Problem Set: Continuous Compounding

 # 1: How much is a \$5000 investment in 9 years if invested at a continuously compounded rate of 6%?

 # 2: How long does it take to double \$9000 invested at a continuously compounded interest rate of 2%? If the investment is worth \$15,000 in 8 years, what continuously compounded rate was it invested at?

 # 3: Consider a \$1000 investment made at an annually compounded interest rate of 6% for 5 years. What is the equivalent semiannually compounded rate which grows the investment to the same level in 5 years? What about an equivalent monthly compounded rate? Continuously compounded rate?

 # 4: Prove the relation

$$r = k \log\Big(1 + \frac{r_k}{k}\Big)$$

between a continuously compounded interest rate r and a periodically compounded rate r_k with compounding frequency k, and show that the inverse relation is

$$r_k = k(e^{r/k} - 1)$$

(**Hint:** as for the relation between different periodically compounded rates, equate the growths of investments at the 2 different rates for a year).

 # 5: If a loan has an APR of 3.5%, continuously compounded, what is the EAR?

 # 6: (a) What happens to the relationship between APR and EAR as the compounding frequency increases to infinity?

(b) What is the highest possible EAR you can achieve for a 1 year investment at an APR of 5%?