UBC – Commerce/FRE 295
FINAL EXAM -- December 12, 2011

Please print clearly.

LAST NAME:_____ FIRST NAME:_____

STUDENT NUMBER: _____

SECTION: _____

PROFESSOR'S NAME: _____

Section 101	N. Schiff
Section 102	R. Shrestha
Section 103	J. Brander
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Section 105	S. Meyer
Section 106	R. Shrestha

Maximum Score: 100
Time Available: 2 hours

Instructions: There are three parts to this exam. Part I consists of 20 multiple choice questions. Part II contains matching and fill in the blank questions. Answer all questions in Parts I and II. Part III contains longer questions. **You must choose 4 out of 5 questions in Part III**.

Provide your answers in the space provided on the exam. Scrap paper for rough work will be provided but will **not** be marked. This is a closed-book exam. You may not use books or notes. You may use a non-graphing, non-programmable calculator and you may use pen or pencil.

Make sure your name, section, and student number are provided above.

This exam has 16 pages. Check now to make sure you have all pages.

MARKS:

Section I _____ / 40

Section II _____/ 12

Section III 1. _____ / 12 (answer 4 out of 5)
2. _____ / 12
3. _____ / 12
4. _____ / 12
5. _____ / 15

TOTAL _____ / 100

PART I
MULTIPLE CHOICE QUESTIONS

Each question has one correct response. Please circle the letter in front of the correct response for each question. There are 20 questions. Each question is worth 2 pts.

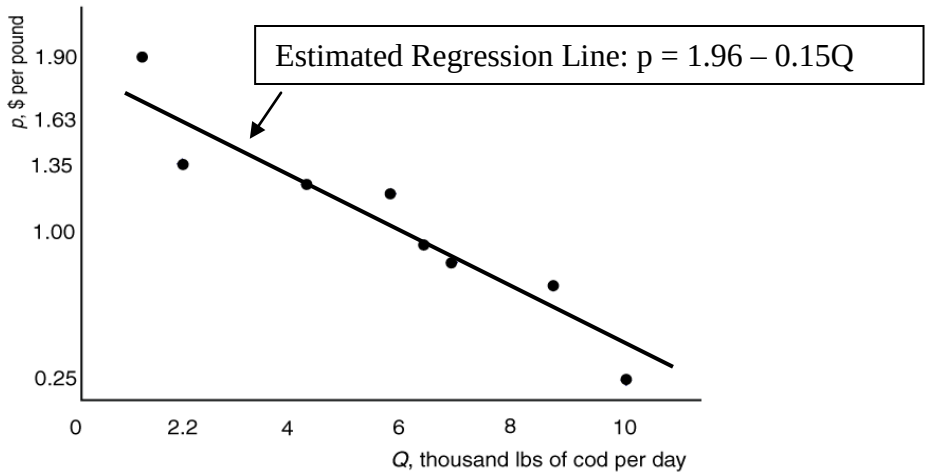
1. Suppose you are examining the market for bicycle tires and observe a linear downwards sloping demand curve. From this observation you know:

a. The price elasticity of demand will be constant but the slope will vary along the demand curve.
b. The price elasticity of demand will vary and the slope will vary along the demand curve.
c. The price elasticity of demand will vary and the slope will be constant along the demand curve.
d. The price elasticity of demand and the slope will both be constant along the demand curve.

2 . A competitive rental-housing market in Vancouver has a demand curve given by Q = 45 – P, where Q = number of units of housing and P = rent per month. The supply is fixed at Q = 30.

a. The equilibrium price is 15.
b. Demand is price elastic at the equilibrium point.
c. An increase in income would cause the demand curve to shift out if housing is a normal good.
d. Both a and c.

3. Consider the following diagram showing an estimated (inverse) demand curve for cod at the Portland Fish Exchange then select the correct response from the responses below.



a. Some data points are not on the estimated regression line because of random fluctuations in variables other than the specified explanatory variable.
b. The slope of the line shown in the diagram is – 0.15.
c. A regression line of this type can be obtained by using Excel to fit a trend line through the data points.
d. All of the above.

4. Which of the following production functions has increasing returns to scale?

a. $q = L^{.5}K$.
b. $q = L+3K$.
c. $q = L^{.5}+3K+20$.
d. Both a and c.

