

Midterm (75 minutes)

No calculators allowed; if calculations are needed, write the explicit equation(s), identifying the variables. Do not write “ $Y = aX$; solve for X .” You can write “ $100 = 10X$; solve for X .” BE SURE TO EXPLAIN YOUR REASONING. If you want extra time, you can buy time at a price of 1 point a minute; for example, if your test is handed in 10 minutes after the scheduled finish time, 10 points will be subtracted from your test score.

1. In the television series *Entourage*, a legendary Hollywood producer brags that a home he purchased 50 years ago for \$140,000 is now worth \$13 million. What was the annual rate of increase?
2. The Powerball lottery has two drums, one with 69 white balls (numbered 1 to 69) and one with 26 red balls (numbered 1 to 26). A player pays \$2 for a ticket and picks 5 white numbers and 1 red number (the Powerball). The player wins the jackpot if the player’s five white numbers match the five numbers drawn from the white-ball drum (not necessarily in order) and the player’s red number matches the one number drawn from the red-ball drum. In the August 23, 2017 Powerball drawing, the stated jackpot was \$700 million, with the winner having the choice of taking
an immediate prize of \$443 million; or
30 annual payments, starting at \$10,536 immediately and increasing by 5% each year.
With either option, there is a federal 25% tax on the payout. Which is financially more attractive, the \$443 million immediate prize or the 30 annual payments? (Just set up!)
3. A *Wall Street Journal* article written by two portfolio strategists argued that wealthy investors don’t pay capital gains taxes because they don’t realize capital gains unless they can realize capital losses to offset the gains. In fact, wealthy investors can realize more losses than gains, giving them a break on their income taxes. They also argued that this strategy is facilitated by purchasing volatile stocks. Respond to this argument from a reader: “This article is patently asinine. Do wealth investors really seek out volatile securities so they will generate losses to offset capital gains on others? . . . Anyone dull enough to believe this rubbish won’t benefit from the general excellence of the rest of the *Journal*.”

4. In an August 15, 2017, MarketWatch column, Mark Hulbert argued that “the stock market is overvalued according to almost any standard valuation measure.” For example, looking at the S&P 500, the P/E ratio was 24.6, compared to an average of 15.7 going back to 1871 and the dividend yield was 1.9%, compared to a historical average of 4.4%.
- a. How much higher (or lower), in percentage terms, would the S&P 500 have to have been in August 2017, for the P/E to equal its historical average?

b. Identify two rational reasons why P/E ratios can be higher than average and dividend yields can be lower than average.

5. How would you reply to this letter to *The Wall Street Journal* responding to a March 14, 2000, OpEd piece by Jeremy Siegel titled “Big Cap Tech Stocks are a Sucker’s Bet,” arguing that big tech stocks are overpriced, including investor favorite JDS Uniphase?

The latest Barron’s gives a consensus earnings forecast of \$1.09 a share for JDSU in 2001. If such earnings were to rise by 44% annually over the following nine years, the company’s earnings in 2010 would be \$29.02 per share. With the stock’s price constant at its recent pre-split level of \$266 per share, its P/E in 2010 would then be a mere 9.2. So: Is this stock “a buy” or “a steal”?

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6. The Academic Management Services Monthly Payment Plan allows college students to pay their tuition and other college charges in 12 equal monthly installments, in place of the 2 semester charges. For example, if a college’s total charges for the 2017-2018 academic year come to \$60,000—\$30,000 due on August 7, 2017, and \$30,000 due on January 8, 2018—the AMS plan allows the student to pay \$5,000 each month, beginning on March 15, 2017, and ending on February 15, 2018. The only fee for this service is a \$45 application fee. How can AMS, a private company, afford to offer this plan? (Use logic, not math.)

7. On October 31, 2001, the U. S. Treasury announced that it would no longer issue 30-year bonds. A Merrill Lynch fixed-income strategist argued that, “The Treasury is trying to shorten the maturity of their debt, which makes sense given the current climate of low yields.” (At the time, interest rates on 2-year Treasury notes were about 2.4 percentage points less than interest rates on 30-year Treasury bonds.) Explain why a switch from 30-year to 2-year securities might not reduce the Treasury’s interest expense.
8. In 1988, a bank offered selected individuals a \$35,000 line of credit, allowing them to borrow up to \$35,000 whenever they wanted at a monthly interest rate of 2.5%, compounded daily. What is the effective annual interest rate? (Assume twelve months of 30 days each.)
9. For each of the following pairs, identify the asset with the longer duration. (Assume that each is priced to give a 15% required return.)
- A stock with an annual dividend that is currently \$2 and will grow by 5% annually, or a stock with an annual dividend that is currently \$1 and will grow by 10% annually.
 - A consol bond with a \$10 quarterly coupon or a no-growth stock that will pay a \$5 quarterly dividend forever.
10. A finance textbook co-authored by a Nobel laureate stated that,
You have just decided to buy a house and need to borrow \$100,000. One bank offers you a mortgage loan to be repaid over 30 years in 360 monthly payments. If the interest rate is 12% per year, what is the amount of the monthly payment? . . . Another bank offers you a 15-year mortgage loan with a monthly payment of \$1,100. Which is the better deal?”
They note that the monthly payment of the 30-year mortgage is \$1028.61, which is less than the \$1,100 monthly payment on the 15-year mortgage. But because the APR on the 15-year mortgage is 10.4%, they conclude that the 15-year mortgage is the better deal.
Is it always true that the loan with the lower APR is the better deal?