Exam 1
Econ 250

1. Large electric producers can produce more efficiently than smaller producers, this is one reason why there is usually one producer in an area. This is called a(n):

   a) economy of scale.
   b) economy of scope.
   c) diseconomy of scale.
   d) diseconomy of scope.

   a.)

2. Which of the following is true for a Nash equilibrium of a two-player game?
   a.) The joint payoffs of the two players are highest compared to other strategy pairs.
   b.) Given another player's strategy stipulated in that Nash equilibrium, a player cannot improve his welfare by changing his strategy.
   c.) A Nash equilibrium is always unique in real world problems.
   d.) Given another player's strategy stipulated in that Nash equilibrium, a player cannot improve his welfare by changing his strategy and a Nash equilibrium is always unique in real world problems.

   b.)

3. If 2 spiders find a dead insect at the same time, each spider will make menacing gestures to scare off the other. If one spider backs down, that spider gets nothing and the other spider gets the insect to itself. If both spiders back down, they can share the insect. If neither backs down, the spiders will fight. The payoffs resulting from the fight depend on the sizes of the spiders and are described below.

   Table 1: Spider 2

		Back Down	Fight
Spider 1	Back Down	8,6	2,9
	Fight	9,2	x,y

   For what values of x and y will each spider have a dominant strategy?

   a.) x = 2, y = 9
   b.) x = y > 2
   c.) x = 9, y = 2
   d.) x =2, y > 9
   e.) x > 9 y = 2

   b.)

4. In a sequential game, a credible threat is one that:
   a) is announced loudly by the first player.

b) would be rational for a player to carry out if the game reached that point.
c) maximizes joint payoffs for both players.
d) minimizes the opponent's maximum possible payoff.

B.)

5. What does an elasticity of demand of 1 say about a firm's market power when compared to an elasticity of demand of 10?

   The firm with an elasticity of demand of 10 has a very elastic product, with a quantity response to a price change 10 times larger than the firm with an elasticity of 1. Any attempts at using market power to drive up their price would be met with big decreases in quantity demanded. Therefore the firm with the elasticity of 1 has a much greater market power than the other.

6. Chris is opening a van repair business. For this business he is renting a garage that costs $2,000 per month. He will hire mechanics to do the work, for every mechanic he hires he can divide the month in 4, and hire them for a week at a time (up to 4 weeks in a month), and he must pay them $500 for every week they work. Each mechanic can repair 4 vans in a month. He can hire up to 4 mechanics in his garage at a time, if he hires more he will need to rent another space that can hold 3 additional mechanics ($500 per week) for $3,000.

   a.) Derive his cost as a function of quantity, q. Hint: q cannot exceed 28 per month.
   Every mechanic can do the work for $500 per van, so the marginal cost of repairing a van is $500. He has fixed costs of $2,000 if he repairs up to 16 vans (4 mechanics hired all month repairing 4 vans). Therefore his cost function for $q \leq 16$ is:
   $c(q) = 2{,}000 + q*500$
   If he wants to repair between 16 and 28 vans he has to rent the other garage, adding $3,000 to his FC. So for $28 \geq q \leq 16$:
   $c(q) = 5{,}000 + q*500$
   b.) What is his marginal cost for each additional van up to 16? What is his average total cost if q=14?

   MC = $500 per van. ATC = $(2{,}000 + 14*500)/14 = \$642.85$

   c.) What is the minimum price for van repair Chris can operate at? What is his minimum ATC?

   We have a constant MC so let's check two points, at q=16 and q=28. At q=16 ATC = $(2{,}000+16*500)/16$ = $625. At q=28, ATC = $678.57, so q=16 provides his minimum ATC. Therefore the minimum repair price he can operate at is $625 per repair.

7. Kim sells cotton to a specific t-shirt manufacturer in Bangladesh. Courtney sells customized software to Google for Android operating systems. Which of these businesses is more likely to experience vertical integration? Why?

   Kim sells a very common, homogenous good. If the company stops buying her product, there are many other companies which will but it at essentially the same price. Courtney, on the other hand, has a specific asset that may not have value to other companies. Google may buy up her business to avoid the hold-up problem, vertically integrating her company into their own.

8. a.) Determine if either player has any dominated strategies. If so, identify them.
   b.) Does either player have a dominant strategy? Why or why not?
   c.) Solve the game. Is there any Nash equilibrium? If so, what is it?

Table 2: Player 2

		L	M	R
	U	1,2	3,5	2,1
Player 1	B	0,4	2,1	3,0
	D	-1,1	4,3	0,2

a.) R for player 2 is dominated. For each player 1 strategy, M gives player 2 a higher payoff than does R.
b.) No, neither player has a dominant strategy, their strategies are contingent on what the other player plays. c.) R is eliminated, so B is dominated for Player 1. In the remaining game D,M is left as a Nash equlibrium as neither player will deviate from it given the other player's choice.

9. A local power company has fixed costs of $200,000 and a marginal cost of $2 per megawatt hour. If it produces 10,000 Megawatt hours to meet demand:

   a.) What are profits if marginal cost pricing is used? What happens to the company if marginal cost pricing is used?
   b.) What is the price if regulators use average cost pricing? What is the profit?
   c.) What is a downside to average cost pricing? d.) What is another regulatory option that solves the problem that average cost pricing has?

   a.) If marginal cost pricing is used this company loses $200,000 per period. They will exit the market.
   b.) The price, using average cost pricing, would be $\frac{200{,}000+20{,}000}{10{,}000}$ or $22. This would give a profit of $0.
   c.) Under average cost pricing the price is determined by cost to the company. The higher the average cost, the higher the price, but the profit does not change with cost. So the company has little incentive to lower their costs, as it wouldn't improve their profit.
   d.) Price-cap regulation has a set price, and then any cost reduction increases the profits of the company. There are problems to this method as well, but it solves the lack of incentive to reduce costs.

10. Two streaming services, Netflix and Hulu, are deciding whether to raise their monthly subscription price or keep it the same. If both keep prices the same, each earns $200 million. If both raise prices, each earns $250 million. If Netflix raises while Hulu keeps prices the same, Netflix earns $150 million and Hulu earns $300 million (and vice versa if Hulu raises while Netflix keeps prices the same).

    a) Construct the payoff matrix for this game.
    b) Find all Nash equilibria, if any exist.
    c) If the companies could reach the best joint outcome, what strategy would they choose? What might we assume about the game that could allow this to happen?

    a.) The payoff matrix can be constructed as follows:

	Hulu Keep	Hulu Raise
Netflix Keep	$(200, 200)$	$(300, 150)$
Netflix Raise	$(150, 300)$	$(250, 250)$

b.) Keep, Keep is the only Nash equilibrium.

c.) The jointly optimal outcome is to raise, raise. To do this we would need:

- Repeated interactions over time, for retaliation
- Explicit or implicit collusion

1. BONUS Question - Two people are given a choice on how to split money. Mary Kate is able to choose first and can choose to divide $20 however she likes. Or she can defer to Ashley who can either choose to divide $100 by a.) giving $15 to MK and $85 to Ashley or b.) $50 to each.

   Draw the game tree. What will be the result? What would Ashley like to do to change the result?