Final Examination (150 minutes)

No textbooks 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. After the close of trading on July 19, 2022, Netflix (the video streaming company) announced that it had lost 970,000 subscribers in the second quarter of 2022. In after-hours trading, the price of Netflix stock jumped $15.83 (7.85%), from 201.63 at the close of trading to $217.46. What is your most compelling explanation for this price jump?

2. A major home builder is financing a residential construction project with a $47 million loan at an interest rate equal to the 1-year Treasury-bill rate plus 2 percentage points. The CEO is concerned that interest rates might increase sharply.
   a. Identify *two* distinct reasons why a jump in interest rates would be bad financially for this company.

   b Which, if any, of these actions would be an appropriate hedge: buy Treasury bond futures; sell Treasury bond futures, buy Treasury bond puts; buy Treasury bond calls.

3. An economist recently argued that

   Short-term rates affect the demand for things normally financed on a short term basis, such as auto leases, computers, furniture, and large appliances. Intermediate-term rates affect the demand for things normally financed on an intermediate-term basis, such as auto purchases and home improvements. Long-term rates affect the demand for things normally financed on a long term basis, such as housing and plant & equipment. In order to encourage long-term investment, the Fed should have these permanent target goals:

Short-term rates	*5.50%*
Intermediate-term rates	*4.50%*
Long-term rates	*3.60%*

   How would you respond?

4. Assuming a 6% required return for each asset, identify the asset with the longer duration:

   a. A 10-year Treasury zero with a 2% yield or a 10-year Treasury bond with 2% coupons

   b. A 30-year Treasury bond with a 4% coupon or a 30-year amortized mortgage with a 4% APR

   c. A stock paying a $2 annual dividend that will grow by 2% a year or a stock paying a $1 annual dividend that will grow by 3% a year

   d. A 30-year amortized mortgage with a 4% APR or a perpetuity with a 3% yield

   e. An apartment building with rent and price growing by 3% a year forever or a perpetuity with a 3% yield

5. Explain the fallacy in this argument:
   In an efficient market with stocks always priced to give investors their market-equilibrium required rates of return, taking into account all available information, actual returns that are higher or lower than these required returns are due solely to new information which, by definition, is unpredictable. The empirical fact that it is nearly impossible to predict whether actual stock returns will be abnormally high or low proves that the efficient market hypothesis is correct.

6. Identify the errors in this mean-variance analysis with a 1-year horizon of a portfolio allocation among 1-year Treasury bills, 10-year Treasury bonds, and the S&P 500. (Do not use the same explanation for multiple answers.)

   a. The mean return on Treasury bills was set equal to average Treasury bill return since 1926.

   b. The standard deviation of the return on 10-year Treasury bonds was set equal to the standard deviation of the yield to maturity on 10-year Treasury bonds since 1926.

   c. The mean return on the S&P 500 was set equal to the average percentage price change in the S&P 500 since 1926.

   d. The correlation between the returns on 10-year Treasury bonds and the S&P 500 was set equal to –0.5 because stock prices generally fall when interest rates go up.

7. The webite efficientfrontier.app says that, "The Efficient Frontier is the set of optimal portfolios that offer the highest expected return for a defined level of risk." On November 17, 2022, using historical data for the previous year, the app estimated the following parameters:

	Mean	Standard Deviation	Apple	Google	IBM
			Correlations		
Apple	-5.20	7.96	1.00	0.79	−0.28
Google	-34.32	13.71	0.79	1.00	−0.44
IBM	30.10	5.55	−0.28	−0.44	1.00

The accompanying opportunity locus showed the means and standard deviations for all possible combinations of portfolios in 10% increments; for example

Apple 0%, Google 0%, IBM 100%
Apple 0%, Google 10%, IBM 90%
Apple 0%, Google 20%, IBM 80%

…

Apple 10%, Google 0%, IBM 90%
Apple 10%, Google 10%, IBM 80%

…

Apple 90%, Google 10%, IBM 0%
Apple 100%, Google 0%, IBM 0%
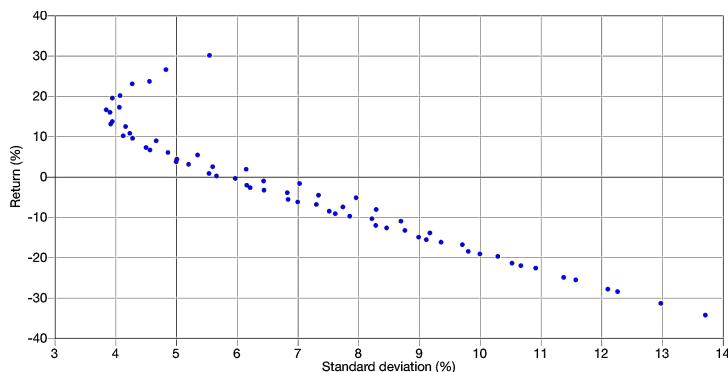
Using the same means, standard deviations, and correlations in the above table, Smith's Financial Package gave this figure:
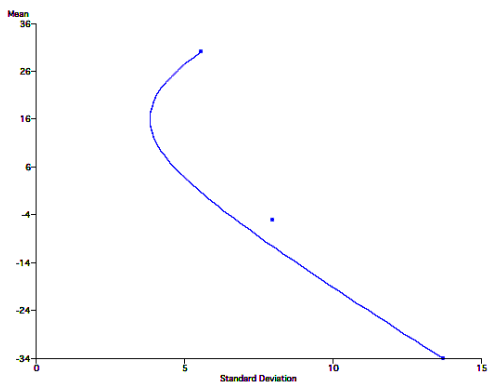
How would you explain why the graphs look so different?

