1) Suppose an annuity *due* consists of 8 yearly payments of $500 and the interest rate is 10% compounded semiannually. Determine
   (a) the present value of the annuity
   (b) the future value of the annuity

2) Ten different books are to be arranged horizontally on a bookshelf.
   (a) In how many ways can this be done?
   (b) If three are mathematics books, five are accounting books, and two are history books. In how many ways can all the books be arranged if the first three books are to be in mathematics and last two books are to be history books?

3) Two cards are randomly drawn with replacement from a standard deck of 52 playing cards. Find the probability that
   (a) both cards are kings;
   (b) the first card is black and the second card is a diamond;
   (c) one card is red and the other is a black.
4) Determine the present value of $5000 due in 7 years if the interest rate is:
   (a) 9.9% compounded semiannually
   
   (b) 9.9% compounded continuously

5) An urn contains five red, four green, and six blue markers. Three markers are randomly drawn in succession without replacement. Determine the probability that
   (a) the first markers is red, the second is blue, and the third is green;

   (b) all the markers are red.

6) A company earns a profit of $2000 in its first month. Suppose its profit increases by 15% each month for two years. Find the amount of profit the company earns in its sixth and sixteenth months.
7) You have a choice of two banks. One bank pays interest at 7.99% compounded monthly and the other bank pays interest at 7.95% compounded daily (365 times a year). Which is the better choice? How much more would you make in one year if you deposited $10,000?

8) Over a period of 5 years, an original principal of $1000 accumulated to $1400 in an account. Determine the interest rate if the interest is:
   (a) compounded quarterly
   (b) compounded continuously

9) If $30,000 is used to purchase an annuity consisting of equal payments at the end of each quarter for the next 5 years and the interest rate is 8% compounded quarterly, find the amount of each payment.
10) A coin is tossed three times. Determine the following events and their probabilities:
   (a) the event $E_1$ that exactly two tails occur;
   (b) the event $E_2$ that at least two tails occur;
   (c) the event $E_3$ that no tail occurs.

11) Suppose a person deposits $1000 in a savings account at the end of every six months for ten years at a rate of 10% compounded semiannually.
   (a) Find the present value of the annuity
   (b) What is the value of the account at the end of five years

12) In seven years a company will purchase equipment costing $90,000. The company decides to place a single deposit into a savings account now so that its future value will equal the cost of the equipment. If the account earns interest at an annual rate of 12% compounded continuously, determine the deposit to the nearest dollar.
13) Find the effective rate that corresponds to a nominal rate of 12% if the interest is
(a) compounded monthly

(b) compounded continuously

14) A company repays a $80,000 loan by paying 12% of the outstanding loan each month. Find the
amount the company pays in the fourth and fourteenth months.

15) (a) If $P(F) = 0.59$, $P(E \cup F) = 0.72$, and $P(E \cap F) = 0.25$, find $P(E')$.

(b) If $P(F) = 0.39$, $P(E \cup F) = 0.82$, and $P(E) = 0.21$, find $P(E \cap F)$.

16) A person deposits $15,000 in a savings account that pays an interest rate of 5.5% compounded
continuously. Find the balance in the account at the end of 5.5 years.