Final Examination (150 minutes)

No 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. In 1986, a *Wall Street Journal* reporter said he was tempted to refinance his 25-year, 13.25% $55,000 mortgage with a new 9.5% loan, but was dissuaded by the $3,500 to $4,000 he would have to pay in points and other closing costs. Critically evaluate his logic. How would you decide? (Use words, not equations.)

     With, say, a saving of $100 a month in principal and interest payments, I would pocket $36,000 over 30 years [net of closing costs], I thought at first. Not so. Since I have only 22 1/2 years left on my existing contract and if I convert it to 25 or 30 years to keep my payments low, I discovered that I could end up paying more total dollars in the long run.

2. Explain this analysis of pension fund and life insurance companies that hold assets with an average duration of 8 years: "[I]nvestment horizons of 40 years are not uncommon for pension funds or life insurance companies....such portfolios will surely suffer when interest rates decline, even though the associated temporary increase in market value...may create the illusion of investment success."

3. In March 2012, a Mega-Million lottery jackpot of $656 million was divided among three winning tickets. Each winner had a choice of receiving either an immediate one-time payment of $157.8 million or 26 annual payments of $8.4 million, beginning immediately. What is the implicit interest rate that was used to determine the $157.8 million payment?

4. What would happen to the divisor for the Dow Industrial Index if Berkshire Hathaway were added? How important would Berkshire Hathaway be to movements in the Dow?

5. A Los Angeles mortgage broker said that he would not finance his own home with an adjustable-rate mortgage because, "I don't want to throw the dice and get burned." In what sense is a fixed-rate mortgage also a throw of the dice? What is a losing roll?

6. A famous stock adviser once argued that a conspiracy between stock specialists and bankers is suggested by the fact that "When you're having a decline in stock prices you can always anticipate an increase in interest rates." What he apparently meant is that when market makers lower stock prices so that insiders can accumulate stocks cheaply, banks raise interest rates so that the public cannot borrow money to purchase stocks at these bargain prices. Provide a reasonable non-conspiratorial explanation for the observation that a drop in stock prices is often accompanied by an increase in interest rates.

7. On December 14, 2012, Apple stock closed at $509.79. An Iron Butterfly in Apple stock would involve buying a put option with a strike price of 490 for $32.70; selling a put option with a strike price of 510 for $42.60; selling a call option with a strike price of 510 for $40.55; and buying a call option with a strike price of 530 for $31.45. All these options expire on March 13, 2013.
   a. Use a graph to show the profits from this Iron Butterfly strategy as a function of the price of Apple stock on the expiration date.

   b. How would you summarize this strategy?

8. Irving Fisher compared the 1929 stock market crash to a run on a bank that had issued paper bank notes whose value exceeded the gold in its vaults. In his analogy, the bank was U.S. industry, the bank's paper money was stock, and the bank's real assets were the country's factories and machines. Explain why this is not an apt analogy.

9. The stock market went up sharply the day before the Presidential election on November 6, 2012. Some commentators said that stock prices went up because, although it was very uncertain whether Obama or Romney would win, investors don't like uncertainty. As one analyst said: "Regardless of who wins the U.S. election, uncertainty declines." Do you agree?

10. On December 14, 2012, an S&P 500 futures contract expiring on December 13, 2013 closed at 1386.40, 1.9%% below the 1413.58 value of the S&P 500 on December 14, 2012. Explain why you either agree or disagree with this reasoning: "If we trust markets, and I do, the stock market is telling us that the experts' best guess is that stock prices will be 1.9% lower a year from now than they are today."

11. Explain why you either agree or disagree with this statement: "only if everyone has the same information will price changes reflect a stock's true value." [Bart K. Holland, *What are the Chances*, Johns Hopkins University Press 2002, p. 120]

12. A *Washington Times* writer observed that
     The money center banks are highly profitable indeed. Bankers Trust's $371.2 million 1985 profit set a record, and for the seventh year in a row the bank was able to raise its cash dividend, then send its shareholders one share of stock for each one they owned.
   Why does the bank's profitability have little to do with its ability to send shareholders one share of stock for each one they owned? How much are these extra shares worth to stockholders?

