Lesson 6 Practice Problems

1. A population of 1,500 insects grows exponentially by a factor of 3 every week. Select **all** equations that represent or approximate the population, p, as a function of time in days, t, since the population was 1,500.

   A. $p(t) = 1{,}500 \cdot 3^t$

   B. $p(t) = 1{,}500 \cdot 3^{\frac{t}{7}}$

   C. $p(t) = 1{,}500 \cdot 3^7 t$

   D. $p(t) = 1{,}500 \cdot \left(3^{\frac{1}{7}}\right)^t$

2. The tuition at a public university was \$21,000 in 2008. Between 2008 and 2010, the tuition had increased by 15%. Since then, it has continued to grow exponentially.

   Select **all** statements that describe the growth in tuition cost.

   A. The tuition cost can be defined by the function $f(y) = 21{,}000 \cdot (1.15)^{\frac{y}{2}}$, where y represents years since 2008.
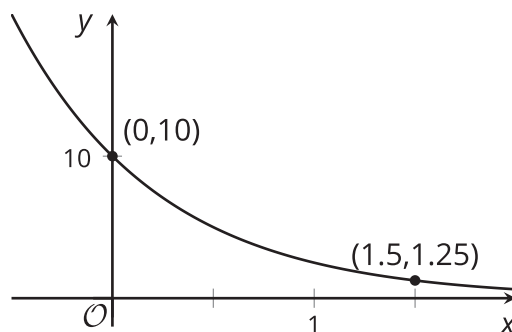
   B. The tuition cost increased 7.5% each year.

   C. The tuition cost increased about 7.2% each year.

   D. The tuition cost roughly doubles in 10 years.

   E. The tuition cost can be approximated by the function $f(d) = 21{,}000 \cdot 2^d$, where d represents decades since 2008.

3. Here is a graph that represents $g(x) = a \cdot b^x$. Find the values of a and b. Show your reasoning.

4. The number of fish in a lake is growing exponentially. The table shows the values, in thousands, after different numbers of years since the population was first measured.

years	population
0	10
1	
2	40
3	
4	
5	
6	

a. By what factor does the population grow every two years? Use this information to fill out the table for 4 years and 6 years.
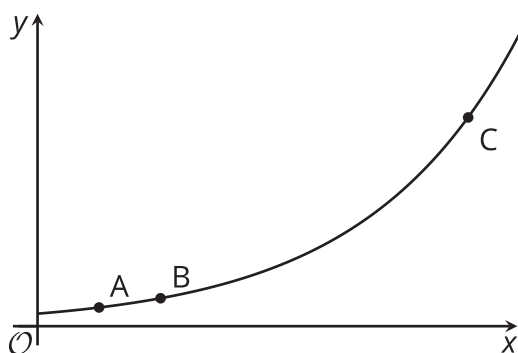
b. By what factor does the population grow every year? Explain how you know, and use this information to complete the table.

(From Unit 4, Lesson 3.)

5. The value of a home increases by 7% each year. Explain why the value of the home doubles approximately once each decade.

(From Unit 4, Lesson 4.)

6. Here is the graph of an exponential function f.

The coordinates of A are $\left(\frac{1}{4}, 3\right)$. The coordinates of B are $\left(\frac{1}{2}, 4.5\right)$. If the x-coordinate of C is $\frac{7}{4}$, what is its y-coordinate? Explain how you know.

(From Unit 4, Lesson 5.)