1. (10 pts. 5 min.) What yearly rate do you need to earn to double the after tax purchasing power of your money in 10 years if the annual inflation rate is 3%, and your marginal tax rate is 35%?

2. (15 pts. 10 min.) You earn $7,000 per month and have $50,000 available for the down payment on a house. At the bank you are told that the interest rate on a 30 year mortgage is 8% compounded monthly. What is the largest mortgage that you can secure if the bank will lend you the smallest of (i) 80% of the price of the house and (ii) the present value at 8% of 360 payments, each equal to 30% of your current monthly income.

3. (15 pts. 5 min.) Find the equivalent uniform cash flow \( F_n = A, n = 0, 1, \ldots, N - 1 \), that is equivalent to a present sum \( P \), at interest rate \( i \).

4. (15 pts. 5 min.) A firm is considering an investment with cash flow \( F_0 = -\$1,000, F_1 = \$2,400 \) and \( F_2 = -\$1,430 \). The roots of \( PV(i) = 0 \) are \( i = 10\% \) and \( i = 30\% \). Is the investment mixed? What is the largest rate at which you can borrow money to invest in the project and still break even if over-recovered balances can be invested at \( j = 20\% \).

5. (10 pts. 5 min.) Suppose that you are free to decide the depreciation schedule of a certain amount, say \( P - F \), over the next 5 years. Give the schedule that maximizes the discounted tax savings if the MARR is 10% and the marginal tax rates for the five years are \( t_1 = 30\%, t_2 = t_3 = t_4 = t_5 = 35\% \).

6. (10 pts. 5 min.) (True or False) In a capital budgeting problem in which you can borrow and lend unlimited amounts at rate \( i \), all projects with positive present value (discounted at rate \( i \)) should be selected regardless of the budget constraint(s).

7. (15 pts. 10 min.) Let \( \rho_n, n = 0, \ldots, N \) be the dual variables of a horizon LP model. A new project, say \( J + 1 \), with post-horizon value \( \hat{a}_{J+1} \) (discounted to time \( N \)) and cash flow \( a_n, J+1, n = 0, 1, \ldots, N \) needs to be considered. When can you reject project \( J + 1 \) without re-solving the linear program? Apply the criterion when \( N = 2, J = 2, \hat{a}_3 = 100, a_{03} = -100, a_{13} = -20, a_{23} = 70, \rho_0 = 1.5, \rho_1 = 1.25, \rho_2 = 1. \)