Name _____

Sample Quiz#1

Mathematical Economics- Paper 3

Achievement Category	Raw Score	DP Mark
Overall	/100	

COMPLETE SOLUTIONS. Show all your work, using correct terminology, for full marks.

1. The daily supply and demand curves for beef in a city are given by $\mathbf{Q_S = -20 + 20P}$ and $\mathbf{Q_D = 80 - 5P}$. Where $\mathbf{Q_D}$ and $\mathbf{Q_S}$ are quantities in thousands of kilos and P is the price per kilo in US$.[1]

a. Calculate $\mathbf{Q_D}$ and $\mathbf{Q_S}$ at a price of US$3 per kilo. *[2 marks]*

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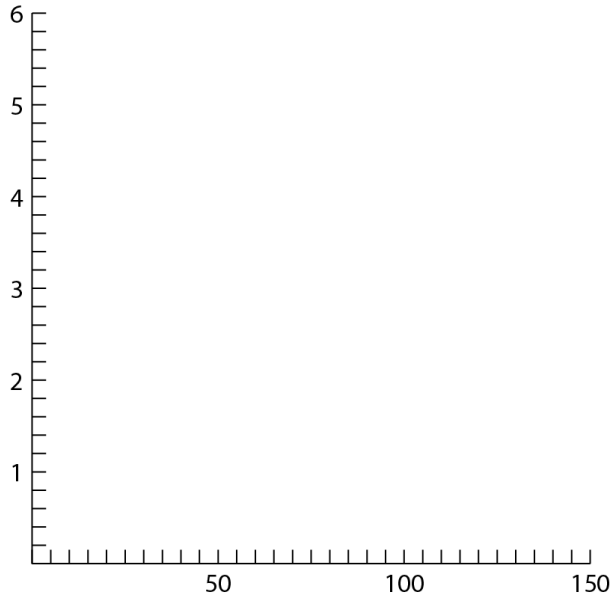
b. Label the axes of the graph below. *[2 marks]*



c. Construct the supply and demand curves on the above graph and identify the Q intercept for the demand curve and the P intercept for the supply curve. *[3 marks]*

[1] SPEC/3/ECONO/HP3/ENG/TZ0/XX

d. Calculate the equilibrium price and quantity below and identify both of these on the graph. *[4 marks]*

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A health scare about the safety of beef leads to a decrease in demand of 25 000 kilos at any price.

e. State the equation for this new demand curve. *[1 mark]*

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f. Draw the new demand curve on the graph and identify the new Q intercept. *[2 marks]*

g. Explain, with reference to the figures, why the price that you calculated in part (d) is no longer the equilibrium price. *[4 marks]*

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h. Calculate the new equilibrium price and quantity below and identify both of these on the graph.
[4 marks]

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i. If the health scare causes a decrease in demand of 25 000 kilos, explain why the new equilibrium quantity is not 25 000 kilos lower than the original equilibrium quantity. *[4 marks]*

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2. In Ruritania, the demand for butter is given by the function $Q_D = 420 – 19P$ where Q_D is the quantity of butter demanded per year, in millions of kilograms (kg), and P is the price of butter in dollars ($) per kg.[2]

a. Calculate the quantity of butter demanded per year when price per kg is

i. $7 *[1 mark]*

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ii. $10 *[1 mark]*

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b. Calculate the price elasticity of demand when price increases from $7 to $10. *[2 marks]*

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c. Explain why, for a linear demand curve, the price elasticity of demand is not represented by the slope of the demand curve. *[4 marks]*

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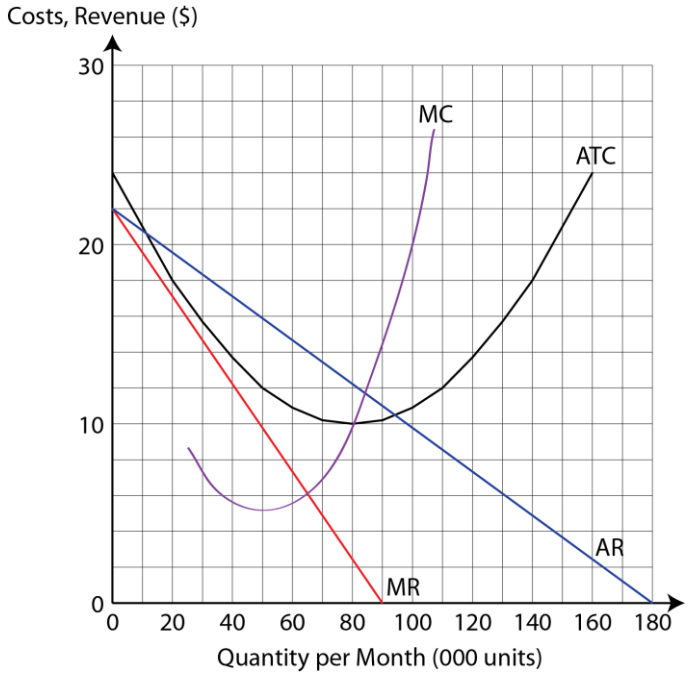
[2] M16/3/ECONO/HP3/ENG/TZ0/XX

