Chapters 9 and 10

9.1 a. Capital gains=\$38-\$37=\$1 / share

b. Total Dollar returns= Dividends+ Capital Gains
= \$1000+(\$1*500)=\$1,500
On a per share basis, the calculation is \$2+\$1= \$3 / share

c. On a per share basis, \$3 / \$37=0.0811=8.11%

d. No, you do not need to sell the shares to include the capital gains in the computation of returns. The capital gain is included whether or not you realize the gain. Since you could realize the gain if you choose, you should include it.

9.8 Five-year Holding Period Return
= (1-0.0491)*(1+0.2141)*(1+0.2251)*(1+0.0627)*(1+0.3216)-1
= 98.64%

9.10 a. $\overline{R}$ = -0.026-0.01+0.438+0.047+0.164+0.301+0.199 / 7= 0.159

b.

R	$R - \overline{R}$	$(R - \overline{R})^2$
-0.026	-0.185	0.03423
-0.010	-0.169	0.02856
0.438	0.279	0.07784
0.047	-0.112	0.01254
0.164	0.005	0.00003
0.301	0.142	0.02016
0.199	0.040	0.00160
	Total	0.17496

$\sigma^2 = 0.17496 / (7 - 1) = 0.02916$

$\sigma = \sqrt{0.02916} = 0.1708 = 17.08\%$

Note, because the data are historical data, the appropriate denominator in the calculation of the variance is N-1.

9. 12 a.

Economic State	Prob. (P)	Return if State Occurs	P*Return
Recession	0.2	0.05	0.010
Moderate Growth	0.6	0.08	0.048
Rapid Expansion	0.2	0.15	0.030
		Expected Return= 0.088	

b.

Return if State Occurs	$R - \overline{R}$	$(R- \overline{R})^2$	$P^* (R - \overline{R})^2$
0.05	-0.038	0.001444	0.0002888
0.08	-0.008	0.000064	0.0000384
0.15	0.062	0.003844	0.0007688
		Variance = 0.0010960	

Standard Deviation= $\sqrt{0.001096}$ =0.03311

9. 17

Let R_{cs}='The Returns on Common Stocks (in %)

Let R_{ss}= The Returns on Small Stocks (in %)

Let R_{cb} = The Returns on Long-term Corporate Bonds (in %)

Let R_{gb} = The Returns on Long- term Government Bonds (in %)

Let R_{tb} = The Returns on Treasury Bills (in %)

Let - over a variable denote its average value

Year	R_{cs}	R_{ss}	$R_{ch-0.1405}$	R_{gb}	R_{tb}
1980	0.3242	0.3988	-0.0262	-0.0395	0.1124
1981	-0.0491	0.1388	-0.0096	0.0185	0.1471
1982	0.2141	0.2801	0.4379	0.4035	0.1054
1983	0.2251	0.3967	0.0470	0.0068	0.0880
1984	0.0627	-0.0667	0.1639	0.1543	0.0985
1985	0.3216	0.2466	0.3090	0.3097	0.0772
1986	0.1847	0.0685	0.1985	0.2444	0.0616
Total	1.2833	1.4628	1.1205	1.0977	0.6902
Average	0.1833	0.2090	0.1601	0.1568	0.0986

Year	$R_{cs}-\bar{R}_{cs}$	$R_{ss}-\bar{R}_{ss}$	$R_{ch}-\bar{R}_{ch}$	$R_{gb}-\bar{R}_{gb}$	$R_{tb}-\bar{R}_{tb}$
1980	0.1409	0.1898	-0.1863	-0.1963	0.0138
1981	-0.2324	-0.0702	-0.1697	-0.1383	0.0485
1982	0.0308	0.0711	0.2778	0.2467	0.0068
1983	0.0418	0.1877	-0.1131	-0.1500	-0.0106
1984	-0.1206	-0.2757	0.0038	-0.0025	-0.0001
1985	0.1383	0.0376	0.1489	0.1529	-0.0214
1986	0.0014	-0.1405	0.0384	0.0876	-0.0370

Year	$(R_{cs}-\bar{R}_{cs})^2$	$(R_{ss}-\bar{R}_{ss})^2$	$(R_{ch}-\bar{R}_{ch})^2$	$(R_{gb}-\bar{R}_{gb})^2$	$(R_{tb}-\bar{R}_{tb})^2$
1980	0.0198	0.036	0.0347	0.0385	0.0002
1981	0.054	0.0049	0.0288	0.0191	0.0024
1982	0.0009	0.0051	0.0772	0.0609	0.0000
1983	0.0017	0.0352	0.0128	0.0225	0.0001
1984	0.0146	0.076	0.0000	0.0000	0.0000
1985	0.0191	0.0014	0.0222	0.0234	0.0005
1986	0.0000	0.0197	0.0015	0.0077	0.0014
Total	0.1102	0.1784	0.1771	0.1721	0.0045

Because these data are historical data, the proper divisor for computing the variance is N-1. Thus, the variance of the returns of each security is the sum of the squared deviations divided by six.

