

This assignment must be submitted by the beginning of class on **Thursday, Oct. 9<sup>th</sup>, 2025**. No late submissions will be accepted. The assignment questions are to be completed in group. You may complete all the problems entirely in the MS Excel spreadsheet. You can also complete it using word documents with Excel spreadsheet attachments. Please **HIGHLIGHT** your final answers. The assignment will be marked based on (1) how you arrive at the solution, (2) is the solution correct or does it make sense? (3) the presentation of your results. Remember, you must present your work in a clear and concise manner. Show your work! **Please keep in mind that copying assignments from past years is considered a honor code violation, and it will hurt your ability to perform on the exams.**

1. *Trading Securities - 25 points*

Suppose that Xtel currently is selling at \$20 per share. You buy 1,000 shares using \$15,000 of your own money, borrowing the remainder of the purchase price from your broker. The rate on the margin loan is 8%.

- (a) What is the percentage increase in the net worth of your brokerage account if the price of Xtel immediately changes to: (i) \$22; (ii) \$20; (iii) \$18? What is the relationship between your percentage return and the percentage change in the price of Xtel?
- (b) If the maintenance margin is 25%, how low can Xtel's price fall before you get a margin call?
- (c) How would your answer to (b) change if you had financed the initial purchase with only \$10,000 of your own money?
- (d) What is the rate of return on your margined position (assuming again that you invest \$15,000 of your own money) if Xtel is selling after 1 year at: (i) \$22; (ii) \$20; (iii) \$18? What is the relationship between your percentage return and the percentage change in the price of Xtel? Assume that Xtel pays no dividends.
- (e) Continue to assume that a year has passed. How low can Xtel's price fall before you get a margin call?

2. *Risk and Return - 25 points*

Consider these long-term investment data:

- The price of a 10-year \$100 face value zero-coupon inflation-indexed bond is \$84.49.
- A real-estate property is expected to yield 2% per quarter (nominal) with a SD of the (effective) quarterly rate of 10%.

- (a) Compute the annual rate of return on the real (i.e., inflation-indexed) bond.
- (b) Compute the continuously compounded annual risk premium on the real-estate investment.
- (c) What is the probability of loss on the real estate investment after 10 years?

3. *Preferences - 25 points*

Period	Average Annual Returns		U.S. Equity Market		
	U.S. equity	1-month T-bills	Excess return	Standard deviation	Sharpe ratio
1927–2021	12.17	3.30	8.87	20.25	0.44
1927–1950	10.26	0.93	9.33	26.57	0.35
1951–1974	10.21	3.59	6.63	20.32	0.33
1975–1998	17.97	6.98	11.00	14.40	0.76
1999–2021	10.16	1.66	8.50	18.85	0.45

The table above shows the average excess return of the U.S. equity market and the standard deviation of that excess return. Suppose that the U.S. Market is your risky portfolio.

- (a) If your risk-aversion coefficient is  $A = 4$  and you believe that the entire 1927-2021 period is representative of future expected performance, what fraction of your portfolio should be allocated to T-bills and what fraction to equity?
- (b) What if you believe that the 1975-1998 period is representative?
- (c) What do you conclude upon comparing your answers to (a) and (b)?

4. *Mean-Variance Investing - 25 points*

Find the mean-variance efficient frontier given the information in Portfolio Optimization Template Excel spreadsheet. Construct at least eight portfolios by targeting different average returns.