5. Which of the following statements about cost relationships is correct?

a. If marginal cost is increasing then average cost must be increasing.
b. Average (total) cost and average variable cost reach their minimum at the same level of output.
c. In the short run a firm will only operate at the minimum of its average cost curve.
d. If average cost is rising then marginal cost must be above average variable cost.

6. Which of the following statements about economic activity in Canada is correct?

a. Corporations produce most of the output but most firms are not corporations.
b. The public sector and the private sector are roughly the same size.
c. Public enterprises such as crown corporations are publicly traded.
d. All of the above.

7. Which of the following statements about a perfectly competitive market is true?

a. Firms can use advertising and branding to enable them to charge higher prices than competitors.
b. Firms choose quantities strategically, considering the best responses of competitors, to keep the market price high.
c. Firms set marginal revenue equal to marginal cost.
d. The market demand curve must be flat.

8. Which of the following statements about perfect competition is true?

a. Perfect competition maximizes consumer surplus.
b. Perfect competition maximizes total profit to producers.
c. A firm can capture all consumer surplus by charging a different price to each consumer for each unit of the product sold.
d. None of the above.

9. Consider a profit-maximizing monopoly facing a linear demand curve. The profit maximizing combination is Q=50 and p=10. Which of the following is true?

a. Price is less than MC at this point.
b. The monopolist could have found the profit maximizing quantity by setting p = MC and then obtaining the optimal price and quantity from the demand curve.
c. If MC=0 then there would be no deadweight loss even though this is a monopoly producer.
d. None of the above.

10. Which of the following statements regarding profit-maximizing pricing strategies is FALSE?

a. Multi-market price discrimination will not raise profits if there is perfect arbitrage (costless resale of the product).
b. Quantity based (i.e. second-degree) price discrimination cannot yield higher profits than perfect (i.e. first-degree) price discrimination.
c. Profit-maximizing two-part pricing and perfect (first-degree) price discrimination both yield equal profits no matter whether consumers are identical or not.
d. Charging a higher price for an evening movie than for the same movie shown in the afternoon is an example of peak-load pricing.

11. Berger Corner is the only restaurant serving hamburgers and fries in a small B.C. town. The restaurant has only two customers: Jenny and Ben. Jenny's reservation price (willingness to pay) is $5 for a hamburger and $1.50 for fries. Ben's reservation prices are $3.00 for a hamburger and $2.50 for fries. The marginal cost for a hamburger or for an order of fries is $2. Jenny and Ben each purchase at most one burger and one order of fries.

a. The best Berger Corner can do with stand-alone pricing is to charge $5 for hamburgers and $2.50 for fries.
b. Profit-maximizing pure bundling yields higher profit than stand-alone pricing.
c. Profit-maximizing mixed bundling yields higher profit than pure bundling.
d. All of the above.

12. In the market for crystal balls there are two producers: Potter enterprises and Gandalf Inc.. They produce identical products. Each has a positive and constant marginal cost. Market demand is linear. From this oligopoly situation we know:

a. Consumers would be better off if the firms competed as Cournot firms rather than as Bertrand firms.
b. If Potter was able to act as a Stackelberg follower and choose quantity after seeing the quantity chosen by Gandalf it would earn more profit than as a Cournot firm.
c. ***If Gandalf was able to slightly differentiate its product it would make the demand curve it is facing less elastic***.
d. If both firms competed as Bertrand oligopolists the best response curves would intersect at the origin.

13. Consider a market with two Cournot firms with identical and constant marginal cost who produce identical products. Demand is linear. Each firm is in a different country. Each firm is very important to its respective country's economy and therefore might receive a per unit subsidy from its government. Which of the following must be true? (Hint: a reduction in marginal cost shifts a firm's best response curve out.)

a. If the governments of both countries each gave identical per unit subsidies to the firm within their country total output will not change.
b. If one government gave a per unit subsidy to its home firm and the other country did not subsidize its home firm then the market will be monopolized by the subsidized firm.
c. If each government gave the same per unit subsidy to its home firm consumers would be made worse off and firms would increase profit.
d. If one government gave a per unit subsidy to its home firm and the other country did not then consumers would be made better off.