Var (R_{cs}) = 0.018372 SD (R_{cs})=0.1355
Var (R_{ss}) = 0.029734 SD (R_{ss}) =0.1724
Var (R_{cb}) = 0.029522 SD (R_{cb})=0.1718
Var (R_{gb}) = 0.02868 SD (R_{gb})=0.16935
Var (R_{tb}) = 0.00075 SD (R_{tb}) = 0.02747

10.2 a) $\bar{R}_A$=(6.3+10.5+15.6) / 3=10.8%
$\bar{R}_B$=(-3.7+6.4+25.3) / 3=9.3%

b) σ_A^2 = {(0.063 - 0.108)^2 + (0.105 - 0.108)^2 +{(0.156 - 0.108)^2} / 3
= 0.001446
σ_A = (0.001446)$^{1/2}$ = 0.0380 = 3.80%

σ_B^2 = {(- 0.037 - 0.093)^2 +(0.064 - 0.093)^2 +(0.253 - 0.093)^2} / 3
=0.014447
σ_B =(0.014447)$^{1/2}$=0.1202=12.02%

c) Cov(R_A,R_B)= [(.063 - .108) (- .037 - .093) + (.105 - .108) (.064 - .093)
+ (.156 - .108) (.253 - .093)] / 3
= .013617 / 3 = .004539
Corr(R_A,R_B) = .004539 / (.0380 * .1202) = .9937

10.8 a. $\bar{R}_u$ = 7%
$\bar{R}_v$ =0.2 (-0.05)+0.5 (0.10)+0.3 (0.25)=0.115= 11.5%
σ_u^2 = σ_u = 0
σ_v^2 = 0.2 (-0.05 - 0.115)^2 + 0.5 (0.10 - 0.115)^2 + 0.3 (0.25 - 0.115)^2
= 0.0110
σv = (0.0110)$^{1/2}$ = 0.105 = 10.5%

b. Cov (R_u, R_v)
= 0.2 (-0.05 - 0.115) (0.07 - 0.07) + 0.5 (0.10 - 0.115) (0.07 - 0.07) + 0.3 (0.25 - 0.115) (0.07 - 0.07)
=0
Corr (R_u, R_v) = 0

c. $\bar{R}_P$ = 0.5 (0.115) + 0.5 (0.07) = 0.0925 = 9.25%
σ_P^2 = 0.5^2 (0.0110) = 0.00275
σ_P (0.00275)$^{1/2}$ = 0.0524 = 5.24%

10.9 a. R_P =0.3(0.10)+0.7(0.20)=0.17=17%
σ_P^2= 0.3^2(0.05)^2+ 0.7^2(0.15)^2=0.01125
σ_P=(0.01125)$^{1/2}$=0.10607=10.61%

b. $\bar{R}_P$=0.9(0.10)+0.1(0.20)=0.11=11%
σ_P^2=0.9^2(0.05)^2+0.1^2(0.15)^2=0.00225
σ_P=(0.00225)$^{1/2}$=0.04743=4.74%

c. No I would not hold 100% of stock A because the portfolio in b has higher expected return but less standard deviation than stock A. I may or may not hold 100% of stock B, depending on my preference.

10.10 The expected return on any portfolio must be less than or equal to the return on the stock with the highest return. It cannot be greater than this stock's return because all stocks with lower returns will pull down the value of the weighted average return.

Similarly, the expected return on any portfolio must be greater than or equal to the return of the asset with the lowest return. The portfolio return cannot be less than the lowest return in the portfolio because all higher earning stocks will pull up the value of the weighted average.

10.24 Expected Return For Alpha = 6% + 1.2*8.5% =16.2%

10.28

$0.25 = R_f + 1.4\,[R_M - R_f]$ (I)

$0.14 = R_f + 0.7\,[R_M - R_f]$ (II)

(I) - (II)=$0.11 = 0.7[R_M - R_f]$ (III)

$[R_M - R_f] = 0.1571$

Put (III) into (I) $0.25 = R_f + 1.4[0.1571]$

$R_f = 3\%$

$[R_M - R_f] = 0.1571$

$R_M = 0.1571 + 0.03$

$= 18.71\%$

10.34 a. The risk premium = $\bar{R}_M - R_f$

Potpourri stock return:

$16.7 = 7.6 + 1.7(\bar{R}_M - R_f)$

$\bar{R}_M - R_f = (16.7 - 7.6)/1.7 = 5.353\%$

b. $\bar{R}_{Mag} = 7.6 + 0.8\,(5.353) = 11.88\%$

c. $X_{Pot}\,\beta_{Pot} + X_{Mag}\,\beta_{Mag} - 1.07$

$1.7\,X_{Pot} + 0.8\,(1 - X_{Pot}) = 1.07$

$0.9\,X_{Pot} = 0.27$

$X_{Pot} = 0.3$

$X_{Mag} = 0.7$

Thus invest $3,000 in Potpourri stock and $7,000 in Magnolia.

$\bar{R}_P = 7.6 + 1.07\,(5.353) = 13.33\%$

Note: The other way to calculate $\bar{R}_P$ is $\bar{R}_P = 0.3\,(16.7) + 0.7\,(11.88) = 13.33\%$

10.39 Weights: $X_A = 5/30 = 0.1667$

$X_B = 10/30 = 0.3333$

$X_C = 8/30 = 0.2667$

$X_D = 1 - X_A - X_B - X_C = 0.2333$

Beta of portfolio = 0.1667 (0.75) + 0.3333 (1.10) +0.2667 (1.36) + 0.2333 (1.88)

= 1.293

$\bar{R}_P = 4 + 1.293(15-4) = 18.22\%$