

Q1 Anglo-Dutch auction

11 Points

Consider an Anglo-Dutch auction in which one item is for sale. In the first-round of the auction, buyers bid in an ascending-bid auction. The two buyers with the highest bids proceed to the second round. In the second round, the two remaining buyers submit sealed bids (that cannot be lower than the price at which the bidding stopped in the first round) and the buyer with the highest bid wins the item and pays what he or she bid. Valuations are drawn from the $\text{uniform}(0, 1)$ distribution.

The following table depicts the valuations for each buyer in the auction.

Buyer #	v
1	0.13134
2	0.18293
3	0.18709
4	0.20800
5	0.33763
6	0.34580

2	0.18293
3	0.18709
4	0.20800
5	0.33763
6	0.34580
7	0.35594
8	0.69384
9	0.77997
10	0.89265

Assume that buyers always bid according to the relevant symmetric equilibrium bidding strategy.

Round all numeric answers to at least three decimal places.

Q1.1

2 Points

Which two buyers will go on to the second round of the auction?

☐ 1☐ 2☐ 3☐ 4☐ 5☐ 6☐ 7☐ 8☒ 9☒ 10**Q1.2**

3 Points

In the first-round, what is the value of the highest bid? *Round your answer to at least three decimal places.*

Q1.3

4 Points

In the second round with two buyers remaining, the probability that a buyer with valuation v wins is v^{N-1} , where N is the number of buyers in the first round. Use the revenue equivalence theorem to derive the symmetric equilibrium bidding function $b(v)$ for the buyers in stage two. *Show your work.*

Upload an image of your answer as a pdf file.

Q1.4

2 Points

At the end of the auction what is the value of the actual (not expected) revenue that the seller receives? *Round your answer to at least three decimal places.*

Enter your answer here

Save Answer

Q2 The Revenue Equivalence Theorem

4 Points

Consider a sealed-bid auction in which the bidder with the highest bid wins the item and **only the winner pays** the *average of the two highest bids*; i.e., if the two highest bids were 0.9 and 0.8, then the winning bidder would pay 0.85. **Buyers who don't win pay nothing.**

Use the revenue equivalence theorem to derive the symmetric equilibrium bidding function $b(v)$. As usual, assume that there are N bidders with private valuations v drawn independently from the $\text{uniform}(0, 1)$ probability distribution. *Show your work.*

Upload an image of your answer as a pdf file.

Please select file(s)

Select file(s)

Q3 Moral hazard in credit markets

12 Points

A competitive lender makes loans to a pool of borrowers that are identical. After borrowers have received their loans they choose one of two investment projects.

Project G pays the borrower a rate of return of r_g with probability p_g . With probability $1 - p_g$, Project G pays a rate of return of -1, the borrower defaults on the loan, and the lender receives nothing.

Project B pays the borrower a rate of return of r_b with probability p_b . And with probability $1 - p_b$, Project B pays a rate of return of -1, the borrower defaults on the loan, and the lender receives nothing.

We assume as usual that $r_g < r_b$, $p_g > p_b$, and $p_g(1 + r_g) > p_b(1 + r_b)$. Suppose $r_g = 0.10$, $r_b = 0.12$, $p_g = 0.99$, $p_b = 0.4$, $r_D = 0.02$, $L = 1$.

The lender can't distinguish between borrower types and so it charges all borrowers the same interest rate r_L . The lender lends an amount L and pays interest r_D on funds acquired from depositors.

Round your answer to at least three decimal places.

Q3.1

3 Points

Write down an expression for the profit that a borrower expects from Project G assuming that no collateral is required.

Upload an image of your answer as a pdf file.

 Please select file(s)

Select file(s)

Save Answer

Q3.2

3 Points

Write down an expression for the profit that the lender expects when the borrower chooses Project G assuming that no collateral is required.

Upload an image of your answer as a pdf file.

 Please select file(s)

Select file(s)

Save Answer

Q3.3

3 Points

Compute the value for r_L^* such that the borrower is indifferent between projects G and B. Round your answer to at least three decimal places.

Enter your answer here

Save Answer

Q3.4

3 Points

Suppose that $r_L = 0.15$. Compute the collateral to loan ratio c_L^* that ensures that the borrower is indifferent between the projects G and B. Round your answer to at least three decimal places.

Enter your answer here

Save Answer

Q4 Subprime lending

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6 Points

During the 2007-08 global financial crisis, we learned that a bunch of non-bank lenders in the US had made an extraordinary volume of mortgage loans to some of the riskiest borrowers in the country. These loans were made to people who had **No Income**, **No Jobs**, and/or no **Assets** and were therefore called sometimes called *NINJA* loans. *However, such loans were more frequently called subprime* loans because they didn't meet minimum industry standards for downpayment amount, borrower income and assets, etc."and were therefore at high risk of default. Countrywide Financial was a big issuer of subprime loans.

Lenders can sell mortgages on a secondary market for cash in the same way that people can sell bonds or stocks. Selling a loans allows lenders to generate revenue from loan origination fees and to also avoid holding the risk associated with the loans they make. In the years up to 2008, investors in the US demonstrated that they were eager to buy mortgages from lenders and that they weren't carefully researching the quality of the mortgages that they were buying.

Countrywide and the other lenders who had issued the subprime loans that were in the market in 2008 helped satisfy the demand for loans by making a large volume of subprime loans and selling them in the secondary market. When, as it happened, these loans began defaulting **en masse* in 2007-08, the people and firms who bought them ultimately lost a fantastic amount of money.

Answer the following.

Q4.1

2 Points

Consider the relationship between (1) Countrywide and the other subprime lenders and (2) the investors who bought the subprime loans. Is this an example of moral hazard or adverse selection?

- ☐ Adverse selection
- ☐ Moral hazard

Save Answer

Q4.2

4 Points

Carefully explain your previous answer.

Enter your answer here

Save Answer

Q5 Credit rationing

7 Points

Answer the following.

Q5.1

4 Points

Provide a clear explanation for why asymmetric information can lead to credit rationing. A complete answer will reference at least the ideas of moral hazard, adverse selection, and loan defaults.

Enter your answer here

Save Answer

Q5.2

3 Points

Explain why asymmetric information increases the likelihood that lenders will discriminate against potential borrowers on the basis of factors unrelated to ability to repay loans; e.g., factors like race, family size, gender.

Enter your answer here