# 4.6 WS

1. The number of bacteria $N(t)$ present in a culture at time $t$ hours is given by $N(t) = 2200(2)^t$. Find the number of bacteria present when:
   a. $t = 0$ hours
   b. $t = 3$ hours

2. A city had a population of 22,600 in 2007 and a population of 24,200 in 2012.
   a. Find the exponential growth function for the city. Use $t = 0$ to represent 2007.
   b. Use the growth function to predict the population of the city in 2022. Round to the nearest hundred.

3. Find the decay function for the amount of polonium ($^{210}Po$) that remains in a sample after $t$ days.

4. Geologists have determined that Crater Lake in Oregon was formed by a volcanic eruption. Chemical analysis of wood chip assumed to be from a tree that died during the eruption has shown that it contains approximately 45% of its original carbon-14. Estimate how long ago the volcanic eruption occurred.

5. Find the balance if $4500 is invested at an annual interest rate of 2.5%, compounded annually, for
   a. 5 years
   b. 12 years

6. How long with it take $1000 to triple if it is invested at an annual interest rate of 5.5% compounded continuously? Round to the nearest year.

**Solve the following equations. Be sure to check your answers.**

7. $\ln(x-1)=3$

8. $-2=\log(2)-\log(x+3)$

9. $4\ln(2x+3)=11$

10. $\log_2(x+5)-\log_2(x-2)=3$

11. $4^{x-3}=\frac{1}{16}$

12. $2e^{0.5x}=45$