8. Madison has $10 million in liquid assets and needs to pay $1 million one year from today in order to make a downpayment on a housing purchase. One strategy is to put the entire $10 million in a stock market index fund. An alternative strategy is to put $9 million in the stock market index fund and hold $1 million in cash to protect against having to sell stocks if the market goes down over the coming year. Assume that the cash will earn a 0% return and that there are only two (equally likely) possible outcomes for the stock market index fund one year from today: up 30% or down 10%. Which strategy has the higher expected return?

9. The British government first consolidated its debts in 1751 by issuing (*consol*) bonds that pay a constant coupon and never mature. However, these and subsequent British consols could be redeemed by the government and either retired or exchanged for new Consols with different coupons.

   The consols issued in 1751 with a face value of £100 initially paid £3.50 coupons; however, the coupons were reduced to £3.00 in 1757, £2.75 in 1888, and £2.50 in 1903, and the bonds were redeemed and retired at face value in 2015. Assuming a constant required return of 3.5% and that the coupons are paid annually at the end of each year, what is the intrinsic value in 1751 of these consols if you

   a. assume they will pay £3.50 coupons forever?

   b. know that the coupons will be reduced to £3.00 in 1757, £2.75 in 1888, and £2.50 in 1903, and the bonds would be redeemed and retired at face value in 2015?

10. Explain why you either agree or disagree with this investment advisor's argument that dividends are better than share repurchases:

> *Although some may think that a company paying dividends is a weakness, showing that the company needs to entice investors to invest in the company, dividend payments are much more profitable to investors than company buybacks are…. Dividends allow shareholders the opportunity to invest back into the company. Many long-term investors choose to automatically reinvest their dividends into additional company shares, and most major companies … make this process easy.*

11. Would the following, *if true*, be evidence against Fama's interpretation of the efficient-market hypothesis?

   a. A well-known investment strategy consistently earns a return greater than zero   □yes □no

   b. When the stock market goes down in January, it usually goes down during the next 11 months   □yes □no

   c. The stock market almost always goes up at least 20 percent in the 9 months preceding presidential elections and goes down 20 percent during the 12 months following elections   □yes □no

   d. Interest rates are higher on AAA Corporate bonds than on AAA municipal bonds   □yes □no

12. Cameron is 18 years old and is considering two career paths:
   a. Take a job immediately with an annual income that is initially $50,000 and will grow by 3% a year.
   b. Go to college for 4 years, with tuition, room & board, and other expenses totaling $75,000 the first year and increasing by 5% each year; after four years of college, take a job with an annual income that is initially $70,000 and will grow by 4% a year.

   Which choice is more financially attractive? Ignore taxes, assume that all income and expenses are paid at the beginning of each year, and assume that, either way, Cameron will retire at age 70.

13. Which of these uncertainties is the most important for a John-Burr-Williams value investor: future dividends, future interest rates, or future stock prices? Explain your reasoning.

14. On November 24, 2022, a website reported the following summary statistics, using stock return data for the preceding 10 years for Coca-Cola and Johnson & Johnson:

	mean	Standard Deviation	Correlation
Coca-Cola	8.67%	7.53%	0.950
Johnson and Johnson	12.90%	9.24%	

Identify the apparently incorrect number(s).

15. Explain why you either agree or disagree with this statement by two senior Morgan Stanley analysts:
   Companies that can invest a lot today at high returns on capital will not only grow faster than the average company, their stocks will have valuations that are more sensitive to changes in the discount rate.

16. Apple currently has $132 billion in debt but repurchased $554 billion in stock over the past 10 years, most recently $24.3 billion on September 30, 2022. Why do you suppose that Apple repurchases stock instead of paying off its debt?

17. An analysis of the first-year income and expenses for a commercial real estate property that was purchased for $5 million with a $1 million downpayment found that the net profit was negative:

Rent	$540,000
Loan payments (15 years @ 6%)	– $405,048
Property Taxes (1% annually)	– 50,000
Insurance	– 40,000
Maintenance	– 50,000
Total	–$5,048

Assuming that the property is never sold, why do you expect the net profit to turn positive in the future?

18. Some investors hold on to stocks they own that have gone up in price and sell the stocks they own that have gone down in price. Is this anything more than momentum investing?

19. Professor Smith just received a letter from TIAA (Pomona College's Retirement plan) stating that the plan's default investment option is a Vanguard Target Retirement Fund that invests 90% in equities and 10% fixed income until the investor is 40 years old, then shifts gradually to 30% equites and 70% fixed income over the next 30 years, and stays at 30/70 after that. Smith is not allowed to choose individual stocks but nonetheless has always avoided target retirement funds. Why do you suppose he made that choice?

20. Why does a portfolio of those stocks with the largest predicted percentage increases in earnings generally underperform a portfolio of those stocks with the smallest predicted percentage increases in earnings?