14. Consider the following game where Heinz and Ketchup King must choose whether to allocate scarce resources to product promotion or to research and development (R&D). Profits are shown in the payoff matrix below. The first number in each cell is the payoff to Heinz. Firms make choices simultaneously and the game is played only once.

Ketchup King

Heinz		Promotion	R&D
	Promotion	10, 5	X,15
	R&D	6, 11	10,12

a. Heinz and Ketchup King both have dominant strategies if X > 10.
b. If X = 5 the maximin solution and the Nash equilibrium are the same.
c. If X = 8 this is an example of a Prisoners' Dilemma game.
d. Both a and b are correct.

15. Consider a game in which Apple and RIM (producer of the Blackberry) make colour choices for a new product. The payoffs are as follows. Both firms are rational profit maximizers.

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RIM	**Apple**			
		White	Black	Violet
	White	10, 10	20, 30	22, 35
	Black	30, 20	0, 0	15, 25
	Violet	40, 15	25, 20	0, 0

a. If RIM moves first it will choose violet.
b. If RIM moves first it will choose white.
c. In a cartel situation in which either firm could make a payment to the other RIM would choose violet.
d. None of the above.

16. You are considering purchasing homeowners insurance to cover your stereo and television. Your stereo is worth $500 and your television is worth $1000. The probability of a burglar stealing just your stereo is 10%, just your television is 10%, and stealing both is 5%. In the event of theft, the insurance policy will fully reimburse you (pay you the full value of the item stolen). If the price of the policy is $P, which of the following prices would make the insurance actuarially fair?

a. P=$200.
b. P=$225.
c. P=$250.
d. None of the above.

17. Frank has a utility function defined over wealth. Four points on the utility function are as follows. U($10,000)=100, U($20,000)=400, U($30,000)=900, U($40,000)=1600. These points can be used to determine Frank's overall attitude toward risk. If Frank is offered the following investment opportunities, which one is he most likely to accept?

a. An investment of $10,000 that has a 50% chance of returning $16,000 and a 50% chance of returning $8000.
b. An investment of $10,000 that has a 50% chance of returning $20,000 and a 50% chance of returning $4,000.
c. An investment of $10,000 that returns $12,000 with certainty.
d. There is not enough information in this problem to distinguish between choices a, b, and c.

18. Consider a market for used cars where sellers know the condition of the cars but potential buyers do not. However, potential buyers do know the proportion of the good cars and lemons offered for sale. Buyers are willing to pay up to $10,000 for a good quality used car but only $5,000 for a lemon. Sellers of good cars are willing to accept $7,000 or more while sellers of lemons are willing to accept $4,000 or more. Both buyers and sellers are risk neutral.

a. If 50% of the used cars for sale are lemons, buyers will pay up to $5,500 for a car picked at random.
b. There will be an adverse selection problem only if more than 60% of the cars potentially for sale are lemons.
c. There will be an adverse selection problem only if more than 40% of the cars potentially for sale are lemons.
d. None of the above.

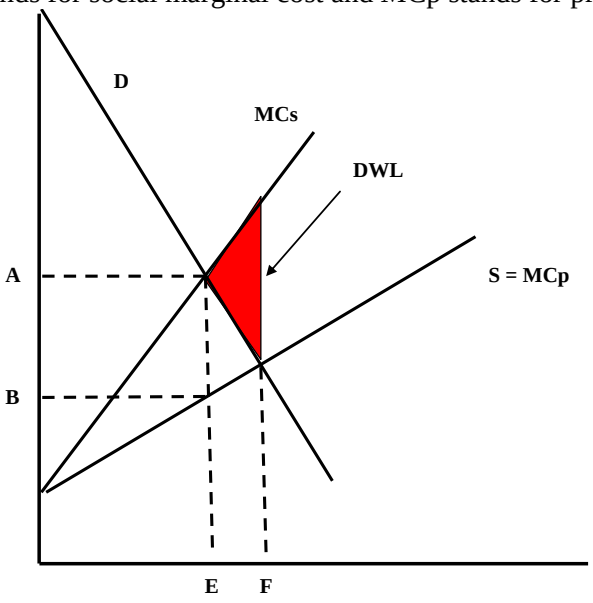
19. A manager is hired by the owner of a restaurant chain to manage a restaurant. The profit of the restaurant depends on luck and on the effort of the manager, as shown in the table below.

