Key to Quiz: 2/27/12

Quiz: Assume you are planning to invest in $100,000 in some combination of Boeing and Sprint and $400,000 in risk-free Treasury bills. The expected return on Boeing is 12% and on Sprint is 22%. The standard deviation (volatility) of returns is expected to be 11% on Boeing and 18% on Sprint. The correlation between the returns on Boeing and Sprint equals +0.3. The risk-free rate equals 1%. The Sharpe Ratios for various combinations of Boeing and Sprint equal:

<table>
<thead>
<tr>
<th>% Boeing</th>
<th>Sharpe</th>
<th>% Boeing</th>
<th>Sharpe</th>
<th>% Boeing</th>
<th>Sharpe</th>
</tr>
</thead>
<tbody>
<tr>
<td>135</td>
<td>0.53</td>
<td>75</td>
<td>1.28</td>
<td>15</td>
<td>1.23</td>
</tr>
<tr>
<td>115</td>
<td>0.78</td>
<td>55</td>
<td>1.35</td>
<td>-5</td>
<td>1.15</td>
</tr>
<tr>
<td>95</td>
<td>1.07</td>
<td>35</td>
<td>1.31</td>
<td>-25</td>
<td>1.08</td>
</tr>
</tbody>
</table>

a. Set up the calculations needed to determine the expected return and standard deviation of the optimal portfolio of Boeing and Sprint. Note: you have split $100,000 between these two stocks.
b. Set up the calculations needed to determine the expected return and standard deviation of your overall portfolio. Note: this is your overall portfolio in which you have invested a total of $500,000.
c. Sketch Boeing, Sprint, and both of your portfolios (a and b) on a risk-return graph.

\[
\begin{align*}
E(R_p) &= .55(12) + .45(22) \\
SD(R_p) &= \sqrt{(.55)^2(11)^2 + (.45)^2(18)^2 + 2(.55)(.45)(0.3)(11)(18)} \\
E(R) &= \frac{100,000}{500,000}E(R_p) + \frac{400,000}{500,000}E(R_f) \\
SD(R) &= \sqrt{\frac{100,000}{500,000}^2SD(R_p)^2 + \frac{400,000}{500,000}^2SD(R_f)^2 + 2\frac{100,000}{500,000}\frac{400,000}{500,000}\rho SD(R_p)SD(R_f)}
\end{align*}
\]