

Name: _____
Date: _____
Class: _____

Algebra
Unit 6
HW 6-6

1) A population of flies is growing at a constant rate of 8% per hour. The population at $t = 0$ is 32 flies. Create an equation that will find the population at different times. Use this equation to find the population at $t = 10$.

2) The balance in an account can be found using $S(t) = 250(1.045)^t$. What is the initial amount invested? What is the interest rate? At $t = 11$, how much money is in the account?

3) Water is draining out of tank at a constant rate of 12% per 30 minute period. The initial height of the water is 22ft. Create a function $H(t)$ that can be used to find the height of the water (where t is the number of 30 minute periods that have occurred). Use this function to determine $H(6)$.

4) Graph $A(t) = 250(1.15)^t$ on the interval $0 \leq t \leq 30$. Using this graph, estimate when $A(t) = 3000$.

5) If a flock of ducks is growing by 6% per year and starts with a population of 68, how many ducks will be in the flock after 10 years?

6) The amount, A , in grams of a radioactive material that is decaying can be modeled by $A(d) = 450(0.88)^d$, where d is the number of days since it started its decay.

Using this function, what is the average rate of change from $d = 2$ to $d = 6$?

7) Newton's Law of Cooling can be used to predict the temperature of a cooling liquid in a room that is at a certain steady temperature. We are going to model the temperature of a cooling cup of coffee. The Fahrenheit temperature of a cup of coffee, T , in a room that is at a 72°F is given as a function of the number of minutes, m , it has been cooling by:

$$T(m) = 114(0.86)^m + 72$$

What does the 114 and the 72 represent in this function?

8) Using the function in #7, sketch a graph from $m = 0$ to $m = 10$.

9) Will the $T(m)$ value (in #7) ever fall below 72? Explain your answer.