PSTAT 171. HW 7 Solution (Winter 2021)

`Instruction: Review textbook chapter 7 and sections 8.1-8.3. first. Multiple reading might help. Then try to solve the homework problems quickly.`

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1. At the beginning of a quarter, Bridget Dubois purchases 200 shares of preferred stock for a price to provide her with a yield rate equal to 6.2%. Assuming the stipulated dividends of \$ .28 per share are paid quarterly, what is Bridget's per share price?

2. Dr. Mary Rogowski opens a new margin account at Robertson and Hendricks brokerage firm, which requires a 65% initial margin and a 45% maintenance margin. She purchases \$13,000 of stock in Bell Foods using her margin account to the full extent allowable. Prior to any interest being credited on the margin account, by what percentage may the stock fall without Dr. Rogowski's account violating the maintenance margin? Assume that she does not use the margin account for any other purpose and that no interest is credited.

3. Eleanor Michaels believes that the price of Continental Metals stock will go up. Its current price is \$35.45 per share and she has \$3,000 to invest. How many shares may she purchase with a cash brokerage account? How many may she purchase using a margin brokerage account with a 60% margin requirement? If the per share price is \$ 38.45 three months later when she sells the shares, what is her quarterly yield in each case? Assume that there are no dividends and that in the case of the margin account, Eleanor deposits exactly \$ 3,000 and interest charged to Eleanor for the three months reduces the funds received by \$ 30.

4. Gregory sells a stock short at a price P and buys it back one year later for $.9P$. The required margin is 50% and interest on the margin deposit is paid at 5%. Gregory's yield for the year is 14%. Dividends are paid out at the end of the year. Find the amount of these dividends as a percent of Gregory's investment.

5. Warren sells short \$3,000 of a common stock that pays dividends of \$20 after six months and \$15 after eighteen months. The margin requirement is 50%, and the annual effective interest rate on the margin account is 4%. Twenty months after he sold the stock, Warren repurchases the stock (to cover the short sale) for \$ 2,650. Find his annual yield for this twenty-month investment.

6. Yuri Popescu purchases \$16,850 of stock using his newly created margin account and borrowing to the full extent allowed. The account has a 40% maintenance margin requirement on all securities and a 50% initial margin requirement. Soon after the sale, the value of the stocks is \$18,200 and Yuri withdraws the full amount of money allowable. The price then plummets to \$13,600 and Yuri receives a margin call.
(a) How much cash would he need to deposit in order for the account to meet the maintenance margin requirement without other changes?
(b) What must be the price of marginable securities added to satisfy the 40% margin requirement? Assume no cash is added or stock sold.
(c) If the margin requirement is to be satisfied solely by liquidation of stocks, what is the market value of the stocks that must be sold?

7. Leonard Talbot observes that there are three options, all with identical prices. The price of the first will increase by 10% if the market goes up, and decrease by 10% if the market goes down. The second will increase in value by 20% if the market is up, and decrease by 15% if the market is down. The third will increase by 16% if the market is up and decrease by 20% if it is down. Describe an arbitrage opportunity.

8. The current prices on one-year, two-year, and three-year \$10,000 zero-coupon bonds are \$9,765, \$9,428, and \$8,986.82, respectively. Find all forward rates implied by these prices.

9. Calculate the total accumulated value four years from now of \$5,000 invested today and \$8,000 invested two years later, implied by the table of current spot rates below.

Term in years	Sport rate
1	2.60%
2	3.25%
3	3.70%
4	4.15%
5	4.80%