

The Problem Set

General Instructions: Show formulas used to solve problems. Display the appropriate numbers in the formulas, so partial credit can be assigned if the results aren't quite right. Again, assume the interest rates given are nominal (yearly) rates. When working with money, round off the final answer to the nearest penny.

1. You went to “Electronics R Us” and purchased a stereo for \$1,300. They charge you 18% annual interest, compounded monthly, to carry your contract. If you make monthly payments and the loan is to be paid off in 2 years, how much is your monthly payment? What did that stereo really cost you?
2. What would be your semi-annual payment if you borrow \$13,000 at 6.7% interest for a period of 7 years? (Assume the interest is only compounded semi-annually also. The formulas get a lot more complicated than given in the book if the compounding by the lender is done at a different rate than the payment schedule.)
3. “Bob’s Sell-A-Dent” has a wide selection of used cars. You can afford to pay at most \$300 per month. Bob offers to carry the loan contract at an annual rate of 11% for a period of 2 years. A car that you wish to buy would cost you \$7,000. Is this car within your budget? (Show work to validate your answer) What’s the minimum down-payment (to the nearest dollar) that would be required to bring the monthly payments within your budget?
4. Suppose you buy a house and will have a mortgage of \$125,000 to pay off over 29 years, paid off on a monthly basis, at an annual interest rate of 7.8%. Find your monthly payment. Find the amount of interest you paid. (Did this surprise you?)
5. If you’re allowed to make extra payments on your mortgage without penalty, many financial experts tell you to pay just a little more per month than you have to. Suppose you make an extra \$25 per month payment each month over your answer in problem (4.) above. Solve the equation for t . (This extra payment will mean you will pay off your loan in a lesser amount months. You will need to use logarithms to solve your equation.) With your increased payment and lesser number of years, how much did you pay total for the house? How much did you save over what you would have paid in problem (4.) above?
6. Suppose you invest \$400 per month into an account that pays 6% annual interest, compounded monthly, for 30 years. At the end of that time, how much can you take out of the account monthly so that the account is used up in another 30 years? (Assume the account continues to be compounded monthly at 6%.)
7. You are planning to buy a new car in 4 years that will probably have a price tag in the neighborhood of \$32,000. You start having \$250 per month taken out of your paycheck that goes into a savings account (compounded monthly at 5.5% interest) for 4 years. You then take out that money (to nearest dollar) and use it for a down payment on the car of your dreams. If you talk the salesman down to a final price of \$30,500, **what will be your monthly payment** if the financing is for 5 years, compounded monthly at 8.9%? (Assume you have the payment taken out automatically from your paycheck). Also, **what did you really pay for that car** in terms of actual money out of your paycheck over all those years?

8. Suppose you have \$400,000 in a retirement fund that is being compounded continuously at 6%. How much will you take out each month if you plan to use up all the money in 20 years? Hint: This is not the “usual” case, since the compounding is being done continuously, whereas the payments are taken out monthly. Go back to the section on effective interest rate, and use the ideas there to find what monthly interest rate is the same as the continuous interest rate.