	Bad Luck	Good Luck
Low Effort	40	60
Med. Effort	60	100
High Effort	100	140

The probability of bad luck is .5 and the probability of good luck is .5. The manager's cost of effort is 0 for low effort, 10 for medium effort, and 30 for high effort. The manager has a profit-sharing contract that pays 40% of profits to the manager.

a. A risk neutral manager will choose high effort.
b. A risk neutral manager will choose medium effort.
c. A risk averse manager might choose any effort level except medium.
d. Based on the information given a risk neutral manager might choose any effort level.

20. The following diagram illustrates the effect of a negative externality in a market with competitive firms. In the diagram MCs stands for social marginal cost and MCp stands for private marginal cost.



Which of the following statements is true.

a. The efficient output level is F but a private market would produce only E.
b. A per-unit tax equal to A – B would eliminate the deadweight loss.
c. Deadweight loss arises because marginal benefit exceeds marginal cost at the market equilibrium.
d. None of the above.

PART II: Fill in the Blanks and Matching
Do All Questions

Fill in the Blanks (6 pts). Fill in each blank with the appropriate term.

1. A commonly used measure of how well a regression line fits the data is the R-squared statistic (R^2).

2. We observe that when Lauren prefers a to b and prefers b to c then she always prefers to a to c. Her preferences are therefore transitive.

3. If we draw all combinations of two inputs that can be used to produce the same output level the resulting curve is called an isoquant.

4. The value of a scarce resource in its best alternative use is called its opportunity cost.

5. When choices under uncertainty change depending only on how the situation is described this is called a framing effect.

6. One theory that explains the effect in point 5 is based on the idea that people have a value function or utility function that is S-shaped, with an inflection point at some initial (or reference) wealth level. This theory is called prospect theory.

Matching. (6 pts) List A contains 14 terms. List B contains 6 descriptions. For each description in list B, select the term in list A that is the **best** match for it. Use each term in List A no more than once.

List A:

adverse selection	free entry	signaling
agency problems	market failure	substitutes
complements	monitoring	tit-for-tat strategy
diminishing returns	insurance	variance
collusion	risk aversion	

List B:

7. The inability of shareholders to observe the actions of executives may cause agency problems.

8. One important response to adverse selection is signaling.

9. This might be used in a repeated game. tit-for-tat strategy.

10. When the price of A rises, demand for B falls. Goods A and B are complements.

11. Externalities, monopoly power, and adverse selection are all examples of market failure.

12. An important characteristic of the long run in monopolistic competition is free entry.

PART III

LONG ANSWER QUESTIONS

Answer only 4 of these 5 questions. If you answer all 5, only the first 4 will be graded. Please show your working and answer each question within the space provided. If necessary, you may cross out an answer and do the entire answer on the back of a page or in the space for the unanswered question, but the space used should be approximately equal to the original space allowed.

1. **Pricing.** Suppose C-Fon is a monopoly supplier of mobile phone services in a small town in BC. All of the consumers in this small town are identical. The monthly market demand is given by P = 20 - 0.005Q, where Q = the total minutes per month. C-Fon's cost of supplying the service is C = 100 + 2Q.

a. (5 pts) If C-Fon can perfectly price discriminate (that is, can charge the maximum willingness to pay for each minute of phone calls), how many minutes in total will consumers purchase each month? What is C-Fon's monthly profit? Illustrate the situation in a properly labeled diagram.

