Final Examination (150 minutes)

You need not do tedious calculations; if calculations are needed, you must write down the explicit equation(s), identifying the variables. Do not write "Y = aX; solve for X." You can write "100 = 10X; solve for X."

1. Warren Buffett took control of Berkshire Hathaway on May 10, 1965, when Berkshire stock closed at $18 a share; 41 years later, Berskshire closed at $100,000 a share. Berskshire has never paid a dividend. If an investor had bought Berkshire in 1965 for $18 and sold it 41 years later for $100,000, what would her annual rate of return have been?

2. In December 2006, the New York Times reported that 25-year-old David King purchased a burial insurance policy for which he would pay $3 a week until he died, at which point his heirs would be paid $10,000 that can be used to pay for his burial. Mr. King explained that $3 is "not very much" and that if he bought burial insurance when he was older, it would cost more: "Might as well get it while the getting's good." If he dies at age 85, what is the implicit annual rate of return on this policy? (Just set up.)

3. People who retire with a defined-benefit pension plan often have the option of choosing: (a) a constant monthly income for as long as they live; or (b) a lump-sum payment equal to the present value of these payments using the life expectancy of people their age. What advantages do you see for each option?

4. (continuation of previous exercise). Pension-reform legislation passed in August 2006 allows companies to determine the value of the lump-sum payment by calculating the present value using a long-term corporate bond rate instead of a long-term Treasury bond rate, as had been done previously. Did this change increase or reduce the size of the lump-sum payment? Explain.

5. You have decided to endow a finance chair at Pomona college named, coincidentally, in your honor. Assuming that salaries are paid once a year, at the end of each year, and that the college can earn 10 percent per year on your gift, how much must you donate in order to provide $250,000 a year forever? A trustee points out that salaries increase each year. If so, how large an endowment is needed to provide $250,000 at the end of the first year and 5 percent more each succeeding year, forever? 15 percent more each succeeding year, forever?

6. Many savings and loan associations have short-term deposits and long-term mortgages. Will their net worth (the market value of their assets minus the market value of their liabilities) decline if interest rates go up or if they go down? Explain which of the following actions are appropriate and which are inappropriate if they want to insulate their net worth from the effects of changes in interest rates:
   a. buy 30-year zero-coupon bonds

   b. buy bond futures

   c. buy call options on Treasury bonds

   d. buy put options on Treasury bonds

   e. swap fixed-rate liabilities for variable-rate liabilities

7. A 1994 Business Week article article that reported dividend increases at many firms argued that "the outlook is good for continued increases. The average [dividend] yield is just 2.9%, low by historical standards. With interest rates rising, dividend yields may have to rise, too, to stay competitive." Explain how dividend yields can rise, even if dividends do not.

8. A savings and loan named Far West Financial began trading on the NYSE in 1964. Using monthly data, its beta coefficient was 0.08 for the first 5 years and 1.51 for the next 10 years. Explain why we might expect an S&L to have a relatively low beta during some historical periods and a relatively high beta during other periods. What might we use instead of CAPM's beta to measure the systematic risk of S&Ls?

9. In the 1920s, most investment companies leveraged themselves by borrowing money; on average, they were financed by roughly 40 percent debt and 60 percent equity. How much leverage does an investment company have if it is financed by 40 percent debt and 60 percent equity?

10. IBI stock is selling for $70 a share. The company has $35 in assets per share and consistently earns a 20 percent return on its assets. This coming year, it is expected to earn an after-tax profit of $7 a share and to pay a dividend of $3.50 per share. Analyst 1 calculates the stockholders' return as $3.50/$70 = 0.05 (5 percent). Analyst 2 calculates the stockholders' return as $7/$70 = 0.10 (10 percent). Analyst 3 argues that the stockholders' return must equal the firm's profit rate, 20 percent. Explain and evaluate the logic behind each analyst's calculation. If you had to come up with a rough estimate of the shareholders' return using these data, what would your estimate be?

11. What is the value of q for the firm in Exercise 10? If IBI were to reduce its dividend by 10 cents a share and use these additional retained earnings to expand its operations, would you predict that this action will raise or lower the price of its stock? Explain your reasoning.

