### 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.
	1. $p\left(t\right)=1,​500⋅3^{t}$
	2. $p\left(t\right)=1,​500⋅3^{\frac{t}{7}}$
	3. $p\left(t\right)=1,​500⋅3^{7}t$
	4. $p\left(t\right)=1,​500⋅\left(3^{\frac{1}{7}}\right)^{t}$
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.
	1. The tuition cost can be defined by the function $f\left(y\right)=21,​000⋅\left(1.15\right)^{\frac{y}{2}}$, where $y$ represents years since 2008.
	2. The tuition cost increased 7.5% each year.
	3. The tuition cost increased about 7.2% each year.
	4. The tuition cost roughly doubles in 10 years.
	5. The tuition cost can be approximated by the function $f\left(d\right)=21,​000⋅2^{d}$, where $d$ represents decades since 2008.
1. Here is a graph that represents $g\left(x\right)=a⋅b^{x}$. Find the values of $a$ and $b$. Show your reasoning.
* 
1. 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
 | *
 |

* 1. By what factor does the population grow every two years? Use this information to fill out the table for 4 years and 6 years.
	2. 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.)
1. 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.)
1. 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.)



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