Problem Set I for Economics 180.367:
Investments and Portfolio Management
Due at the beginning of class on September 19

Note: Point totals are shown at the beginning of each question. It is important to show your work.

1. (10 pts) Use Bloomberg to look up the yield (Mid Px) on the Treasury bill maturing on November 16, 2017 as of August 31, 2017 with settlement on September 1, 2017. The face value of the bill is $10,000. The number of days between the settlement date and maturity date is 76. Compute the price that an investor would pay for this bill implied by the quoted yield.

2. (10 pts) Use Bloomberg to look up the effective federal funds rate (Bid Price) on August 31. If you borrowed $10,000,000 in this market on that day, what interest would you owe at the maturity of the loan?

3. (10 pts) XYZ corporation has a current stock price of $50. Over the next year its price will rise 10% with probability 0.6, and it will fall 5% with probability 0.4. In addition it will pay a dividend of $3 at the end of the next year. Compute the mean and variance of the holding period return on XYZ over the next year.

4. (20 pts) There are two possible outcomes for stocks A and B; each will either earn a return of +20% or -10%. Here are the probabilities of the four possible joint outcomes:

<table>
<thead>
<tr>
<th>A return is</th>
<th>B return is -10%</th>
<th>B return is +20%</th>
</tr>
</thead>
<tbody>
<tr>
<td>-10%</td>
<td>10%</td>
<td>20%</td>
</tr>
<tr>
<td>+20%</td>
<td>20%</td>
<td>50%</td>
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Find the covariance between the percentage returns of stocks A and B.

5. (10 pts) Look up the end-of-year stock prices for Amazon at the end of 2015 and 2016 (Bloomberg mnemonic: AMZN US Equity). Amazon does not pay any dividends. What was the holding period return for Amazon in 2016?

6. (10 pts) An asset pays an investor $100 in one year from now and another $150 in two years. The effective annual interest rate (EAR) is 2%. What is the present value of this asset?

7. (10 pts) An asset costs $300 today and will have a payoff of $100 in one year and another $220 in two years. What is the internal rate of return?

8. Download the daily prices of the S&P 500 index from January 1 1980 to December 31 2016, from Bloomberg. Exclude all non-trading days. Construct the daily holding period returns, ignoring dividends \( \frac{P_t - P_0}{P_0} \). You should have returns for a total of 9,333 days.

   (a) (10 pts) What is the mean and standard deviation of daily returns?
   (b) (10 pts) How many days have returns less than the mean minus 6 standard deviations? How many days have returns more than the mean plus 6 standard deviations?