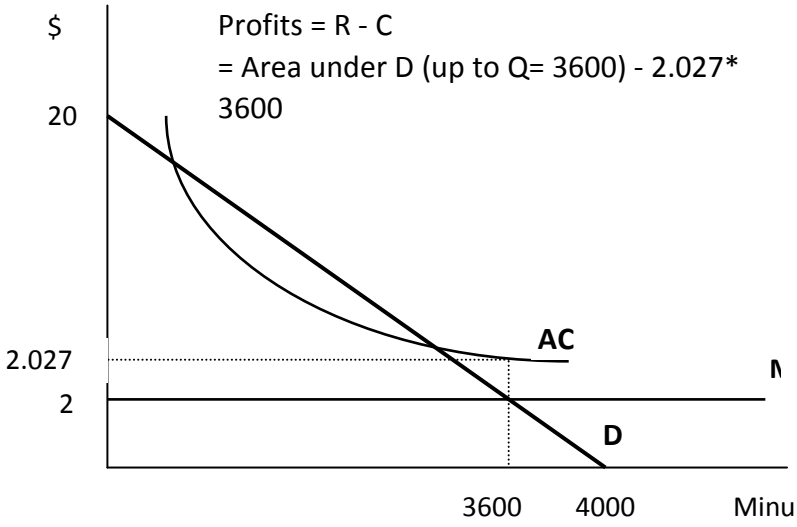
If C-Fon can perfectly price discriminate, it will sell services until the price consumers are willing to pay is equal to its MC (as in the competitive market).

Price for the last minute call, P = MC

20 - 0.005Q = 2

Q = 3600 minutes/month

Profits = 0.5 (20+2)*3600 - (100 + 2*3600) = $32,300



b. (4 pts) Now the government passes a law making price discrimination in the mobile phone market illegal. What alternative pricing scheme can C-Fon use and still make as much profits as with perfect price discrimination? Specify the details of this pricing structure and show that profit is the same as under perfect price discrimination.

If consumers are identical then perfect price discrimination and **two-part tariffs** yield equal profits.

The profit-maximizing usage price P = MC = $2

The total access fee for all consumers combined = 0.5(20 - 2) 3600 = $32,400. **(1 pt)**

Revenue = revenue from access fee + usage fee = 32,400 + 2*3600 = $39,600
Cost = 100 + 2*3600 = $7,300
Profits = 39,600 - 7,300 = $32,300. **(1 pt)**

c. (3 pts) Some airlines require passengers to spend at least one Saturday night away from home to qualify for a discount fare. What do you think these airlines are trying to do? Explain in less than 60 words.

The airlines are trying to carry multi-group price discrimination. Could be called third degree price discrimination.

The Saturday night stayover is a way of separating the market into two groups.

2. **Oligopoly.** Market demand for robotic lawnmowers is Q = 650-.5P. There are two firms producing robotic lawnmowers: Alpha Mowers and Beta Mowers. Each firm has a total cost function given by C(q)=100q+25. They produce identical products. Denote the output levels as Qa and Qb.

a. (5 pts) Determine the best response functions (reaction functions) for Alpha Mower and Beta Mowers and illustrate these best response functions in a suitable diagram. (The diagram does not need to be drawn to scale, but it does need to be properly labeled. Put Qa on the horizontal axis.)

