SUNY-Binghamton Name _____

Spring 2026 Economics 450

Monetary Economics

First midterm exam

No calculators. Total points on exam: 149. Look over the entire exam before you begin. If I ask you to "explain," your grade for the question will depend on your explanation. If I ask you to figure out a number, **show your work**. Good luck!

1) Consider a zero-coupon bond that you buy today, in February 2026, for a price P_t. The bond will pay \$1000 thirty years from today, in February 2056. Ten years from today, in February 2036, you sell the bond for a price P_{t+10}.

a) 5 pts Write down a formula (do not solve it) that defines the bond's yield in February 2026.

b) 5 pts Write down (do not solve) a formula that defines the bond's yield in February 2036.

c) 5 pts Write down (do not solve) a formula that defines the rate of return you receive from buying the bond in 2026 and selling it in 2036.

2) Consider a coupon bond that you can buy today in February 2026. The bond will make coupon payments once a year, in February 2027, February 2028, February 2029, and also pays off its face value (or principle) in February 2029. The face value is \$500. The coupon rate is 5% ("%" means percent). You look on your Bloomberg terminal and see that current market yields to maturity for "zero coupon" (single-payment) bonds are as follows:

7% for bonds paying off in February 2027 (one year zero-coupon bonds)
8% for bonds paying off in February 2028 (two-year zero-coupon bonds)
12% for bonds paying off February 2029 (three-year zero-coupon bonds)

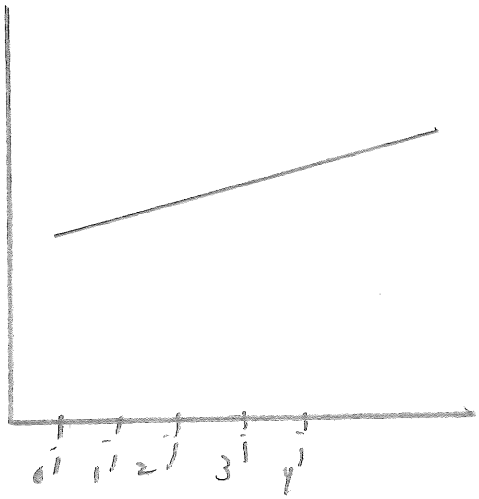
a) 5 pts. Write a formula that shows the highest price anyone should be willing to pay for this bond. *Plug in actual numbers wherever you can* but do not try to solve the formula to get a number for the price.

b) 5 pts. Now suppose that today's market value of the bond is \$300. Write a formula that defines the coupon bond's yield to maturity. Again, use all the information I gave you, plug in numbers where you can, but do not try to solve the formula. **Point out which symbol in the formula stands for the yield to maturity.**

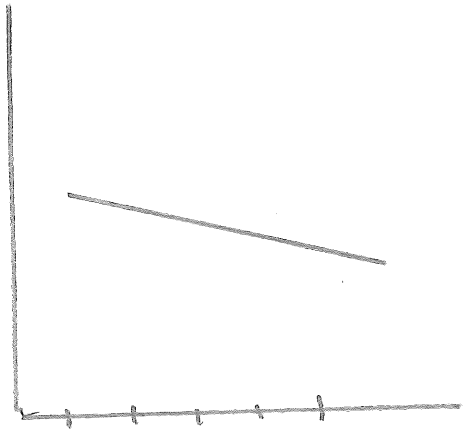
c) 5 pts. Suppose that today's market price for the bond, $300, is less than the value that comes out of the formula you wrote down for part a) of this question. What could you do to make money very fast?

3) The figures below depict (approximately) the Treasury yield curve that *actually existed*, what you would have seen on a financial news website, on some randomly chosen days within the last 30 years. For each yield curve, describe what might have been true on that day with respect to people's expectations of future overnight rates.

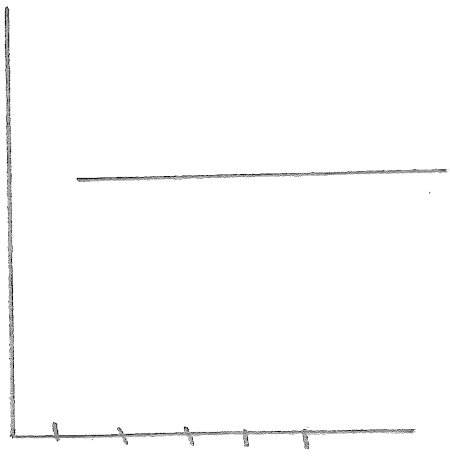
a) 5 pts.



b) 5 pts.



c) 5 pts.



