Name: _____ Date: _____

Exponential Growth and Decay Homework

$$Growth: y = P(1+r)^t \qquad Decay: y = P(1-r)^t$$

1) Given the equation $y = 35(0.57)^x$
   a) Does this equation represent growth or decay? _____
   b) What is the growth or decay factor? _____
   c) What is the rate of growth or decay? _____
   d) What is the initial value? _____
   e) Evaluate for x = 5 _____

2) Given the equation $y = 200(1.54)^x$
   a) Does this equation represent growth or decay? _____
   b) What is the growth or decay factor? _____
   c) What is the rate of growth or decay? _____
   d) What is the initial value? _____
   e) Evaluate for x = 2 _____

3) Given the equation $y = 15(1.073)^x$
   a) Does this equation represent growth or decay? _____
   b) What is the growth or decay factor? _____
   c) What is the rate of growth or decay? _____
   d) What is the initial value? _____
   e) Evaluate for x = 7 _____

4) Ryan is saving for his college tuition. He has $2,550 in a savings account that pays 6.25% annual interest.

   a) Write an exponential equation describing this situation. _____

   b) How much money will Ryan have in his account 6 years from now?

5) Josh's parents purchased a used car for him at $12,329 this year. Each year the car's value decreases 5.5%.

   a) Write an exponential equation describing this situation. _____

   b) What will the car be worth in 2020?

   c) How long does it take for the car to be worth less than half the original value?

6) Ms. Wise writes novels in her spare time. Her first year of sales she made $1,212. Each of the following years her profit increased 12%.

a) Write an exponential equation describing the situation. _____

b) What will she make in 20 years?

7) Dianna just bought a home. She paid $240,000. She is able to pay 20% of the loan off each year.

a) Write an exponential equation describing the situation. _____

b) What will she owe in 10 years?

8) A radioactive material decays at a rate of 40% per hour.

a) If we start with 80 grams of the substance, can you find a formula that models this rate of decay? _____

b) How much will be remaining at the end of 6 hours?

c) Will we have less than a gram before the end of the day? About how many hours does it take to decay to less than 10 grams?

9) The number of mosquitoes at the beach has tripled every year since 1999. In 1999, there were 2,500 mosquitoes.

a) Write an exponential model for this situation. _____

b) How many mosquitoes would you predict were at the beach in 2005?

10) Ellie started a service club at her high school. After all of the members signed up and paid dues, the club started the year with $500. Each month, the club collects 11% of their total the previous month.

a) Write an exponential equation describing the situation. _____

b) After one year, how much money will the club have collected?

c) How long will it take the club to collect over $5,000?