Introduction to Finance

Problem Set 2

Question 1

You expect to have $8,000 in one year. A bank is offering loans at 4.5% interest per year. How much can you borrow today?

Question 2

Qualcomm has developed a groundbreaking new CPU chip. The patent on the chip will last 17 years. You expect that the chip's profits to be $4 million in its first year and that this amount will grow at a rate of 5% per year for the next 17 years. Once the patent expires, Intel will be able to produce the same chip and competition will likely drive profits to zero. What is the present value of the new chip if the interest rate is 8% per year?

Question 3

Assume that Social Security promises you $50,000 per year starting when you retire 45 years from today (the first $50,000 will get paid 45 years from now). If your discount rate is 4%, compounded annually, and you plan to live for 17 years after retiring (so that you will receive a total of 18 payments including the first one), what is the value today of Social Security's promise?

Question 4

Consider the following three stocks.

a. Stock A is expected to provide a dividend of $10 a share forever.
b. Stock B is expected to pay a dividend of $5 next year. The dividend growth is expected to be 4% per year forever.
c. Stock C is expected to pay a dividend of $5 next year. The dividend is expected to grow by 20% annually for 5 years (i.e., until year 6) and then pay no dividend forever.

If the discount rate for each stock is 10%, which stock is the most valuable?