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. A conservative investor kept $40,000 in a locked safe "for emergencies" for 40 years, 1978-2017. If this money had instead been invested in the S&P 500, which had a compounded annual return of 11.94% over this period, what would the value of the investment have been at the end of 2017?

2. In 2017 a German-Russian citizen was accused of bombing the team bus carrying the Borussia Dortmund soccer team to a Champions League match. German investigators reported that he had borrowed "several tens of thousands of euros" and made "suspicious options purchases" for shares in Borussia Dortmund, the only top-league German club listed on the stock exchange, on the same day as the attack. Do you think he bought puts or calls? (Be sure to explain your reasoning.)

3. "Stock futures rose sharply today, indicating that investors are increasingly optimistic about the stock market." What is an alternative explanation?

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

   *The market depends on error for its very existence. If people weren't wrong, there could be no stock market.Suppose everybody knew the future perfectly. Suppose everybody knew with absolute certainty, for example, that the fortunes of a certain company were about to improve. Nobody would then want to sell that company's stock. There would be a world full of buyers but no sellers. And when the shape of the future changed, when everybody knew for sure that the company was heading for trouble, there would be a world of sellers but no buyers. There would be no stock market. There could be none.*

5. Briefly explain why each of the following events is or is not a persuasive reason to buy stock:
   a. Consolidated Water hasn't missed a dividend payment in 120 years.

   b. CoolTech has a Tobin's q of 2.0

   c. The term structure is downward sloping, indicating that financial experts expect interest rates to fall.

6. Ginnie Mae mutual funds buy a pool of residential mortgages that are guaranteed by the Government National Mortgage Association. Investors in these funds receive the monthly mortgage payments made by homeowners. While investors are protected against default, they can be hurt both by a rise in market interest rates and by a decline. Explain how this is possible.

7. Berkshire Hathaway has never paid a dividend, but it has twice made stock buybacks. Why do you suppose they prefer buybacks to dividends?

8. An article in *The Wall Street Journal* noted that, over the preceding five years, stock prices increased by 200% while the economy grew by only 40%, suggesting that stock prices had lost touch with fundamentals. This provoked an irate letter to the editor claiming that,

   > *The market is telling us the future of profits from the nation's capital stock looks that much better than it did five years ago. Either there will be more sustained growth or there will be fewer recessions affecting that income stream, or both.*

   What other rational explanation might there be?

9. A finance professor began an article with this observation: "Adjustable rate mortgages (ARMs) have become an increasingly popular loan vehicle over the last four or five years....the primary advantage to lenders is clear—elements of interest rate risk are shifted to borrowers." In what sense does an ARM shift interest rate risk to the borrower; i.e., what gamble were lenders taking before, that borrowers are now taking? Will lenders, in retrospect, ever regret avoiding this gamble?

10. Some criticize dual-purpose funds because the fund's managers cannot possibly satisfy both classes of shareholders. For example, the purchase of high-dividend, slow-growth stocks benefits the income shareholders at the expense of the capital shareholders. Explain why this claim is refuted by the argument that dividing the fund's shares into two classes cannot make shareholders worse off.

11. A department store advertises that if a customer borrows money to buy a major appliance, the first six month's interest will be free and that no payments are due for six months. What is the effective interest rate if $1,000 is borrowed and, after the initial six-month grace period, 18% annual interest is charged and the loan is paid off in 24 equal monthly installments? Just set up.

12. The *Encyclopedia of Investments* states that, "The effective rate of return [on a Treasury bond] . . . is normally referred to as the security's yield to maturity." Explain why an investor's realized rate of return is not necessarily equal to the bond's yield to maturity, even if the bond is held until maturity.

13. Movie Treasures owns the rights to thousands of old movies and pays out all of the royalties it receives as dividends. Its annual dividend is currently $4/share. Shareholders project the dividend to decline steadily by 5 percent a year and require a 10 percent return on their stock.
    a. What is the stock's intrinsic value?

    b. What will happen to the intrinsic value as time passes? (Be specific.)

    c. Why would anyone ever invest in a negative-growth stock?

14. In 1992 *The Wall Street Journal* reported that many corporations were repurchasing their shares, and noted that one money manager "cautions against buying the stocks of companies that are borrowing money to finance share repurchases." How can shareholders benefit when companies borrow money in order to repurchase their shares?

15. A Yale economics professor and graduate student looked at Bitcoin prices from January 1, 2011, to May 31, 2018 (as far back as there are reliable data). Among their findings:
    1. When Bitcoin's price increased, it tended to keep increasing; so they offered this trading rule: "buy Bitcoin if its price increases more than 20 percent the previous week."
    2. Bitcoin's price tended to increase after surges in Google searches for the word *Bitcoin* and decline after a surge in Google searches for the phrase *Bitcoin hack*.
    3. They calculated correlations between Bitcoin returns and hundreds of other financial variables, and found that Bitcoin returns are positively correlated with stock returns in the consumer goods and health care industries and negatively correlated with stocks returns in the fabricated products and metal mining industries.

    Why are you skeptical of the usefulness of these findings?

16. Continuing the previous exercise, how do you know that these conclusions are far-fetched?
    1. Bitcoin doesn't generate cash or pay dividends, so they created a proxy, the number of Bitcoin Wallet users (essentially the number of people owning Bitcoin), and then calculated a dividend-price ratio by comparing Bitcoin prices to the number of Bitcoin Wallet users.
    2. Bitcoin's price increased from $0.30 to $7,530.55, an annual return of 292 percent. They concluded that, "If you as an investor believe that Bitcoin will perform as well as it has historically, then you should hold 6% of your portfolio in Bitcoin."

17. Should a conservative investor with a high required return be more interested in high-dividend or high-growth stocks? To investigate this, consider Stock A paying a $2 dividend that is expected to grow by 2% a year and Stock B paying a $2 dividend that is expected to grow by 6% a year. If the market prices both using a 10% required return, which will appear more overpriced to an investor with a 12% required return?

18. Critically evaluate this advice:

    *The yield curve can help both large and small investors pick attractive maturities. Because investors' collective wisdom is often correct, yield curves can serve as a forecasting tool, though a limited one. Thus when a steeply rising yield curve is flashing an inflation warning, specialists urge investors to pick bonds with maturities of three to five years. Such securities capture reasonable returns but minimize the risk that your principal will shrink if rates continue to climb.*

19. "I bought BigBox stock because it is the largest discount chain in the world and its stock was selling for only $5 a share." Give two distinct and quite different reasons why the intrinsic value of shares of the largest discount chain in the world might be only $5 a share, when the intrinsic values of shares of smaller advertising agencies are more than $100 a share.
    1.

    2.

20. Briefly explain why the following allegations, if true, either would or would not provide evidence against the strong form of the efficient-market hypothesis:
    a. When a company announces a stock split, its stock price generally goes up substantially the day *before* the split is announced.

    b. When a company announces a stock split, its stock price generally goes up substantially the day *after* the split is announced.

    c. The stock market almost always goes down on Friday 13.

    d. AAA 30-year Corporate bonds have consistently higher yields to maturity than AAA 30-year municipal bonds.