**Midterm 1** (100 points)

1. (12 points) Suppose you save $10,000 a year for retirement. Assuming your investment has a 7% annual return, how much money will you have saved after 40 years.

2. (12 points) Calculate the present value of the following cashflow associated with owning a car. Use a 5% annual discount rate. You pay $24,000 now. Then in years two through six you pay $400 in maintenance each year (in the first year, maintenance is covered by the warranty). Then after six years you sell the car for $15,000.

3. You and a friend are renting a condo for $1,100 a month. The landlord offers to sell you the condo for $200,000. Assume a discount rate of a 3% annual rate compounded monthly and that the rent remains constant.

a) (8 points) Should you take the landlord’s offer?

b) (8 points) Suppose that the landlord’s offer is still valid after six months. Suppose you decide to rent for six months and then take the landlord’s offer. How does the discounted cost of this alternative compare to the cost of buying now?

4. A loan shark (or pay-day lender) charges $15 to borrow $1000 for a month, that is you need to pay back $1,015 in a month.

a) (8 points) What is the effective annual interest rate?

b) (4 points) What is the annual rate compounded monthly?

5. (8 points) Your local dry cleaners gives a 10% discount when you pre-pay instead of paying 2 days later when you pick it up. What is the effective annual rate for the time value of money implied by this discount?

6. (8 points) Your condo association recently repaired the building roof for $10,000. The contractor assesses a 20% penalty if the bill is paid 90 late (instead of immediately). What is the effective annual interest rate of this penalty (90 days is roughly ¼ year)?

7. Five years ago you bought a home and took out a 30 year mortgage for 250k at 6.5%. Suppose you’ve made monthly payments of $1700. (Note: this may be higher than the minimum monthly payment.)

a) (8 points) What is the remaining balance on the mortgage today?

b) (8 points) What is the monthly payment if you would refinance the mortgage with a new 15-year mortgage at 3%?

8. (16 points) You qualified for a 30-year mortgage with a 20% down payment at a 3.5% interest rate. You have saved $20k for a down payment and believe that you can afford a $1100 monthly payment. How expensive a house can you buy?