Exercise session 6

1. Suppose that Veronika is the only producer of the Trdelnik in Brno. The (inverse) demand function for the Trdelnik is given by P(Q)=55-2*Q. Veronika's cost function is TC(Q) = 100 – 5*Q+Q^2.

   a. Determine the marginal revenue as a function of Q.

      First we need to find total revenue: TR(Q)=P(Q)*Q=55Q-2Q^2

      Marginal revenue will be the derivative of TR with respect to Q:

      MR=$\frac{\partial TR}{\partial Q} = 55 - 4Q$

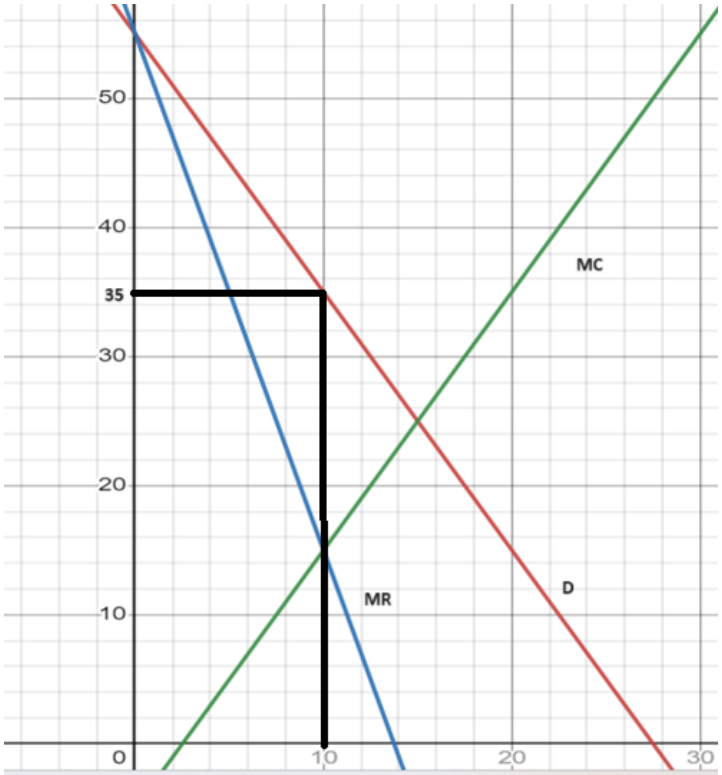
   b. If Veronika maximizes her profit, what price does she charge? How much profit she gets?

      Profit maximizing condition is MR=MC, where MC=$\frac{\partial TC(Q)}{\partial Q} = -5 + 2Q$, therefore, $55 - 4Q = -5 + 2Q \Rightarrow Q^m = 10$

      If we plug this into the demand function, we get $P^m = 35$

      Her profit will be $\pi = TR - TC = 55 * 10 - 200 - 100 + 50 - 100 = 200$

   c. Calculate the consumer surplus.



CS=(55-35)*10/2=100

d. If instead Veronika decides to maximize total social surplus, what price does she charge? Calculate the profit at this price.

At the competitive equilibrium (Veronika as social planner), we are looking for the intersection between the demand function and the MC curve:

$$-5 + 2Q = 55 - 2Q \Rightarrow Q^c = 15 \Rightarrow P^c = 25$$

$$\pi = TR - TC = 55 * 15 - 2 * 225 - 100 + 75 - 225 = 125$$

e. Calculate the deadweight loss if profit is maximized.

First let's find the price where MR and MC curves intersect. In this case we can plug in Q=10 in either of the curves, we get P=15

The DWL is the area of the triangle = (35-15)*(15-10)/2=50

Pr. 2

a) Here we should note that MC is constant and equals to 40; MC = 40. The same way as in Pr 1, we will use MR = MC condition to calculate profit maximizing level of output.

afternoon: $MR = 100 - 2Q \Rightarrow 100 - 2Q = 40 \Rightarrow Q = 30;\ P = 70$

evening: $MR = 200 - 2Q \Rightarrow 200 - 2Q = 40 \Rightarrow Q = 80;\ P = 120$

b) payed to the distributor: $40 \times (30 + 80) = 4400$, hence

$\Pi = 30 \times 70 + 80 \times 120 - 4400 = 7300;$

c) In this case MC = 0 (no charge per ticket); therefore:

aftern: $100 - 2Q = 0 \Rightarrow Q = 50,\ P = 50;$ → revenue = 2500

evening: $200 - 2Q = 0 \Rightarrow Q = 100,\ P = 100;$ → revenue = 10 000

$\Rightarrow \Pi = \underbrace{2500 + 10000}_{\text{revenue}} - \underbrace{10000}_{\text{flat fee}} = 2500$

In part b cinema had profit of 7300, now 2500, therefore the owner of the cinema would not prefer this arrangment.

d) It will depend on the arrangement:

40 czk / ticket: $MC = P = 40 \Rightarrow$ Aftern: $100 - Q = 40;\ Q = 60$

evening: $200 - Q = 40;\ Q = 160$

flat fee of 10 000czk: $MC = P = 0 \Rightarrow$ Afternoon: $100 - Q = 0,\ Q = 100$

evening: $200 - Q = 0,\ Q = 200$

3. A monopoly firm can sell 150 units of output for $10 per unit. Alternatively, it can sell 151 units of output for $9.90 per unit. The marginal revenue of the 151st unit of output is
   a. -$5.10.
   b. -$0.10.
   c. $2.45.
   d. $5.90.

