Engineering Economy Class Problems

Class Problem 1 - We learned in class that if we want to have $5,000,000 when we retire in 50 years, and our money will earn 10% interest, then we need to put $42,593 in the bank now. However, we realized that we don't have that much money. If we commit to saving some money every month between now and retirement, then how much do we need to save monthly to have $5,000,000 at the end of 50 years? Again, assume a 10% interest rate. $287

Class Problem 2 - Dr. Swanbom has just won $100,000,000 in the lottery and is about to resign his position at the university. Before he does, he needs some financial advice from his ENGR 122 students. Should he (1) take the $100,000,000 in the form of annual payments of $5,000,000 for the next 20 years, or (2) take $40,000,000 as a lump sum payment now? Assume that with both options he won't spend any of the money, but will instead invest all of it at 9% interest compounded yearly. Neglect the effect of taxes on both options.
   option 1: F = $255.8 million
   option 2: F = $224.2 million

Class Problem 3 - Dr. Cronk is considering whether or not to re-finance the mortgage on his home. He owes $100,000 on his home, and will continue paying the mortgage for the next 25 years. He currently is paying 7% interest on the mortgage.
   (a) What are his current monthly payments? $707
   (b) How much interest will he pay over the next 25 years if he keeps his present mortgage? (In other words, how much does his current loan cost?) $112,034

If Dr. Cronk re-fineses the home, he will have to pay the mortgage company $4,000 for the costs of refinancing the loan. The company will add that to his balance, so that he will owe $104,000 on the house. However, the interest rate will drop to 6.5%. Assuming that Dr. Cronk re-fineses for 25 years, then:
   (c) What will his new monthly payment be? $702
   (d) How much will his new loan cost? (Hint: Include interest charges and the cost of refinancing.) $110,665
   (e) Should Dr. Cronk keep his current loan or re-finance his home? Why?

Class Problem 4 - The Biomedical Engineering Program is interested in purchasing a new scanning electron microscope (SEM). The cost of the microscope is $50,000; however, the prices have been dropping at the rate of about 5% per year. The program can set aside about $8000 annually into an account that will accrue interest at 10%. How long will it be before BME can purchase the microscope?
   5 years; will have $10,152 more than needed at the end of 5 years