13. Here is an explanation of "statistics-based technical analysis."

Statistics-based technical analysis utilizes the known probabilities associated with a bell curve; for example, that there is only a 2.5% chance of getting an observation that is two standard deviations above the mean. Suppose that a stock's price over the past 100 days has a mean of $10 with a standard deviation of $5. If the price on Day 100 is $20, there is only 2.5% chance the price will go even higher, above $20. This is an obvious sell situation.
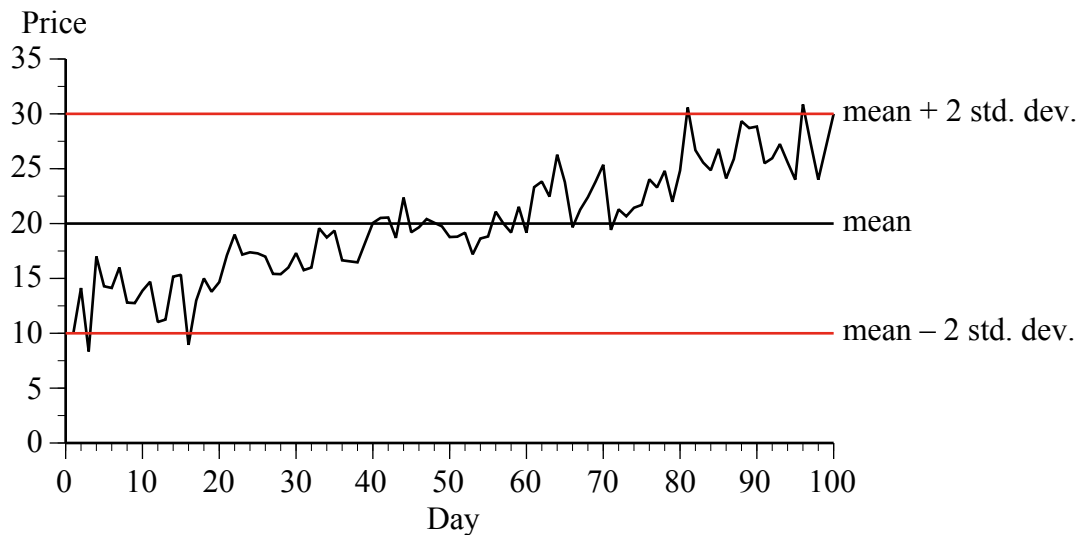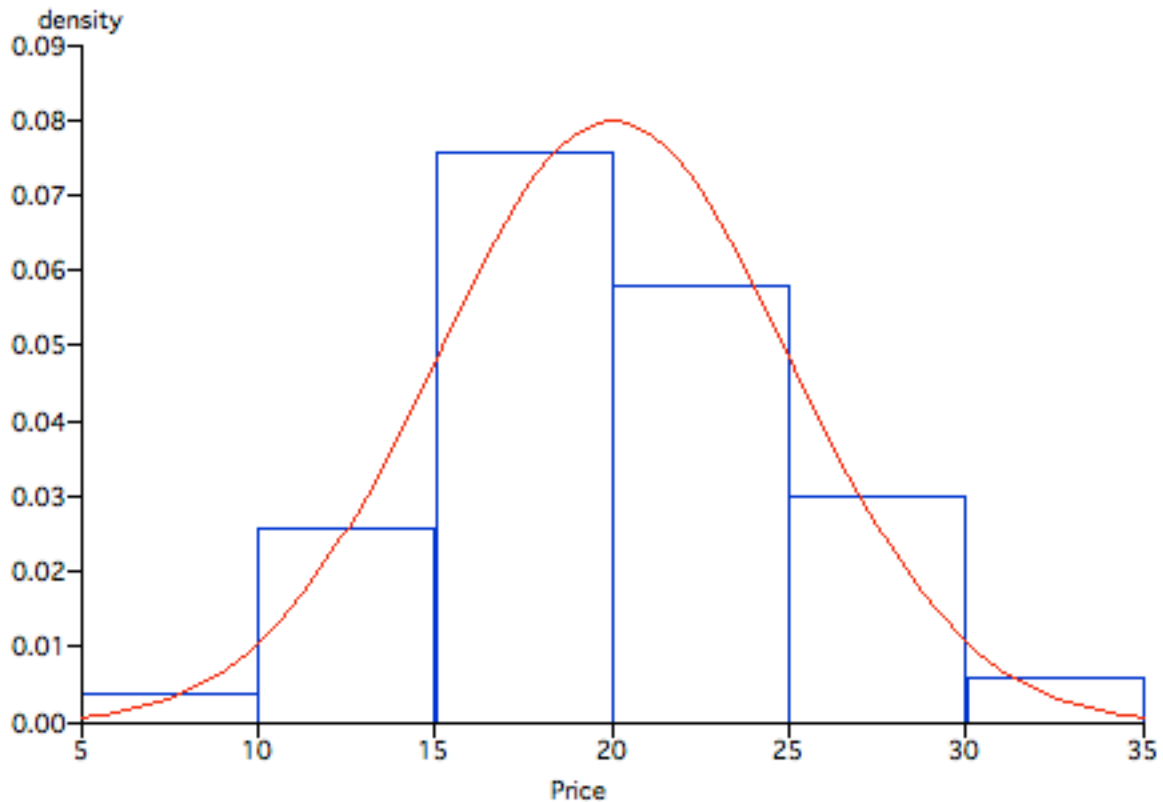
a. What is the logical error in this reasoning?