inverse demand P=1,300-2Q
MC=100

Ra=[1300-2(Qa+Qb)]Qa = 1300 Qa - $2Qa^2$ -2QaQb

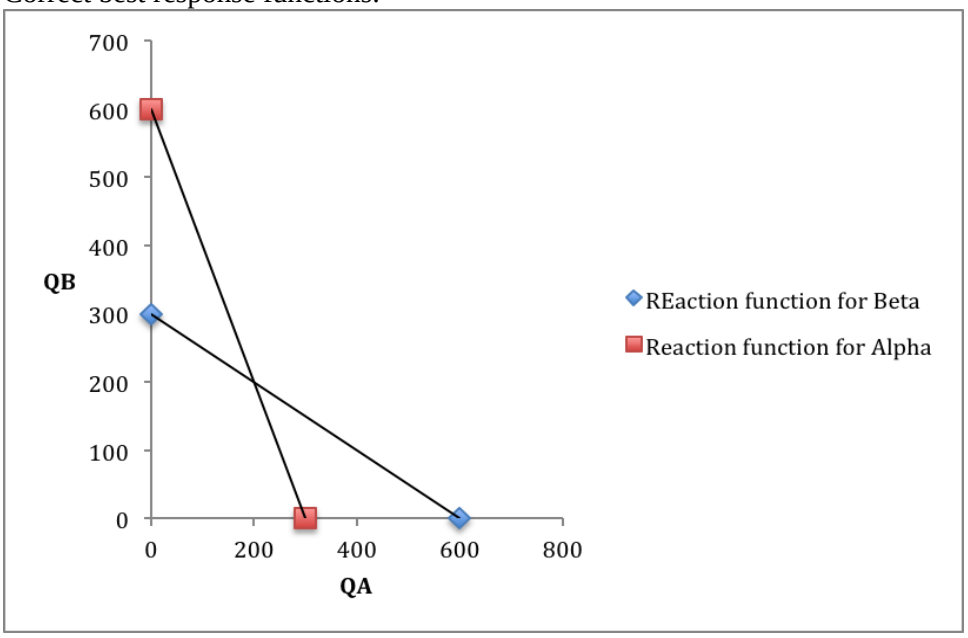
MRa =1300-4Qa-2Qb

Set MR=MC or maximizing the profit equation

MR = MC => 1300 - 4Qa - 2Qb = 100.

Rearrange to get Qa=300-Qb/2 and Qb=300-Qa/2

Correct best response functions:



b. (4 pts) Determine the output of each firm and the market price. What would happen to price if Alpha Mowers and Beta Mowers acted as a profit-maximizing cartel? Specify a numerical value for the new price. (No diagram is needed.)

Cournot
Qa = Qb = 200
Q =400
Market price = 500

Cartel would act as if monopoly

Q=300
P=700

Note – if students did not read the question carefully and used Q=650-5P (they missed the decimal) the solution works out to:
Qa=75-Qb/2 and Qb-75-Qa/2
Qa=Qb=50 Q =100 and market price=110
Cartel solution: p=115 Q=75

Give full marks for this in both parts a and b.

c. (3 pts) Specify three important factors that would make it difficult for such a cartel to operate in Canada? Explain each factor very briefly.

1. It would be illegal to form a cartel
2. There is an incentive for cartel members to cheat.
3. Entry would undermine the cartel.

3. **Game Theory.** Firms A and B are each deciding whether to produce hybrid cars. The market is large enough so that either firm can earn profits if it is the only producer. However, if both firms produce hybrid cars, both will make losses. The potential profits which can be earned by each firm are as follows. (The first number in each cell is the payoff of Firm A.)

Firm B

Firm A		**Produce**	**Don't Produce**
	Produce	-20, -20	50, 0
	Don't Produce	0, 50	0, 0

a. (4 pts) Identify any Nash equilibria in the simultaneous-move game where the firms must decide simultaneously on whether or not to produce hybrid cars. Explain briefly how you obtain your answer.

There are two Nash equilibria -- Firm A produces and Firm B does not or Firm B produces and Firm A does not. It is okay if answers are identified by the payoffs (0,50) and (50,0).
Explanation -- the basic idea is that we finding a Nash equilibrium by finding an outcome where each firm is making the best choice it can given the choice made by the rival. Students might say each firm is choosing a best response to the other firm's choice, or neither firm wants to change or regrets its choice. If students say anything related they get at least 1 pt. Anyone who writes anything for this question should get at least 1 pt. out of 4.

b. (4 pts) Now suppose that Firm A is able to make its decision before Firm B, and that Firm B observes this decision. Draw the decision tree, and identify the Nash equilibrium of the sequential game. Briefly explain your reasoning. What would happen if this game was repeated indefinitely?

The Nash equilibrium is for Firm A to produce and Firm B not to produce
Correct game tree = **1 pt**.
Reasoning must include backward induction. To get the point the student can just use the term "backward induction" or can explain the idea (Firm A looks ahead and anticipates what Firm B will do for each choice that A can make) or can just work through the game tree: Firm B makes its best choice for each possible choice by Firm A, then Firm A picks the best choice taking this into account. Firm B will enter if Firm B does not and will not enter if Firm A does. Anticipating this, the best Firm A can do is to enter.

If the game is repeated indefinitely we expect the same outcome (entry by A and by B) over and over again.

c. (4 pts) Would mixed strategies or credible threats be relevant considerations in either part a or part b? Explain in 60 words or less.

Mixed strategies could be used in part a, as firms could randomize between entering and not entering
Mixed strategies would not be used in part b.
Credible threats are not relevant in part a (because it is a static game).
Credible threats are relevant in part b. In essence, by going first, firm A is able to make its threat to enter credible.

