1. An investment of $1000 is made at interest rate 5% p.a. with continuous compounding. What is the value of the investment after 2 years. Compare this result with the same investment with daily compounding assuming 360 days per year.

2. An amount $A$ is invested at interest rate $r$ p.a. with continuous compounding for $T$ years. What is the equivalent interest rate $R$ p.a. with compounding $m$ times per year that yields the same future value.

3. What interest rate with continuous compounding is equivalent to 10% p.a. with monthly compounding.

4. What is the future value of a $1000 investment after 5 years with continuous compounding assuming an interest rate of 5% p.a. for the first 6 months, 5 1/4% p.a. for the next year, and 5% p.a. for the remaining time.

5. What is the present value ($t = 0$) of $1000 at time $T = 2$ with continuous compounding and a 5% p.a. interest rate.

6. Compute the present value ($t = 0$) of $1000 at time $T = 2$ with the interest rate structure described in problem 4.

7. What is the present value of investment that will payout $1000 for 5 consecutive years starting 10 years from today. Assume an interest rate of 7% with continuous compounding.

8. Which of the following sequence of yearly payouts (starting one year from now) is preferable, i.e. the largest present value.

   (a) 1200, 1400, 1600, 1800, 2000
   (b) 1600, 1600, 1500, 1500, 1500
   (c) 2000, 1600, 1400, 1200, 1000

   if $r = 10\%, 20\%, \text{ and } 30\%$. 