Final Examination (150 minutes)

No textbook or calculators allowed; if calculations are needed, write the explicit equation(s). Do not write "Y = aX; solve for X." You can write "100 = 10X; solve for X." The price of extra time is 1 point/minute; e.g., if your test is handed in 5 minutes after the scheduled finish time, 5 points will be subtracted from your test score.

1. "If you pay us $1,000 a year for 10 years, we will pay you and your heirs $1,000 a year forever." What is the value of the interest rate implicit in this offer? (Assume that the first $1,000 payment is due a year from today and that the first $1,000 received begins one year after the tenth $1,000 payment.)

2. Explain why you either agree or disagree with this reasoning:

    Using common sense, you don't have to be a professional Wall Street analyst to pick winners.

    Your first step is to decide what industries are in an uptrend. That's not too difficult. For example, there's a fuel crisis. Accordingly, even quite small companies that are successful in exploration and production of oil and natural gas or possess extensive coal reserves should increase their profits. . . .

    Choose a stock in a sound company whose profits are growing by 15-20 percent a year, and you'll probably make money. Also there's money to be made in companies likely to be bought out. In the past year stockholders in Sea World, Koehring, Milgo Electronics, and S. and S. Corporation (a maker of coal-mining machinery) have all gained 50 percent or more by "buy out" offers for their holdings.

    On the Amex [last year] there were 200 stocks that doubled. The standout performer, Resort International; "B," rose from 2 5/8 to 22 1/2. Look for stocks like these.

3. The most popular way of determining whether rental property is fairly priced is to divide the annual net income by the property's price. For example, a property priced at $200,000 with $20,000 net income has a ratio of 10%. A prospective buyer can then compare this ratio to the ratios for other properties and to interest rates. What absolutely crucial consideration is overlooked in this analysis?

4. Explain why you either agree or disagree with the following argument:

   The many are smarter than the few. Any single person's prediction of a stock's price next year may be much too high or much too low, but the average prediction of a large number of people will almost certainly be close to the true expected value. Here's a proof. If there are n investors and each investor's prediction has a standard deviation of σ, then we know from statistics that the standard deviation of the average prediction has a standard deviation equal to $\frac{\sigma}{\sqrt{n}}$, which approaches 0 as n increases.

5. Explain why this argument is correct or incorrect: "If you and I agree on the probability distribution for the anticipated cash flow from an investment, then we should use the same required return."

6. An investor will use mean-variance analysis to allocate her wealth among Treasury-bills, a long-term Treasury bond fund, and an S&P 500 stock fund, with expected returns of 1.5%, 3%, and 7%, respectively. Which of these two scenarios do you predict will lead to a higher ratio of stocks to bonds in the optimal portfolio? Be sure to explain your reasoning.
    a. There is little uncertainty about the economy and considerable uncertainty about interest rates.
    b. There is little uncertainty about interest rates and considerable uncertainty about the economy.

7. ECA has 19 million shares outstanding with a market price of $20. Management wants to pay a dividend this quarter, but is temporarily strapped for cash. So, it sells another 1 million shares at $20 and pays a $1 dividend on all 20 million shares. Does this action make shareholders better or worse off? Explain.

8. A *Wall Street Journal* article showed readers when it pays to refinance a mortgage. Readers were advised to calculate the one-time cost of refinancing C and their monthly savings S from the new mortgage. The ratio C/S gives the number of months that it will take for the refinancing to begin paying off. This number of months can be compared to the length of the mortgage and the length of time that the homeowner plans to stay in the current house. For instance, if it costs $5,000 to refinance a mortgage that will save $50/month in mortgage payments, the C/S is 100 months—making refinancing attractive for someone who plans to stay in the house for more than 100 months and has a mortgage with more than 100 monthly payments remaining.
    Critically evaluate this calculation.

9. Why do you suppose that, even if they could borrow at the same interest rate, companies with little current income are less interested in issuing debt than are more profitable companies? Give two distinct reasons.

10. Explain why it either is or is not inconsistent to measure risk by the standard deviation in mean-variance analysis and by beta in the CAPM.

11. Explain this observation:

    The stock market is a pretty good leading indicator in that it often goes up or down before the economy does likewise. However, the economy is useless for predicting the stock market. Even when an economic recession is certain, stock prices are as likely to go up as down.

12. In an October 3, 2017, interview with CNBC, Warren Buffet said that, "Valuations make sense with interest rates where they are." A *Business Insider* columnist wrote that,

    The investment community breathed a sigh of relief. After all, Buffett is arguably the most successful stock investor in world history. An all-clear from him surely gives a green light for adding more equity exposure, right?

    Wrong, says John Hussman, the president of the Hussman Investment Trust and a former economics professor. In his mind, Buffett only gets half of the equation right. While Hussman acknowledges that low lending rates do, by nature, improve future cash flows, he argues that they must also be accompanied by strong growth—something that he notes the US is not currently enjoying….

