Homework Problems for Chapter 21

Compound Interest

1. I invest $300 at 10% compounded semiannually for three years.
   a. How much do I have at the end of the three years?
   b. How much interest did I earn during the second six months?
   c. What was the effective rate of interest for this investment?

2. I invest $1,000 at 8% compounded quarterly for two years.
   a. What is the accumulated value after two years?
   b. What is the effective rate of interest here?
   c. How much total interest did I receive?

3. I invest $500 at 12% compounded monthly for a year.
   a. How much interest do I earn during the 7th month?
   b. How much is in my account at the end of the third month?
   c. What is the effective rate of interest here?
   d. How much will I have at the end of the year?

4. I invest $2,000 at 5% compounded annually for ten years.
   a. How much is in my account at the end of six years?
   b. How much interest do I earn in the 8th year?
   c. How much interest do I earn in the first three years?
   d. What is the accumulated value at the end of the ten years?

5. An investment at 12% compounded quarterly accumulated to $1,000 at the end of three years.
   a. What was the amount of the original investment?
   b. What was the total amount of interest earned?
   c. What is the effective rate of interest here?

6. An investment at 8% compounded semiannually accumulated to $4,500 at the end of eight years.
   a. What was the principal investment?
   b. How much interest was earned during the first six months?
   c. How much interest was in the account at the end of five years?

7. At 18% compounded monthly, how much must I invest to accumulate $10,000 in two years?
Annuities

8. For each of the following annuities, find the accumulated value and the present value:
   a. 12 year annuity of $200 at 6% compounded annually;
   b. 15 year annuity of $150 at 10% compounded semiannually;
   c. 5 year annuity of $400 at 16% compounded quarterly;
   d. 1 year annuity of $50 at 18% compounded monthly.

9. For each annuity in Problem 8, find what the periodic deposit should have been to yield the respective accumulated value:
   a. $3,500
   b. $10,000
   c. $15,000
   d. $1,304

Amortization

10. Having examined his budget, Joe figures he can afford $250 per month for a car payment. The interest rate is 12% compounded monthly for a three year (36 month) payment period. How much of a loan can he afford for a car?

11. For each of the following, construct an amortization table.
   a. A purchase of $1,000 with a $100 down payment financed over six months at 12% compounded monthly.
   b. A purchase of $2,000 with no down payment financed over four months at 18% compounded monthly.
   c. A purchase of $1,650 with a $250 down payment financed over eight months at 12% compounded monthly.
   d. A purchase of $5,000 with a $500 down payment financed over twelve months at 18% compounded monthly.

Answers

#1: 402.03, 15.75, 10.25 #2: 1171.70, 8.24, 171.70 #3: 5.31, 515.15, 12.68, 563.40
#4: 2680.20, 140.71, 315.20, 3257.80 #5: 701.36, 298.64, 12.55 #6: 2402.56, 96.10, 3556.27
#7: 6995.45 #8: (a) 3374.00, 1676.77 (b) 9965.70, 2305.86 (c) 11911.00, 5436.08 (d) 652.00, 545.33
#9: 207.46, 150.52, 503.74, 100.00 #10: 7526.88