PROBLEM SET 8

This homework will not be graded, but you need to do it before the exam.

1. Consider the following four portfolios:
   (a) 50% in Treasury bills (with a non-risky rate of return), 50% in shares of stock W
   (b) 50% in shares of stock W, 50% in shares of stock X, where the returns are perfectly positively correlated (i.e. the coefficient of correlation is equal to 1)
   (c) 50% in shares of stock X, 50% in shares of stock Y, where the returns are uncorrelated (i.e. the coefficient of correlation is equal to 0)
   (d) 50% in shares of stock Y, 50% in shares of stock Z, where the returns are perfectly negatively correlated (i.e. the coefficient of correlation is equal to -1)

   In which of these cases would the standard deviation of the portfolio be exactly midway between that of the two securities? Explain.

2. (a) Plot the expected returns and standard deviations of the following risky portfolios on a graph. To simplify assume that you cannot combine them.

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
</tr>
</thead>
<tbody>
<tr>
<td>Expected return, r, %</td>
<td>10</td>
<td>12.5</td>
<td>15</td>
<td>16</td>
<td>17</td>
<td>18</td>
<td>18</td>
<td>20</td>
</tr>
<tr>
<td>Standard deviation, %</td>
<td>23</td>
<td>21</td>
<td>25</td>
<td>29</td>
<td>29</td>
<td>32</td>
<td>35</td>
<td>45</td>
</tr>
</tbody>
</table>

   (b) Five of these portfolios are efficient, and three are not. Which are the inefficient ones? Explain.

   (c) Suppose you plan to invest in one of these portfolio knowing that you can also borrow and lend at an interest rate of 12%. Which of the above portfolio is the best? What are the combination of expected return-standard deviation that you can obtain by investing in this portfolio and borrowing or lending at 12%?

   (d) Suppose that you are prepared to stand a standard deviation of 25% and that you cannot borrow or lend. What is the maximum expected return that you can get from investing in one of the risky portfolios?

   (e) Suppose that you are prepared to stand a standard deviation of 25% and that you can borrow or lend at 12%. What is the maximum expected return that can get by combining one portfolio with borrowing or lending?

3. Exercises 10.19, 10.23, 10.26, 10.27, 10.29, 10.32, 10.35, 10.38 of textbook.