    "It's an incomplete sentence," Hussman wrote in a recent blog post. "Unfortunately, the convenience of investing-by-slogan, rather than carefully thinking about finance and examining evidence, is currently leading investors into what is likely to be one of the worst disasters in the history of the U.S. stock market." Hussman calculates that stock valuations are stretched 175% above their historic norms, and predicts the S&P 500 will see negative total returns over the next 10 to 12 years. Along the way, the benchmark index will experience an interim loss of more than 60%.

   Do you agree with Hussman's reasoning? (Not his conclusion, his reasoning.)

13. A *Fortune* article described two strategies:

    a. *The PowerShares S&P 500 BuyWrite Strategy buys all the stocks in the S&P 500, then sells "at the money" calls on the index, meaning managers sell options with a strike price set at the price of the index at the moment.*

    b. *The Horizons S&P 500 Covered Call EIF, launched in June, uses a similar strategy but sells "out of the money calls" on the individual stocks, meaning the strike price is above the current price.*

Compare the returns from these two strategies on the day the options expire.

14. A study looked at the annual Cash Flow Return on Investment (CFROI) for more than 6,000 companies. The study separated the companies into quintiles based on their CFROI in 2015, with the companies in Quintile 1 having the highest CFROI, Quintile 2 the second highest, and so on. The study then calculated the average CFROI for the companies in each 2015 quintile, every year from 2015 back to 2005. Explain the results below, using language that an ordinary investor would understand.
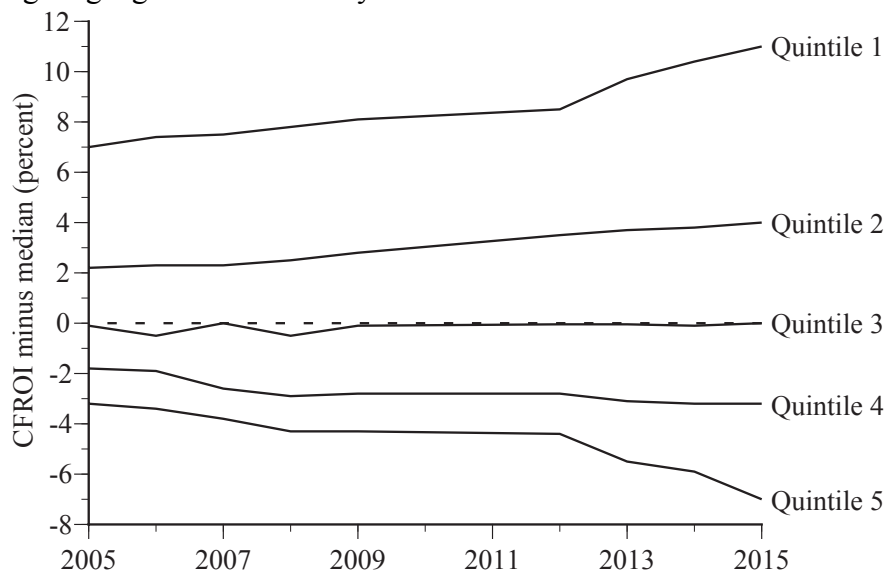
15. A researcher reported the following estimated equation using daily data for the period 1968 - 1984:

$$R = 0.0002 + 1.212M + 1.40S + 0.58H \qquad R^2 = 0.05$$
$$\quad [0.29] \qquad [12.69] \qquad [8.79] \qquad [3.00]$$

where the t-values are in brackets and

R = return on Hemisphere Fund capital shares minus return on T-bills
M = return on S&P 500 minus return on T-bills
S = size factor
H = book-to-market factor

a. Is it possible for coefficients to be statistically significant when the R^2 is so low?

b. Why is the coefficient of M larger than 1?

c. Why do you think that the coefficient of H is positive?

d. What does the intercept measure?

16. On October 19, 2017, Hewlett-Packard Enterprises announced that it would repurchase $2 billion of its own stock. Why might this repurchase benefit shareholders more than
a. investing $2 billion to expand its business?

b. retiring $2 billion of its debt?

c. paying $2 billion out in dividends?

17. Explain the logic behind this advice: "For two companies whose expected growth rates are the same, you are better off with the one whose dividend payout is higher."

18. An investment consultant says that all prudent investment strategies today are short-term because, "We no longer buy stocks to pass on to our heirs, or depend on dividends for retirement. Nor do we like to tie up capital for long periods." Explain why you agree or disagree with his three arguments.

19. Students in the introductory class for quantitative finance majors at the Stevens Institute of Technology create mock portfolios at the beginning of the semester. Any student whose portfolio beats the S&P 500 for the semester is given an automatic *A* grade on the final exam. If you were teaching this course, what problems would you see with this feature?

20. Critically evaluate this October 2017 claim by Donald Trump that the stock market boom during his presidency has reduced the national debt accumulated by his predecessor:

    The last eight years, they borrowed more than it did in the whole history of our country. So they borrowed more than $10 trillion, right? And yet, we picked up $5.2 trillion just in the stock market. Possibly picked up the whole thing in terms of the first nine months, in terms of value. So you could say, in one sense, we're really increasing values. And maybe in a sense we're reducing debt.