Whitman College
Econ 358
February 17, 2010
Exam 1

Show all of your work. The exam ends at 10:50.
For the graph in question 3(c), use the graph paper provided. Otherwise, write all answers in your blue book.

1. (10pts) List the four functions of financial markets described in class.

2. Consider Fisher's simple savings model of a two period pure-exchange economy with one divisible non-durable good at each date. Suppose the market interest rate is 10%. A particular individual, Sarah, has endowments of 40 units of the date 1 good and 0 units of the date 2 good. Sarah has an investment opportunity that costs 40 now and provides benefits, with certainty, of 47 next period.

(a) (10pts) Calculate the net present value of this project.

(b) (5pts) Use this example to explain what present value means.

Sarah gets a relatively high amount of satisfaction from date 1 consumption and a relatively low amount of satisfaction from date 2 consumption. She is thinking of rejecting this investment opportunity because it requires her to trade away all of her date 1 endowment.

(c) (25pts) Using indifference curve analysis, explain whether Sarah is better off rejecting or accepting this investment opportunity. You should refer to a graph that includes budget lines and indifference curves. Draw that graph on graph paper.

3. (a) (10pts) Define an annuity.

(b) (10pts) Derive the formula for the annuity factor, which gives the present value of an annuity of one dollar when the interest rate is r. Show and thoroughly explain all of your work.

4. Until the 1970's, the typical home mortgage was a 20-year loan. To enable borrowers to buy more expensive houses, lenders started offering 30-year mortgages. For parts (a)-(c), consider a hypothetical borrower with an annual income of $45,000.

(a) (10pts) Suppose the market interest rate is 7%. How much could this person borrow if she took out a 20 year mortgage with an annual payment that was one-third of her income?

(b) (10pts) Suppose again that the market interest rate is 7%. How much could she borrow if she took out a 30 year mortgage with an annual payment that was one-third of her income?

Before the current subprime mortgage crisis, the lending standards for granting home mortgages in the United States were fairly high. For instance, lenders would not generally grant mortgages to applicants whose debt payments would take more than one-third of their income. One of the factors that contributed to the run up in housing prices and the subprime crisis is that in the early 2000's some lenders relaxed the limit on the percentage of income that mortgage borrowers could devote to debt payments. Another factor was that mortgage interest rates fell, due to a world glut of savings and due to policy measures that the United States Federal Reserve took.

(c) (10pts) How much could this person borrow if she took out a 30 year mortgage with an annual payment that was one-half of her income, and the market interest rate is 5%?