4) 10 pts. Suppose the assumption we make for the "expectations hypothesis" of the yield curve is correct, that is, all that people care about is the expected value of the return to their investments. Consider a five-year zero-coupon Treasury bond being bought and sold today. The IOU on the bond is $400. The price of the bond today is $100. Everyone believes there is a probability of 50% (1/2) that the price of the Treasury bond a year from now will be $200, and a 50% (1/2) probability the price of the Treasury bond will be $150 a year from now. What is today's yield on a one-year zero-coupon bond?
SHOW YOUR WORK below.

_____percent

5) 10 pts. Suppose the assumption we make for the "expectations hypothesis" of the yield curve is correct, that is, all that people care about is the expected value of the return to their investments.Today's yield on a two-year zero coupon bond is 2 percent. Today's yield on a one-year zero-coupon bond is 1 percent. People believe that one year from now, the yield on a one-year zero-coupon bond may or may not be 1 percent. With a probability of 50% (1/2), the one-year yield will still be be 2 percent, but with a probability of 50% (1/2), the one-year yield will be a higher value x. People in the economy have in mind a specific number for x, but I haven't told you what it is. Figure it out. That is, based on the information I have given you, what must x be equal to?
SHOW YOUR WORK below.

_____percent

6) 15 pts. Suppose the "expectations hypothesis" of the yield curve is correct (there are no term premiums). Today, the overnight rate is 1%. People are sure it will remain 1% for a whole year. *After that*, they believe, there are just two things that can happen.
With a probability of 1/2, the Fed will keep the overnight rate at 1% for several more years.
With a probability of 1/2, the Fed will raise the overnight rate to 3 percent, hold it at 3% for a year, then raise the overnight rate again to 5% and hold it at 5% for several years.
In the space below, figure out what yields will be for one-year, two-year and three-year zero-coupon Treasury bonds. **Show your work**. At the bottom, plot the yield curve.

a) What is ${}_1i$? _____ percent

b) What is ${}_2i$? _____percent

b) What is ${}_3i$? _____percent

c) Yield curve

7) 10 pts. A company that issues a bond will pay a bond-rating company (e.g. Moody's or Standard & Poor's) to rate the bond, even if the bond is sure to get a low rating (e.g. BBB or CCC). Why?

8) 10 pts. Bond A and bond B both have a maturity of ten years – that is, each bond's last payment will be made ten years from now. Bond A is a *zero-coupon* bond. Bond B is a *fixed-payment bond*. Today the market price of bond A is the same as the market price of bond B. If yields rise unexpectedly tomorrow, which bond's price will fall more, or will the two prices fall by the same amount? Explain.

9) 15 pts. Consider two bonds, Bond A and Bond B, issued by two different companies. Based on what I have told you in class and in the notes, which of the following bonds is likely to have the widest (biggest) bid-ask spread quoted by dealers: Bond A, or bond B? Explain. Your score on this question depends on the thoroughness and clarity of your explanation.

Bond A was issued by an insurance company that operates in California. Everyone believes this company will default on its bonds if and only if there is a big earthquake in California within the next ten years. Everyone knows that geologists put the probability of this at 40 percent, that is all anyone knows about it, and that is all anyone *can* know about it.

Bond B was issued by a company in the mining services industry. Everyone knows that, on average, 10 percent of the bonds issued by companies in this industry are defaulted on. That is all most people know about bond B.

10) 10 pts. What is the fact about bond yields that makes people think the expectations hypothesis cannot completely explain the shape of yield curves?

11) At the bottom of this page is a list of words and phrases. Each of the sentences below can be completed with one of the words or phrases. A word or phrase may be the answer to more than one sentence. Not all of the words and phrases are answers to a sentence. 3 pts each.

a) In a legal procedure called _____, a borrower's assets are seized and liquidated and the proceeds are used to pay the borrower's debts as much as possible.

b) A financial intermediary that collects information about a potential borrower to judge the probability that the potential borrower would default on a loan is using _____.

c) When one party to a transaction has information that the other party lacks, that is called _____.

d) In order to protect itself against a borrower's incentive to do high-risk, high-return things with borrowed money, a lender will lend only to a potential borrower with positive _____.

g) A lender can prevent a borrower from carrying out a business project in a high-risk way by using _____ and _____.

h) In the country of Batavia, the medium of exchange is little disks, ½ inch in diameter, made of gold-colored plastic. This is an example of _____ .

i) In the country of Illyria, the medium of exchange is little disks, , ½ inch in diameter, made of chocolate covered with gold-colored plastic. This is an example of _____ .

j) If a lender has to sell off some of the loans she has made quickly, she may have to take low prices for them, in a _____.

	Net worth
Screening	Lender of last resort
First come, first served	Fiat money
Monitoring	Commodity money
Secondary reserves	Collateral
Moral hazard	Restrictive covenants
Liquidity	Bankruptcy
Fire sale	Asymmetric information
Bond rating	Interest-rate risk