b. How would you describe statistics-based technical analysis; for example, "fundamental analysis using Tobin's q."

14. Eugene Fama has argued that the best predictor of future interest rates is current interest rates; for example, the interest rate on 1-year Treasury zeros a year from now will be the same as it is today. Suppose that the interest rates on 1-, 2-, and 3-year Treasury zeros are 1.0%, 1.8%, and 2.0%, and you are going to buy one of these three zeros and hold it for one year. (If equations are needed, you must show these equations, but do not solve them.)

   a. If the expectations Hypothesis is correct, which of these three zeros has the highest expected return?

   b. If Fama's theory is correct, which of these three zeros has the highest expected return?

15. An article in *The Wall Street Journal* claimed that a 9.25 percent annual interest rate, compounded daily, was more attractive than a 9.40 percent annual interest rate, compounded quarterly; a reader wrote in to say that his calculations showed just the opposite. Which rate is more attractive?

16. Explain this argument by Dan Caplinger ("Are Investors Too Obsessed With Dividends?" The Motley Fool, August 15, 2012) about why many tech companies use stock buybacks instead of paying dividends:
   "Tech companies have been reluctant to pay dividends for many reasons.... [A] selfish reason may have to do with tech company compensation, which has historically revolved around stock options."

17. Consider two risky investments, the first with an expected return of -5% and a standard deviation if 15%, and the second with an expected return of +5% and a standard deviation of 10%. A safe asset has a return of 0%. Would a risk-averse investor using mean-variance analysis to allocate her money among these three assets ever invest anything in the first asset?

18. An investor was interested in acquiring a commercial office building. She estimated that the annual after-tax cash flow was $800,000 and she predicted that this cash flow would increase by 5% annually forever. Using a 15% discount rate, she applied a "capitalization rate" of 10, giving the property a value of 10($800,000) = $8,000,000.
    a. Where did the value 10 for the capitalization rate come from?

    b. How would her valuation be affected if she planned on selling the property after 20 years?

19. A closed-end mutual fund has 5 million shares outstanding, each with a current market price of $18/share. Its stock portfolio is worth $100 million.
    a. What is the value of Tobin's q for this fund?

    b. Would the fund make its current stockholders better off if it: (i) sold part of its stock portfolio and repurchased its own shares; or (ii) issued new shares and used the cash to expand its stock portfolio?

20. A graduate student once appealed to the random walk hypothesis in arguing that population growth follows a random walk. What economic forces that imply a random walk of stock prices might not apply to birth rates?