FINC460 - Midterm Exam

NAME: _____ SECTION: _____

1. Please do not open this exam until directed to do so.
2. This exam is 1 1/2 hours long.
3. Please write your name and section number on the front of this exam, and on any examination books you use.
4. Please show all work required to obtain each answer. Answers without justification will receive no credit.
5. State clearly any assumptions you are making.
6. This is a closed book exam. No books or notes are permitted. Calculators are permitted. Laptops are permitted but you are only allowed to use Excel and a blank worksheet.
7. Brevity is strongly encouraged on all questions.
8. The exam is worth 130 points.
9. Relax, and good luck!

Hints:

1. *Think through problems before you start working. Draw pictures.*
2. *If you get stuck on part of a problem, go on to the next part. You may need to use answers from earlier parts of the question to calculate answers to the later parts. If you weren't able to solve the earlier part, assume something.*
3. *Remember, setting up the problem correctly will get you most of the points.*

Short questions (40pts)

Assess the validity of the following statements (True, False or Uncertain) and explain your answers. Each question is worth 8pts.

1. If the CAPM holds, then the expected return on any risky asset must be higher than the risk free return.

2. According to the Black-Litterman model, in the absence of additional information, all investors should hold the market portfolio.

3. According to the CAPM, holding everything else fixed, if the covariance of a security with the market portfolio doubles so will its beta and its risk premium.

4. The variance of a portfolio equals the average of the variances of the individual assets.

5. XYZ is planning to pay a $ 10 dividend to shareholders. XYZ's stock price is expected to fall on the ex-dividend day by $10. This predictable drop in the stock price is a violation of efficient markets.

Question 1 (40pts)

Assume that the CAPM holds. Now, consider a mutual fund AMQ, which has a correlation coefficient with the return on the market of zero. Furthermore, the annual expected return on the market is 15% and the annualized standard deviation of the market is 30%. Also, the risk free rate is 5%/year. For simplicity, assume that AMQ charges no management fee, and has zero expenses.

1. (10pts) Calculate the maximum Sharpe ratio you could earn with any portfolio.

2. (10pts) If your coefficient of risk aversion were 1, what portfolio should you hold? (assume you can trade in AMQ, the market portfolio, and the risk free asset)

3. (5pts) Find the expected return of AMQ.

4. (5pts) Find the systematic standard deviation of AMQ.

5. (10pts) Assume that AMQ is on the minimum-variance frontier. Find the return variance of AMQ.

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Question 2 (50pts)

Assume that the table below illustrates your beliefs about the expected returns and betas of the market portfolio and two mutual funds A and B over the next year.

Asset	E(R)	β	σ
A	8%	0.5	15%
B	10%	1.5	35%
Market	9%	-	20%
Risk-free	2%	-	-

Additionally, you believe that returns of A, B and the market over the next year are represented by a single-factor model:

$$R_{i,t} - r_f = a_i + \beta_i(R_{m,t} - r_f) + \epsilon_{i,t}$$

where ϵ_A and ϵ_B are uncorrelated.

1. (5pts) Find the R^2 of the above equation for both funds, A and B. What should the R^2 be according to the CAPM? *Recall that the R^2 is defined as the "explained variance" (that is, the variance of $a_i + \beta_i(R_{m,t} - r_f)$), divided by the variance of the dependent variable ($R_{i,t} - r_f$).*

2. (5pts) Calculate $cov(A, B)$.

3. (10pts) Plot the Security Market Line and find α_A and α_B.

4. (10pts) Is the market portfolio mean-variance efficient? Answer YES or NO and explain your answer.

5. (15pts) Now assume that your entire wealth is a portfolio of financial assets with a value of \$1 million. Assume also that you can combine either A or B with the market portfolio, but you cannot hold both A

and B. Also, you can freely short the market portfolio but not the two funds A or B, and you can borrow or lend at the risk-free rate of 2%/year.

Based on this, calculate:

(a) Your optimal portfolio of risky assets (i.e. the optimal allocation between the market and A or B).

(b) The Sharpe-ratio of your portfolio.

6. (5pts) Based on your answer above, what is the maximum fee you would be willing to pay the manager of A or B?

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