2-1. Taxable equivalent yield = \text{tax-exempt municipal yield} \cdot \frac{1.0}{1.0 - \text{marginal tax rate}}

The taxable equivalent yield for a tax-exempt yield of 9.5\%, for an investor in a 15\% tax bracket, is

\[
\text{Taxable equivalent yield} = \frac{.095}{1-.15} = 11.18\%
\]

2-2. According to the problem, the corporate bond pays 12.4 percent after tax.

The municipal bond has a taxable equivalent yield of

\[
\frac{.08}{1-.35} = 12.31\text{ percent}
\]

The investor would be slightly better off with the corporate bond.

5-1. (a) A limit order to sell is placed above the current market price. If the limit order is set at $130, the investor will realize a gross profit of at least $30 (ignoring transaction costs).

(b) A sell stop order is placed below the market price. If the stop order is placed at $120, the investor should realize a profit of approximately $20 per share. Technically, to be certain of $20 per share, the stop order probably would have to be set slightly above $120 because a stop price is actually an activator that initiates a market order when the specified price is reached.

5-2. To realize a gross profit of $5000 on 200 shares sold short at $75, the investor must cover at (ignoring transaction costs):

\[
200(\$75) = 15,000 - X = 5,000\text{ profit}
\]

\[X = 10,000\text{, which must be divided by 200 shares.}\]

\textbf{ANSWER:} $50 per share
For a profit of $1000, the calculation is:

\[
\begin{align*}
15,000 & - \ X \\
\hline
\end{align*}
\]

\[\begin{align*}
\text{X is$14,000, which again must be divided by 200 shares.}
\end{align*}\]

**ANSWER:** $70 per share.

5-3. 100 shares at $50 per share is a total cost of $5000. At 50% margin, the investor must put up $2500, resulting in a gross profit percentage relative to equity of

\[\frac{1000}{2500} = 40\%\]

At 40% margin, the investor must put up $2000, resulting in a gross profit percentage relative to equity of

\[\frac{1000}{2000} = 50\%\]

At 60% margin, the investor must put up $3000, resulting in a gross profit percentage relative to equity of

\[\frac{1000}{3000} = 33.3\%\]

5-4. The initial margin is 50% of $6000, or $3000. The other $3000 is borrowed from the broker.

(a)

\[
\text{actual margin} = \frac{\text{market value of securities} - \text{amount borrowed}}{\text{market value of securities}}
\]

\[
\begin{align*}
\text{market value of securities} - $3000 & = \ - \ - \ - \ - \ - \ - \ - \ - \\
\text{market value of securities} & = \ - \ - \ - \ - \ - \ - \\
\text{market value of securities} & = 40\%
\end{align*}
\]
(b) In a restricted account, the actual margin is between the initial margin (i.e., 50%) and the maintenance margin (i.e., 30%). The actual margin is now:

\[
\text{actual margin} = \frac{\text{market value of securities} - \text{amount borrowed}}{\text{market value of securities}}
\]

\[
\frac{\$5500 - \$3000}{\$5500} = 45.5\%
\]

Therefore, the account is restricted.

(c) A margin call results when the actual margin declines below the maintenance margin. At a stock price of $49, the actual margin is:

\[
\text{actual margin} = \frac{\$4900 - \$3000}{\$4900} = 38.8\%
\]

Because the actual margin is not below the maintenance margin of 30%, there is no margin call.

(d) At a stock price of $45, the actual margin is

\[
\text{actual margin} = \frac{\$4500 - \$3000}{\$4500} = 33.3\%
\]

At $35, however, the actual margin is

\[
\text{actual margin} = \frac{\$3500 - \$3000}{\$3500} = 14.3\%
\]
The amount of the margin call is calculated as:

\[
.3 = \frac{(x + $3500) - $3000}{(x + $3500)} = $785.71
\]

6-5. (a) The arithmetic rate of return is

\[
\frac{.3148 + (4.847) + 20.367 + 22.312 + 5.966 + 31.057}{6} = 17.72
\]

The geometric mean rate of return for the S&P 500 Composite Index for 1980-1985 (from Table 6-1) is:

\[
G = (1.3148 \times .95153 \times 1.20367 \times 1.22312 \times 1.05966 \times 1.31057)^{1/6} - 1.0
\]

\[
= (2.5579111)^{1/6} - 1.0
\]

\[
= 1.1694 - 1.0 = .1694 \text{ or } 16.94\%
\]

6-6. Refer to Equation 6-12 for the standard deviation formula. We will use n-1 in the calculation.

<table>
<thead>
<tr>
<th>Year</th>
<th>TR(%)</th>
<th>X-X</th>
<th>(X-X)^2</th>
</tr>
</thead>
<tbody>
<tr>
<td>1980</td>
<td>31.480</td>
<td>13.7575</td>
<td>189.2688</td>
</tr>
<tr>
<td>1981</td>
<td>-4.847</td>
<td>-22.5695</td>
<td>509.3823</td>
</tr>
<tr>
<td>1982</td>
<td>20.367</td>
<td>2.6445</td>
<td>6.9934</td>
</tr>
<tr>
<td>1983</td>
<td>22.312</td>
<td>4.5895</td>
<td>21.0635</td>
</tr>
<tr>
<td>1984</td>
<td>5.966</td>
<td>-11.7565</td>
<td>138.2153</td>
</tr>
<tr>
<td>1985</td>
<td>31.057</td>
<td>13.3345</td>
<td>177.8089</td>
</tr>
<tr>
<td>------</td>
<td>-------</td>
<td>-----</td>
<td>---------</td>
</tr>
<tr>
<td></td>
<td>106.335</td>
<td></td>
<td>1042.7322</td>
</tr>
</tbody>
</table>

\[
\bar{X} = 17.7225
\]

\[
1042.7322/5 = 208.5464 = \text{variance}
\]

\[
(208.5464)^{1/2} = 14.44\%
\]
6-12. First, raise 3.00 to the 73rd power;

\[(1.0300)^{73} = 8.652\]

