$
* $g\left(x\right)=4\left(x−5\right)$
* $h\left(x\right)=\frac{x}{4}−5$
	1. Which function value is the largest: $f\left(100\right)$, $g\left(100\right)$, or $h\left(100\right)$?
	2. Which function value is the largest: $f\left(-100\right)$, $g\left(-100\right)$, or $h\left(-100\right)$?
	3. Which function value is the largest: $f\left(\frac{1}{100}\right)$, $g\left(\frac{1}{100}\right)$, or $h\left(\frac{1}{100}\right)$?
* (From Unit 4, Lesson 4.)



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