Problem Sets 7

1. Future and present values
Suppose a relative has promised to give you $1,000 as a wedding gift the day you get engaged. Assuming a constant interest rate of 5%, consider the present and future values of this gift, depending on when you become engaged. Complete the first row of the following table by determining the value of the gift in one and two years with interest if you become engaged today and save the money.

Date Received	Present Value (Dollars)	Value in One Year (Dollars)	Value in Two Years (Dollars)
Today	1,000.00		
In 1 year		1,000.00	
In 2 years			1,000.00

Now complete the first column of the previous table by computing the present value of the gift if you get engaged in one year or two years. The present value of the gift is _____ if you get engaged in two years than it is if you get engaged in one year.

2. Which lottery payout scheme is better?
Suppose you win a small lottery and have the choice of two ways to be paid: You can accept the money in a lump sum or in a series of payments over time. If you pick the lump sum, you get $2,850 today. If you pick payments over time, you get three payments: $1,000 today, $1,000 1 year from today, and $1,000 2 years from today.

1) At an interest rate of 9% per year, the winner would be better off accepting the _____, since that choice has the greater present value.
2) At an interest rate of 11% per year, the winner would be better off accepting _____, since it has the greater present value.
3) Years after you win the lottery, a friend in another country calls to ask your advice. By wild coincidence, she has just won another lottery with the same payout schemes. She must make a quick decision about whether to collect her money under the lump sum or the payments over time. What is the best advice to give your friend?
   A. The lump sum is always better.
   B. The payments over time are always better.
   C. It will depend on the interest rate; advise her to get a calculator.
   D. None of these answers is good advice.

3. Risk and return

Suppose Dina is choosing how to allocate her portfolio between two asset classes: risk-free government bonds and a risky group of diversified stocks. The following table shows the risk and return associated with different combinations of stocks and bonds.

Combination	Fraction of Portfolio in Diversified Stocks *(Percent)*	Average Annual Return *(Percent)*	Standard Deviation of Portfolio Return (Risk) *(Percent)*
A	0	2.50	0
B	25	3.50	5
C	50	4.50	10
D	75	5.50	15
E	100	6.50	20

If Dina reduces her portfolio's exposure to risk by opting for a smaller share of stocks, she must also accept a _____ average annual return.

Suppose Dina currently allocates 25% of her portfolio to a diversified group of stocks and 75% of her portfolio to risk-free bonds; that is, she chooses combination B. She wants to increase the average annual return on her portfolio from 3.5% to 5.5%. In order to do so, she must do which of the following?

A. Accept more risk
B. Sell some of her stocks and use the proceeds to purchase bonds
C. Sell some of her bonds and use the proceeds to purchase stocks
D. Sell some of her stocks and place the proceeds in a savings account

The table uses the standard deviation of the portfolio's return as a measure of risk. A normal random variable, such as a portfolio's return, stays within two standard deviations of its average approximately 95% of the time. Suppose Dina modifies her portfolio to contain 50% diversified stocks and 50% risk-free government bonds; that is, she chooses combination C. The average annual return for this type of portfolio is 4.5%, but given the standard deviation of 10%, the returns will typically (about 95% of the time) vary from a gain of _____ to a loss of _____.

4. Using the rule of 70

Consider an imaginary economy that has been growing at a rate of 3% per year. Government economists have proposed a number of policies to increase the growth rate but first need to convince the president that the policies will pay off. To do so, they want to present a comparison of the number of years it will take for the economy to double, depending on the growth rate. Using the rule of 70, determine the number of years it will take the economy to double at each growth rate.

Growth Rate (Percent)	Years Required to Double (Nearest whole number of years)
3	
4	
5	