Problem 1 (60%)

Prices on many goods have increased substantially over the past few years. Some economists claim that this is because product markets have become less competitive and therefore that mark-ups (the difference between prices and marginal costs) have increased while marginal costs have remained constant.

a) Discuss this claim in the context of a monopolistic competition industry model. Assume that the industry has become less competitive because the fixed cost of entering the industry has increased. For now, you can assume that there is no international trade. You should explain your reasoning with both words and figures (and/or math). You should explain the economic mechanisms and intuition.

b) Assume that the industry is characterized by the following two equations

$$AC = c + n\frac{F}{1000}$$
$$P = c + \frac{1}{n},$$

where marginal costs are $c = 1/20$, AC are average costs, P is the price and n is the number of firms. Initially, the fixed entry cost is $F = 16$. The entry cost then increases to $F = 25$, while other parameters remain constant.

In this monopolistic competition model, what is the equilibrium number of firms, n, before and after the change in entry costs F?

What is the equilibrium price, P, before and after the change in entry costs F?

What is the relative change in the price?

What is the equilibrium mark-up before and after the change in entry costs F? Define the mark-up as $\mu = P/c$.

c) Policymakers are concerned about the increase in prices and markups. In the context of the model, what can they do to get lower prices? Use diagrams and/or math to explain.

d) A new technology arrives which lowers the marginal costs of production. What happens to prices and the number of firms?

Problem 2 (40%)

Consider an industry with only two firms, 1 and 2, which produce a good with marginal costs equal to 4. The market price for the good is given by the following inverse demand function:

$$p = 16 - (q_1 + q_2)\,,$$

where q_1 is quantity produced by firm 1 and q_2 is quantity produced by firm 2.

a) Assume that each firm chooses quantity produced simultaneously and independently. Derive profits for firm 1 and 2 as a function of q_1 and q_2. What is the profit maximizing q_1 and q_2, as a function of q_2 and q_1, respectively? What is the Nash equilibrium is this static game? What is the market price p? What is the equilibrium q_1 and q_2? What is total profits for both firms?

b) Assume that firm 2 chooses production q_2 first, and that firm 1 chooses production q_1 after having observed q_2. Explain what is a strategy for firm 1 in this dynamic game. What is the subgame perfect Nash equilibrium? How much will firm 2 and 1 produce in this equilibrium? What is total profits in this equilibrium?

c) Which firm is better off under b) compared to a)? Why?