12. Black and Scholes found that call options that are far out of the money (have exercise prices substantially above the stock's current market price) tend to be overpriced while those far in the money (have exercise prices substantially below the stock's market price) tend to be underpriced. This evidence suggests a strategy of buying in-the-money calls and selling out-of-the-money calls on the same stock. Draw a graph to show how the profitability of this strategy is related to the price of the stock on the exercise date.

13. A 1980 Wall Street Journal article observed that

   In February, Allied sold four million shares for $216 million. It thereby saved $35 million in annual interest payments, by paying off $137 million in short-term borrowings....Based on Allied's annual dividend rate of $2.20 a share, the four million additional shares will cost the company $8.8 million in payouts.

   In 1980 corporations as a whole raised $83 billion by borrowing and only $13 billion by selling stock. Why didn't all companies reduce their interest expense by selling stock?

14. In 1992 it was reported that a "Ban the Bond" posse, which included some of Bill Clinton's closest financial advisors, wanted the U.S. government to stop issuing long-term bonds and thereby reduce the federal deficit: "the approximately $40 billion a year that the U.S. Treasury now raises through 30-year bonds should be borrowed at shorter terms—say, between one and 10 years, where rates are lower." Why might such a shift not, in fact, reduce the federal deficit in the long run?

15. In 1986, the Korea Fund, a closed-end investment company that invests in Korean securities, had 5 million shares outstanding with a net asset value of $18 and a market price of $32, a 78 percent premium over NAV. The Korea Fund then sold 1.2 million new shares at $32, raising $38.4 million. Did this sale increase or reduce the NAV of existing shareholders? Explain.

16. An investments textbook states that, "Multistage dividend discount models assume that, ultimately, economic forces will force the convergence of the profitability and growth rates of different firms." To support this assumption, the book looked at the 20 percent of firms with the highest profit rates in 1966 and the 20 percent with the lowest profit rates that year. Fourteen years later, in 1980, the profit rates of both are more nearly average: "convergence...is apparent....the phenomenon is undoubtedly real." Explain why the explanation might be statistical rather than economic.

17. A company has 50 million shares of common stock outstanding with a current market price of $20 a share. It decides to give its shareholders 50 million warrants, one for each outstanding share of common stock. The warrants have an exercise price of $20 a share; when a warrant is exercised, the warrant holder pays the exercise price to the company and the company issues a new share of stock. In theory, what should the value of the common stock be if these warrants are issued and immediately exercised? What should the value of the common stock be if the warrants are issued with an exercise price of $10 and immediately exercised?

18. During the 10-year period 1982–1992, three-fourths of the professionally managed bond mutual funds did worse than the Salomon Brothers Broad Investment Grade Bond Index. A managing director of PIMCO, one of the few funds that beat the index, said that regulatory and accounting rules compel many investors to buy one-year securities, making their interest rates artificially low. Investors who are not subject to such constraints can do better buying a portfolio of 6-month and 2-year securities. Consider a 6-month Treasury zero with a 4 percent interest rate, a 1-year Treasury zero with a 3.5 percent interest rate, and a 2-year Treasury zero with a 4.0 percent interest rate. Instead of investing $1 million for 6 months in the 1-year zero, how should an investor divide $1 million between the 6-month and 2-year zeros so that her portfolio of 6-month and 2-year zeros will have the same duration as a portfolio of 1-year zeros?

19. A financial columnist offered several tips to investors who want protection from a bear market, while "allowing yourself room to make money if the bull is still alive:" Explain to a novice investor how each action accomplishes the stated objective, and the drawbacks (if any).
    a. Enter stop-loss orders

    b. Buy put options

    c. sell stocks that are overvalued

    d. sell stocks short

    e. invest in mutual funds with proven track records

20. A mutual fund that is fully invested in stocks with an average beta of 2.0 is concerned that the stock market may collapse and, yet, because of taxes and transaction costs, doesn't want to sell any stocks. To hedge its $400 million portfolio completely, should it buy or should it sell index futures with an aggregate value of $200 million, $400 million, or $800 million?