Name _____

Homework 14
Sections 4.1 & 4.2

1. (4) $2400 is invested in an account which compounds interest semiannually. What interest rate (to the nearest 0.01%) is needed so that the balance in the account at the end of 3 years is $2700?

2. (4) Suppose $900 is deposited in an account which pays $2\frac{1}{2}\%$ interest, compounded continuously. What is the balance at the end of 8 years?

3. (4) How much *interest is earned* in 4 years on a \$1200 investment, if it is invested in an account which pay 5.2% and compounds interest continuously?

4. (4) A particular radioactive substance is known to decay according to the continuous exponential model $Q(t) = Q_0 e^{-0.108t}$, when t is measured in years. What percentage (to the nearest 0.01%) of the original amount of the substance is left after 5 years?

5. (4) Caffeine is a chemical stimulant found in coffee and some soda. A typical human body eliminates 10% of the compound each hour after ingestion.

   Suppose George enjoys a double espresso (60 milligrams of caffeine), at the beginning of a lab class which begins at 1:00 pm. Write an exponential function of the form $Q(t) = Q_0(a)^t$ that models the amount of caffeine present in George's body t hours after 1:00 pm and use your model to determine how much caffeine is left in his system when his class ends at 3:30 pm.