Second, divide nominal cumulative wealth by the cumulative inflation index.

\[13,293.14 / 8.652 = 1,536.42 = \text{inflation-adjusted CWI for small common stocks, 1926-1998.}\]

6-13. \[(9/1)^{1/83} = 1.0267\]

\[1.0267 - 1.0 = .0267 \text{ or 2.67}\%\]

NOTE: For a problem such as this, always divide the ending value by the beginning value.

7-1. \((.15)(.20) = .030\)
\((.20)(.16) = .032\)
\((.40)(.12) = .048\)
\((.10)(.05) = .005\)
\((.15)(-.05) = -.0075\)
\(.1075 \text{ or 10.75}\% = \text{expected return}\)

To calculate the standard deviation for General Foods, use the formula

\[\text{VAR}_i = \sum_{i=1}^{n} \left[ PR_i - ER_i \right]^2 P_i\]

\[\text{VAR}_{GF} = [(0.20-.1075)^2.15] + [(0.16-.1075)^2.20] +
[(0.12-.1075)^2.40] + [(0.05-.1075)^2.10] +
[(.05-.1075)^2.15]
= .00128 + .00055 + .00006 + .00033 + .00372
= .00594\]

Since \(s_i = (\text{VAR})^{1/2}\)
the s for GF = \((.00594)^{1/2} = .0771 = 7.71\%\)

7-2. (a) \((.25)(15) + (.25)(12) + (.25)(30) + (.25)(22) = 19.75\%\)
(b) \((.10)(15) + (.30)(12) + (.30)(30) + (.30)(22) = 20.70\%\)
\[ (c) \quad (.10)(15) + (.10)(12) + (.40)(30) + (.40)(22) = 23.50\% \]

7-3. (a) 

\[
\begin{align*}
(1) \quad \text{[3 decimal places]} \quad & (1/3)^2(10)^2 = 11.089 \\
& + (1/3)^2(8)^2 = 7.097 \\
& + (1/3)^2(20)^2 = 44.360 \\
& + (2)(1/3)(1/3)(.6)(8)(10) = 10.645 \\
& + (2)(1/3)(1/3)(.2)(20)(10) = 8.871 \\
& + (2)(1/3)(1/3)(-1)(20)(8) = -35.485 \\
\end{align*}
\]

\[ \text{variance} = 46.577; \quad s = 6.82\% \]

\[
(2) \quad \text{variance} = (.5)^2(8)^2 + (.5)^2(20)^2 + 2(.5)(.5)(-1)(20)(8) \\
\quad = 16 + 100 - 80 \\
\quad = 36 \\
\quad s = 6\%
\]

\[
(3) \quad \text{variance} = (.5)^2(8)^2 + (.5)^2(16)^2 + 2(.5)(.5)(.3)(8)(16) \\
\quad = 16 + 64 + 19.2 \\
\quad = 99.2 \\
\quad s = 9.96\%
\]

\[
(4) \quad \text{variance} = (.5)^2(20)^2 + (.5)^2(16)^2 + 2(.5)(.5)(8)(20)(16) \\
\quad = 100 + 64 + 128 \\
\quad = 292 \\
\quad s = 17.09\%
\]

(b) \[
(1) \quad \text{variance} = (.4)^2(8)^2 + (.6)^2(20)^2 + 2(.6)(.4)(-1)(8)(20) \\
\quad = 10.24 + 144 - 76.8 \\
\quad = 77.44 \\
\quad s = 8.8\%
\]

\[
(2) \quad \text{variance} = (.6)^2(8)^2 + (.4)^2(20)^2 + 2(.6)(.4)(-1)(8)(20) \\
\quad = 23.04 + 64 - 76.8 \\
\quad = 10.24 \\
\quad s = 3.2\%
\]

(c) \quad \text{In part (a), the minimum risk portfolio is 50\% of the portfolio in B and 50\% in C. But this may not be the highest return. For the combinations in (a) above, the return/risk combinations are:}

<table>
<thead>
<tr>
<th>Portfolio</th>
<th>ER</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>(1) A, B, C</td>
<td>19%</td>
<td>6.82%</td>
</tr>
<tr>
<td>(2) B&amp;C</td>
<td>21%</td>
<td>6.00%</td>
</tr>
<tr>
<td>(3) B&amp;D</td>
<td>17%</td>
<td>9.96%</td>
</tr>
<tr>
<td>(4) C&amp;D</td>
<td>26%</td>
<td>17.09%</td>
</tr>
</tbody>
</table>
Combination (BC) is clearly preferable over (ABC) and (BD), because there is a higher ER at lower risk. The choice between (BC) and (CD) would depend on the investor's risk-return tradeoff.

8-3. To answer this question, eliminate the dominated portfolios by either comparing the return and risk for various pairs, or by graphing the portfolios. For example, portfolio 1 is dominated by portfolio 9 (higher return and lower risk). The set of dominated portfolios include: 1, 2, 3 and 5. The remaining portfolios are in the efficient set.

8-4. b (12 X 20 X .30)