4. **Uncertainty.** Lisa owns a small vineyard in Kelowna. If the weather is good she earns $10,000 from selling the grapes. If the weather turns bad, she makes only $2500. The probability of good weather is 80% while bad weather has a 20% probability. (No diagrams are needed for this question.)

a. (5 pts) Ethan, a grape buyer, offers Lisa a guaranteed income of $8,000 each year in exchange for her harvest. If she is risk neutral, will she accept the offer? What if she is risk averse? Explain briefly.

Lisa's expected income from the vineyard E(X) = 0.8*10,000 + 0.2*2,500 = $8,500.

If Lisa is risk neutral she will reject the offer because a risk neutral will always choose the higher expected value and the offer amount of $8000 is less than the $8500 expected value of the grapes.

If she is risk averse then she may (or may not) accept the offer depending on how risk averse she is.

b. (5 pts) If Lisa is risk averse with utility function $U(X) = X^{0.5}$, where X = income, what is the minimum guaranteed income she is willing to accept from Ethan? What is her risk premium?

Let's assume the minimum guaranteed income offer is CE. She will accept this offer only if utility from X is higher than expected utility from the vineyard.

$U(CE) > E(U) = 0.8*U(10,000) + 0.2*U(2,500)$

$X^{0.5} > 90$

$X > \$ 8,100.$ (1 pt)

The minimum guaranteed income she is willing to accept is $8,100.

Lisa is willing to sacrifice expected income of $8,500 from the risky option in exchange for the guaranteed income of $8,100. Thus her risk premium = 8,500 - 8,100 = $400.

c. (2 pts) Explain what the term "risk premium" means in this situation in 60 words or less.

There are several ways a student could express this idea. Here are few. Either is worth

i) The risk premium is the maximum income one is willing to sacrifice to avoid a risk associated with a risky prospect.

ii) The risk premium is the extra expected value a person would have to receive in order to take on a risk.

In this case, Lisa is willing to sacrifice $400 (take $8,100 guaranteed income in exchange for a risky prospect with expected income of $8,500).

5. **Asymmetric information**. An insurance company is offering private health insurance to university students. There are two types of students: students who exercise regularly and those who don't. There are 8000 students who exercise. They value health insurance at V_X=$2500. If they are insured they have an expected healthcare expenditure of HE_X=$2000 (which would be paid by the insurance company). There are 2000 students who don't exercise. They value health insurance at V_D=$3000 and, if they are insured, have an expected healthcare expenditure of HE_D=$4000 (which would be paid by the insurance company).

a. (6 pts) If the insurance company **cannot** tell which students exercise and which do not, what price or prices will it charge for insurance. Explain what happens in this market.

Students need to calculate the expected cost to the insurance company if all students buy insurance. This expected cost is .8*$2000+.2*4000=$2400.

The insurance company will charge $2500 to all students. It is okay if students say the price will be $2400 or between $2400 and $2500.

The explanation needs to cover the following points: At this price all students would buy the insurance and the insurance company would make money (or at least not make losses)**.** To get the third pt. students need to say something like the company cannot charge more that 2500 because the students who exercise would not buy and the firm would lose money.

b. b. (4 pts) If the insurance company can determine which students exercise and which do not, what price or prices would it charge for insurance. What happens in this market now?

If the insurance company can distinguish between the two types of students it will charge $2500 to the students who exercise and a price greater than $3000 to the students who don't exercise**.** It is okay if students say a price greater than $4000 would be charged to students who do not exercise.

The key points or explanation are i) The company does not want to sell insurance to the no-exercise students because the valuation of these students ($3000) is below the expected expenditure ($4000), and thus expected profits would be negative**.** The market outcome is that only students who exercise purchase insurance at their willingness to pay of $2500.

c. (2 pts) Does situation a. or situation b. give stronger incentives for students to exercise. Explain briefly in 60 words or less.

Situation b gives stronger incentives to exercise. No-exercise students may want to change their type by exercising, and thus purchase at a price of $2500. Students who already exercise would also have an incentive to continue exercising to ensure they receive insurance at a price of $2500.