Problem 1. Suppose the nominal money supply grows from $M_0 = 500$ to $M_1 = 550$, real income grows from $Y_0 = 100$ to $Y_1 = 105$, and the velocity of money is constant. Using the quantity theory of money, solve for the exact rate of change in the price level, as well as the approximate rate of change in the price level using the most common approximation.

Problem 2. Suppose you lend \$100 for one year and the expected annual rate of inflation is $\pi^e = 0.04$. What annual nominal interest rate i will give you ex-ante real rate of return $r^e = 0.02$?

Problem 3. Suppose the expected rate of inflation is 4 percent and the ex-ante real interest rate is 2 percent. Suddenly the expected rate of inflation increases to 6 percent. According to the Fisher effect, what is the new ex-ante real interest rate?

Problem 4. Suppose the annual nominal interest rate is always $i = 0.05$.

(a) What is the future value of 100 of today's dollars?

(b) What is the present value of 200 dollars you'd receive one year from now?

(c) What is the present value of 200 dollars you'd receive one year from now, plus 300 dollars you'd receive two years from now?

(d) What is the present value of 200 dollars you'd receive annually and perpetually, starting one year from now?