Question 1 :

Consider the following information on three stocks:

		Rate of Return if State Occurs		
State of the economy	Probability	Stock A	Stock B	Stock C
Boom	0.30	0.40	0.35	0.60
Normal	0.50	0.15	0.15	0.05
Bust	0.20	0.00	-0.25	-0.75

a. If your portfolio is invested 40% each in A and B and 20% in C, what is the portfolio expected return? The variance? The standard deviation?.

b. If the expected T-bill is 3.80%, what is the expected risk premium on the portfolio?

c. If the expected inflation rate is 3.50%, what are the expected real returns on the portfolio and real risk premium on the portfolio.

Question 2 :

Part I

Given $E(r_M) = 0.12$, $r_F = 0.05$, $\sigma^2(r_M) = 0.01$, refer to the following data to answer the following questions:

Stock i	Correlation coefficient i with M	Standard Deviation of i
A	0.5	0.25
B	0.3	0.30

1. Compute betas for Stock A, Stock B, and for an equally weighted portfolio of Stocks A and B.

2. Compute the equilibrium expected return according to the CAPM for Stock A, Stock B, and for an equally weighted portfolio of Stocks A and B.

Part II

Suppose you observe the following information:

Security	**Beta**	**Expected return**
ABC corporation	1.15	18%
XYZ corporation	0.80	15%

Assume that these securities are correctly priced. Based on the CAPM, what is the expected return on the market? What is the risk-free rate?

Question 3 :

Miss Maple is considering two securities, A and B, and the relevant information is given below:

State of the economy	Pr	Return on A (%)	Return on B (%)
Bear	0.6	3.0%	6.5%
Bull	0.4	15.0	6.5

a. Calculate the expected returns and standard deviation of the two securities.

b. Suppose Miss Maple invested $2,500 in security A and $3,500 in security B. Calculate the expected return and standard deviation of her portfolio.

c. Suppose Miss Maple borrowed from her friend 40 shares of security B, which is currently sold at $50, and sold all share of the security. (She promised her friend she would pay her back in a year with the same number of shares of security B). Then she bought security A with the proceeds obtained in the sales of security B shares and the cash of $6,000 she owned. Calculate the expected return and standard deviation of the portfolio.

Question 4 :

Suppose the current risk-free is 7.6 percent. Potpourri Inc. stock has a beta of 1.7 and an expected return of 16.7 percent. (Assume the CAPM is true)

a. What is the risk premium on the market?

b. Magnolia Industries stock has a beta of 1.8. What is the expected return on the Magnolia stock?

c. Suppose you have invested $100,000 in a portfolio of Potpourri and Magnolia, and the beta of the portfolio is 1.77. How much did you invest in each stock? what is the expected return on the portfolio?

Question 5 :

1. According to corporate finance theory, it is stated that financial managers should act to maximize shareholders wealth. In your view, why are the efficient markets hypothesis (EMH), the CAPM, and the SML so important in the accomplishment of this objective.[**10 marks**].

2. We routinely assume that investors are risk-averse seekers; i.e., they like returns and dislike risk. If so, why do we contend that only systematic risk is important (Alternatively, why is total risk not important to investors, in and of itself).[**10 marks**].

Question 1:

a. Boom: $\mathrm{E}(\mathrm{R}_P) = 0.4(0.40) + 0.4(0.35) + 0.2(0.6) = 0.42$

Normal $\mathrm{E}(\mathrm{R}_P) = 0.4(0.15) + 0.4(0.15) + 0.2(0.05) = 0.13$

Bust: $\mathrm{E}(\mathrm{R}_P) = 0.4(0) + 0.4(-0.25) + 0.2(-0.75) = -0.25$

$\mathrm{E}(\mathrm{R}_P) = 0.30(0.42) + 0.50(0.13) + 0.2(-0.25) = 0.1410$

$\sigma_P^2 = 0.30(0.42 - 0.1410)^2 + 0.50(0.13 - 0.1410)^2 + 0.2(-0.25 - 0.1410)^2 = 0.05399$

$\sigma_P = [0.05399]^{1/2} = 0.2324$

b. Risk premium $= \mathrm{E}(\mathrm{R}_P) - R_f = 0.1410 - 0.038 = 0.103$

c. Expected real return $= 0.1410 - 0.035 = 0.106$

Expected real risk premium = Risk premium - inflation rate $= 0.103 - 0.035$

Question 2:

