# Midterm Study Guide

From Quantitative Analysis Software Courses

## Overview

You should know how to solve the assignments presented in Python so far. The Python questions assume that knowledge for the first Mini Course.

You should know all of the material in the book "What Hedge Funds Really Do" by Balch and Romero.

## Previous Exams

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## Example Questions

1. Fill in section A to complete code that will cause the following output:

```
import numpy as np
j = np.random.random([2,2])
print j
print _A_
```

Output:

```
[[ 0.1624438 ,  0.14157016],
 [ 0.07818402,  0.85854546]]
[[ 1.        ,  1.        ],
 [ 0.48129886,  6.06445229]])
```

2. Why (or why not) is Sharpe Ratio a better measure of portfolio performance than cumulative return?

3. Suppose we have a group of N assets in our portfolio with allocation w_i to each asset i, each with a specific Beta_i and alpha_i. Write an equation that describes the expected return of the entire portfolio in terms of the market return r_m.

4. Assume two stocks, A and B, that you'd like to combine into a portfolio with weights w_a, w_b respectively. You have calculated Beta values and estimated alphas for each. Your objective is to gain positive

return while minimizing market risk. Utilize CAPM to find the weights that achieve this goal. Assuming your estimates of alpha are correct, what is your expected return?

- Beta_A = 0.5, Beta_B = 1.0
- alpha_A = 5%, alpha_B = -10%

5. Write the equation for Sharpe Ratio using 6 months of data assuming returns are calculated monthly or weekly.

6. What is the output of the following code snippet?

```
import numpy as np
A = np.ones((3,3))
w = np.array([0.0, 0.1, 0.2])
print (A*w).sum()
print (A*w).sum(axis=0)
print (A*w).sum(axis=1)
```

7. A company promises to pay a $30 dividend every year starting one year from now. Based on the riskiness of the company, you believe the discount rate should be 7% per year. Assume 0% inflation. Based on these factors only, what is the present value of this company?

8. Define each of these company valuation methods (one or two sentences or a formula):

- Intrinsic value
- Market capitalization
- Book value

9. Define

- Weak EMH
- Semi-strong EMH
- Strong EMH

10. Which form(s) of the EMH prohibit profiting from Fundamental Analysis?

11. Given an order book be able to estimate the average price that a BUY or SELL order will be filled at.

12. Consider a $100 bill and a $100 US bond payable in one year. Which statement is true: a. The $100 is worth more than the bond b. The $100 bond is worth more than the bill. c. They are both worth the same.

12. Write the equation that describes the Fundamental Law of Active Management. Define each term.

13. Consider two portfolio managers A and B. They both have the same Information Ratio and the same Information Coefficient. Suppose B wants to improve his Information Ratio to be double that of A. How can he accomplish his goal?

14. Define "survivor bias"

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