The following diagram illustrates the average total cost (ATC), marginal cost (MC), average revenue (AR) and marginal revenue (MR) curves for a cartel which acts as a monopoly in order to maximize joint profits.



d. If fixed costs are $800,000 per month, calculate the total variable costs at a monthly output of 140,000 units. *[2 marks]*

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e. Outline the difference between the explicit and implicit costs of production. *[2 marks]*

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f. Define the term **normal profit**. *[2 marks]*

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g. Calculate the total economic profit made by the cartel is the members jointly supply 50,000 units per month. *[2 marks]*

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h. Identify the level of output which would maximize revenue for the cartel. *[1 mark]*

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i. Calculate the value of total revenue per month for members of the cartel if they produce at the revenue maximizing level of output. *[2 marks]*

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j. Outline the reason why, even if a cartel achieves its objective of jointly maximizing profit, there will be an incentive for members of the cartel to cheat. *[2 marks]*

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k. Explain **two** conditions, apart from the incentive for members to cheat, which make cartel structures difficult to maintain. *[4 marks]*

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3. A manufacturer of cotton trousers faces the following costs of production annually in €.

Category	**Cost**
Rent for Premises	10,000
Advertising	1,000
Raw Materials	15,000
Direct Labour	26,000
Energy	2,000
Depreciation	2,000
Other Variable Costs	2,000
Other Fixed Costs Including Normal Profit	10,000

a. Calculate the annual Fixed and Variable Costs of Production. *[2 marks]*

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b. Calculate Variable cost as a % of total cost. *[1 mark]*

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Assume the firm has the capacity to produce 60,000 pairs of trousers per year, but produces 40,000 pairs in total and sells them for €6 per pair.

c. Calculate the annual supernormal profit. *[3 marks]*

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d. Define normal and supernormal profit. *[4 marks]*

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e. If the firm receives an order to sell 20 000 pairs of trousers for €1.20 a pair, should it accept the order assuming it faces constant returns? Explain your answer. *[4 marks]*

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f. Calculate the AVC for the additional 20 000 pairs of trousers. *[2 marks]*

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g. Assuming that there are many competing firms in the market is this firm operating in perfect or monopolistic competition? Explain your answer. *[4 marks]*

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h. Explain what will happen in this market in the long run. *[5 marks]*

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4. The only cinema in Hamilton has a total of 300 seats. It estimates the demand for tickets by adults to be as follows. The total cost of showing any film is $900.

Price (in $)	Quantity Demanded
15	25
14	50
13	75
12	100
11	125
10	150
9	175
8	200
7	225
6	250
5	275
4	300
3	325
2	350
1	375

a. Identify the market structure. *[1 mark]*

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b. Calculate the profit maximizing ticket price *[4 marks]*

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c. Calculate the total profit. *[2 marks]*

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d. Calculate the lowest price the cinema would charge to show a film. *[2 marks]*

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e. Calculate the price that would maximize Total Revenue. *[2 marks]*

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f. Comment on the marginal cost and price elasticity of demand at the revenue maximizing price. *[4 marks]*

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If in addition to the adult demand there was the following children's demand

Price (in $)	5	4	3	2	1
Quantity Demanded	20	40	60	80	100

g. Calculate how many children's tickets, in addition to the adult tickets, a profit maximizing cinema should sell and at what price. Explain your answer. *[4 marks]*

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h. How would you describe the policy of charging different prices to different age groups and what are the conditions necessary for it to be practiced? *[4 marks]*

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i. If the government imposed a 10% tax on adult tickets, how would this affect your answer to (g)? *[2 marks]*

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