1. Recall that: $Cov(r_i,r_M) = \rho_{i,M}\sigma(r_i)\sigma(r_M)$

and $\beta_i = Cov(r_i,r_M)/\sigma^2(r_M)$

so $Cov(r_A,r_M) = \rho_{A,M}\sigma(r_A)\sigma(r_M) = (0.5)(0.25)(0.01)^{0.5} = 0.0125$

therefore $\beta_A = Cov(r_A,r_M)/\sigma^2(r_M) = 0.0125/0.0100 = 1.25$

For B, $Cov(r_B,r_M) = \rho_{B,M}\sigma(r_B)\sigma(r_M) = (0.30)(0.30)(0.01)^{0.5} = 0.009$

therefore $\beta_B = Cov(r_B,r_M)/\sigma^2(r_M) = 0.009/0.010 = 0.90$

For portfolio beta: $\beta_P = w_A\beta_A + w_B\beta_B = (0.50)(1.25) + (0.5)(0.90) = 1.075$

2. The equation for the expected return can be written as:

$E(r_i) = r_F + [E(r_M) - r_F]\beta_i$

or alternatively, as

$E(r_i) = r_F + [E(r_M) - r_F]\beta_i = r_F + [E(r_M) - r_F]Cov(r_i,r_M)/\sigma^2(r_M) = r_F + [E(r_M) - r_F](\rho_{i,M}\sigma(r_i)\sigma(r_M)/\sigma^2(r_M))$

We could use the above equation to find the equilibruim expected return, but both are perfectly satisfatory.

For stock A:

$E(r_A) = 0.05 + [(0.12 - 0.05)(0.5)/(0.01)^{0.5}]0.25 = 0.1375$

We do the same for B, we get $E(r_B) = 0.1130$

For an equally weighted portfolio,

$E(r_P) = (0.5)(0.1375) + (0.5)(0.1130) = 0.1253$

Question 3:

a. $\mathrm{E}(\mathrm{R}_A) = 0.6(0.3) + (0.4)(0.15) = 0.078 = 7.8\%$

$\mathrm{E}(\mathrm{R}_B) = 0.6(0.065) + (0.4)(0.065) = 0.065 = 6.5\%$

$\sigma_A^2 = 0.6(0.03 - 0.078)^2 + 0.4(0.15 - 0.078)^2 = 0.003456$

$\sigma_A = (0.003456)^{1/2} = 0.05878 = 5.88\%$

$\sigma_B^2 = \sigma_B = 0$

b. $W_A = \$2,500/\$6,000 = 0.417$

$W_B = 1 - 0.417 = 0.583$

$\mathrm{E}(\mathrm{R}_P) = 0.417(0.078) + 0.583(0.065) = 0.0704 = 7.04\%$

$\sigma_P^2 = W_A^2\sigma_A^2 = 0.0006$

$\sigma_P = (0.0006)^{1/2} = 0.0245 = 2.45\%$

c. Amount borrowed = -40*\$50=-\$2,000

$W_A = \$8,000/\$6,000 = 4/3$

$W_B = 1 - 4/3 = -1/3$

$R_P = (4/3)(0.078) + (1/3)(0.065) = 0.0823 = 8.23\%$

$\sigma_P^2 = W_A^2\sigma_A^2 = (4/3)^2(0.003456) = 0.006144$
$\sigma_P = (0.006144)^{1/2} = 0.07838$

Question 4:

a. The risk premium $= R_m - R_f$

Potpourri stock return: 16.7=7.6+1.7$[R_m - R_f]$, then $[R_m - R_f] = [16.7 - 7.6]/1.7 = 5.3529\%$

b. $E(R_{Mag}) = 7.6 + 1.8(5.353) = 17.2353\%$

c. $W_{Pot}\beta_{Pot} + W_{Mag}\beta_{Mag} = 1.77$

$1.7W_{Pot} + 1.8(1 - W_{Pot}) = 1.77$

$0.1W_{Pot} = 0.03$, then $W_{Pot} = 0.3$ and $W_{Mag} = 0.7$

Thus invest \$30,000 in Potpourri stock and \$70,000 in Magnolia.

$E(R_P) = 7.6 + 1.77(5.353) = 17.07\%$

Note: the other way to calculate $E(R_P) = 0.30(0.167) + 0.7(0.17235) = 17.07\%$

Question 5:

1. In simple terms, one could say that maximizing shareholder wealth by maximizing a share price is a reasonable objective if and only if we have some assurance that observed prices are meaningful - i.e., that they reflect the value of the firm. This is a major implication of the EMH. Further, if we are to be able to assess the wealth effects of future decisions on security and firm values, we must have a valuation model whose parameters can be shown to be affected by those decisions (Models that depend on future dividends, and interest rates, are the subject). Finally, any valuation model we employ will require us to quantify return and risk, as represented by the SML or CAPM equations.

2. This question postulates that rational investors will diversify away as much risk as possible. From the discussion carried in the class, most students will have picked up that it is quite easy to eliminate diversifiable risk in practice - either by holding small (15 - 20 stock) portfolios, or by holding one share in a diversified mutual fund. As noted, there will be no return for bearing diversifiable risk, thus, total risk is not particularly important to a diversified investor.