### Lesson 18 Practice Problems

1. For each growth rate, find the associated growth factor.
	1. 30% increase
	2. 30% decrease
	3. 2% increase
	4. 2% decrease
	5. 0.04% increase
	6. 0.04% decrease
	7. 100% increase
2. In 1990, the population $p$ of India was about 870.5 million people. By 1995, there were about 960.9 million people. The equation $p=870.5⋅\left(1.021\right)^{t}$ approximates the number of people, in millions, in terms of the number of years $t$ since 1990.
	1. By what factor does the number of people grow in one year?
	2. If $d$ is time in decades, write an equation expressing the number of people in millions, $p$, in terms of decades, $d$, since 1990.
	3. Use the model $p=870.5⋅\left(1.021\right)^{t}$ to predict the number of people in India in 2015.
	4. The 2015, the population of India was 1,311 million. How does this compare with the predicted number?
3. An investor paid $156,000 for a condominium in Texas in 2008. The value of the homes in the neighborhood have been appreciating by about 12% annually.
* Select **all** the expressions that could be used to calculate the value of the house, in dollars, after $t$ years.
	1. $156,​000⋅\left(0.12\right)^{t}$
	2. $156,​000⋅\left(1.12\right)^{t}$
	3. $156,​000⋅\left(1+0.12\right)^{t}$
	4. $156,​000⋅\left(1−0.12\right)^{t}$
	5. $156,​000⋅\left(1+\frac{0.12}{12}\right)^{t}$
1. A credit card has a nominal annual interest rate of 18%, and interest is compounded monthly. The cardholder uses the card to make a $30 purchase.
* Which expression represents the balance on the card after 5 years, in dollars, assuming no further charges or payments are made?
	1. $30\left(1+18\right)^{5}$
	2. $30\left(1+0.18\right)^{5}$
	3. $30\left(1+\frac{0.18}{12}\right)^{5}$
	4. $30\left(1+\frac{0.18}{12}\right)^{5⋅12}$
1. The expression $1,​500⋅\left(1.085\right)^{3}$ represents an account balance in dollars after three years with an initial deposit of $1,500. The account pays 8.5% interest, compounded annually for three years.
	1. Explain how the expression would change if the bank had compounded the interest quarterly for the three years.
	2. Write a new expression to represent the account balance, in dollars, if interest is compounded quarterly.
2. The function, $f$, defined by $f\left(t\right)=1,​000⋅\left(1.07\right)^{t}$, represents the amount of money in a bank account $t$ years after it was opened.
	1. How much money was in the account when it was opened?
	2. Sketch a graph of $f$.
	3. When does the account value reach $2,000?
* (From Unit 5, Lesson 9.)
1. The graph shows the number of patients with an infectious disease over a period of 15 weeks.
	1. Give an example of a domain for which the average rate of change is a good measure of how the function changes.
	2. Give an example of a domain for which the average rate of change is not a good measure of how the function changes.
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* (From Unit 5, Lesson 10.)
1. A party will have pentagonal tables placed together. The number of people, $P$, who can sit at the tables is a function of the number of tables, $n$.
	1. Explain why the equation $P=3n+2$ defines this function.
	2. How many tables are needed if 47 people come to the party?
	3. How many tables are needed if 99 people come to the party?
	4. Write the inverse of this function and explain what the inverse function tells us.
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* (From Unit 4, Lesson 16.)



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