1. Two identical firms are supplying a market where demand is given by …. The firms have constant marginal costs c …. Find the Cournot equilibrium price and quantity.

2. Firm 1 and Firm 2 are potential entrants in a market where there are two segments, X and Y and each firm can enter at most one segment. As indicated in the payoff table below, they are better off if they enter different segments than when they choose to enter the same segment.

a) Find the pure strategy Nash equilibria assuming the firms move simultaneously.
b) Suppose Firm 1 gets to move first and Firm 2 observes Firm 1's move before making its move. Draw the game tree and determine the perfect equilibrium.
c) Suppose Firm 2 can speed up its market entry decision at a cost c which would allow it to move first. What is the maximum value of c for which Firm 2 would decide to speed up?

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3. Olga is indifferent between …. for sure and a lottery which gives her …. with probability …. and zero with probability …. a) Is Olga risk loving, risk neutral or risk averse? Explain your answer. b) What is Olga's risk premium for this lottery?

4. A firm has production function ….. Labour (L) costs w per unit and capital (K) costs r per unit. a) Draw the isoquant for Q= ….. b) Determine the cost function.

5. You are considering investing in two assets, A and B. A has an average return of …. and volatility (standard deviation of return) of ….%; B has an average return of ….% and volatility of ….%. A and B's returns have a correlation of ….. Suppose you invest a fraction α of your wealth in A and 1-α in B. (a) What is your expected portfolio return? (b) What is the standard deviation of the portfolio return? (c) What fraction should you invest in A if you want to minimise risk (standard deviation of portfolio return)?

8. A decision maker has utility function …..

(a) Derive the coefficient of relative risk aversion (CRRA).

(b) Assume ..... The decision maker is indifferent between $…. for sure and a lottery with prize $$x$ with probability …. and zero with probability ….. Determine x.

9. A price taking firm has production function …. where K is the amount of capital employed. The cost of capital is r per unit. a.Write down the firm's profit function (as a function of K). b.What is the optimal level of K? c.Determine the ratio of optimal profit over optimal K.

10. Two identical firms supply a market with demand function .... where Q is the total quantity supplied i.e. the sum of quantities supplied by the two firms ($Q=q1+q2$). The firms have constant marginal cost c *(....)*. Firm 1 first chooses its quantity $q1$ which is observed by Firm 2 before it decides on its quantity $q2$. Find the sub-game perfect equilibrium of this game.

11. A duopolistic industry has market demand ..... The two firms have identical cost functions …. and zero fixed costs. (a) Determine the Cournot quantities and profits.

(b) Suppose there are two managers in each firm and one of them wants to maximise output whereas the other wants to maximise profit. They compromise and the result is that both firms maximise profit times (own) quantity. Find the equilibrium output levels and profits. (c) Now suppose that only firm 1 has the setup in (b) i.e. it maximises its proft times its quantity whereas firm 2 maximises its profit. Find the equilibrium output levels and quantities. (d) The owners of the two firms simultaneously decide on the firms' objective functions (through their choice of incentive scheme for the managers), i.e. they can choose profit maximisation or maximisation of the product of profit and output. Which choices do they make in equilibrium?

12. Find all perfect (pure strategy) equilibria for the game below.

…. …. …. ….

13. A manufacturer has to decide which (if any) of two plants to operate. Plant 1 has cost function …. and Plant 2 has cost function ….. Demand is given by
….. a) If both plants are used, how should output be divided between them? Calculate the corresponding profit. b) Verify that it is better to use both plants than to just use Plant 2.
14. Amos owns a very large hotel which has enough rooms to meet all potential demand. He provides rooms for business travellers and students. The marginal cost of providing a room is 10. Demand from business travellers is given by …. and demand from students is given by
….. (a) Suppose Amos can charge different room prices to business travellers and students. What are the profit maximizing prices? (b) Now suppose Amos has to charge the same price to both groups of customers. What is the profit maximizing price? (c) Amos decides that he wants to offer his guests breakfast. The room price is p_r and the price for breakfast is p_m. Assume that the cost of breakfast is zero. The proportion s of guests who buy breakfast is given by ….. Guests do not take into account the price of breakfast when booking a room. Assuming Amos has to charge the same prices to both groups of customers, find the profit maximizing p_m and p_r.
15. A monopoly manufacturer has cost function ….. It sells its products through two retailers who have identical cost functions …. , i=1,2. Market demand is given by
….. (a) Assume the retailers act as Cournot duopolists, taking the wholesale price, p_w, as given. Find their equilibrium sales as functions of the wholesale price. (b) Calculate the manufacturer's optimal wholesale price and profit. (c) Now assume that the two retailers have exclusive territories of identical size i.e. they both behave as monopolists with respect to half the market demand. Calculate optimal prices, quantities and profits for the retailers and the manufacturer.
16. A firm's production function is given by …. Assume that the markets for the input factors are competitive. The market prices for input factor 1 and input factor 2 are given by …. and …. respectively. (a) Derive the conditional input demand for each input factor. (b) Derive the cost function. (c) Assume that the firm is a monopolist in the output market. The demand function for the output is given by ….. What is the profit maximising quantity q the monopolist should produce?
17. Ayla's utility function is ….. She has income $…., the price of x is $…. while the price of y is $1. What is her demand for x and y?
18. Duopolists have a demand curve given by ….. The marginal cost of each firm is 10. There are no fixed costs. Find the Cournot and Bertrand equilibria.
19. For utility function …. apply the utility maximisation problem (UMP).
20. For utility function …. apply the utility maximisation problem (UMP).
21. For the following production function apply the cost minimisation problem …..
22. Find conditional demands for Cobb-Douglas production function given as such ….
23. Explain the analogy between cost minimisation and profit maximisation.
24. Explain the analogy of utility maximisation and expenditure minimisation.
25. Explain the general idea between optimisation problems of the supply and demand sides of an economy.