4. Why might economists prefer private ownership of monopolies over public ownership of monopolies? Explain.
   The private monopolist is governed by the market. Even though the market solution is sub-optimal, it may be better than outcomes generated by publicly owned monopolies. Publicly owned monopolies may restrict output to levels below the private market outcome

and thus generate an even lower level of social surplus than a private profit-maximizing monopolist. Private owners have an incentive to minimize cost as long as they reap benefits in the form of higher profits. Government bureaucrats have no incentive to reduce costs. The losers are customers and taxpayers, whose only recourse is the political system.

5. For each question, state clearly whether you find the statement to be true, false, or uncertain. Then provide a clear explanation.

   (a) *Hockey is a public good.*

Uncertain. It's not a pure public good. If we're talking about the attendance of a hockey the game, then the good is clearly excludable (you need a ticket to get in) and it's rival to the extent that once the seats are full, one person's presence excludes another from viewing. Hockey on television is less excludable and is entirely non-rival. So arguably it's more of a public good. Excludability is the issue here. If it's shown on free TV (as opposed to cable), then anyone can watch it. But can people watch it without paying? Depends how you view advertising. In order to watch a hockey game on TV, you're basically forced to watch advertising (you have to engage in costly activities to avoid the ads). This can be viewed as a form of the admission fee, which implies excludability. So, it's certainly not a pure public good, but it's also not a pure private good. Hence, it's likely to be underprovided (as some are now sorely aware). This could be used as justification for government intervention in the current labor dispute.

   (b) *The free-rider problem tends to get worse as the number of beneficiaries from a public good rises.*

True. The free-rider problem arises when you believe someone else will provide the good for you. The more people there are to provide the good for you, the more you can rely on those other sources of provision. Also, the more people there are, the more the gap is between one person's personal valuation of an extra unit of the good, and societies marginal valuation of the good. Free-riding on things like doing the dishes is much less likely to be a problem when you have one roommate than when you have ten.

   (c) *Because drivers of cars have their own life on the line, they will exert the efficient level of care when driving.*

False. We can think of driver carefulness as a good with an associated positive externality. My being careful benefits me primarily, but also has spillover benefits for others on the road. I'll be careful up to the point where the marginal benefit to me equals the marginal cost to me. But others are benefiting as well from my care, implying that the MSB curve lies above my private MB curve. Thus, I will be providing too little care, from a social welfare (efficiency) perspective. Just because my life is on the line doesn't mean I take sufficient care to account for the external benefits.

   (d) *Assuming you and I benefit from a public good, your marginal benefit for the last unit consumed must equal my marginal benefit from the last unit consumed, for efficiency to hold.*

False. For private goods where everyone consumes at least some of the good, MB for person A must equal MB for person B in order for efficiency to hold. Otherwise we could take some of the good away from the person with lower marginal benefit and give it to the person with higher marginal benefit, while compensating the person with the lower marginal benefit. This would increase overall social welfare. Hence with private goods, MB must be equal across all consumers for each good consumed. For public goods, this is not the case. All consumers consume the same amount of the good. For some, the last unit of the good may give very little benefit. For others, it may give significant benefit. Suppose I get MB=1 out of the last unit consumed and you get MB=4. If the two of us make up society as a whole, then we know that as long as Q is such that MC=5, the good is being efficiently provided. We don't need our individual MBs to be equal.

6. A monopoly operated in a market with (inverse) demand $P(Q)=20-\frac{Q}{5}$. The marginal cost is 10.

(a) Find the monopoly's optimal output and price

the optimal quantity will be defined from the condition MR=MC: $R(Q)=Q*P(Q)=20Q-\frac{Q^2}{5}$ therefore $MR(Q)=20-\frac{2Q}{5}$, hence, from $MR(Q)=20-\frac{2Q}{5}=10$, we get that $Q^*=25$, plugging this value into the (inverse) demand function will give: $P^*=15$.

(b) Compute the deadweight loss (DWL) due to the monopoly.

If $P=MC=10$, then $Q=100-5P=100-5*10=50$, therefore $DWL=\frac{1}{2}(15-10)*(50-25)=62.5$ (drawing the graph would help you calculate the DWL more easily).

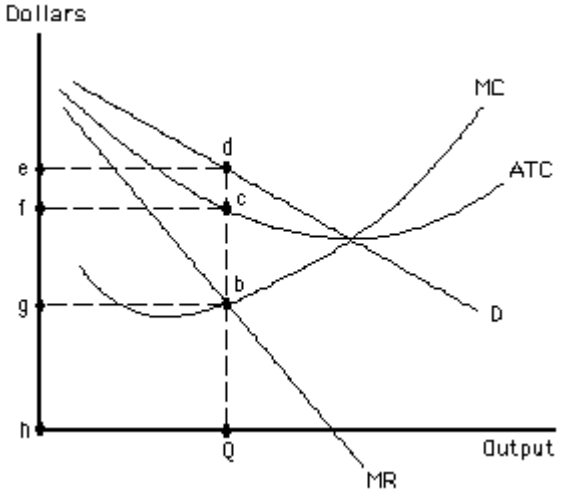
7. If a non-discriminating monopolist decides to lower its price to sell one more unit of its product, then

a. total revenue rises by an amount equal to the price
b. some revenue is lost to the extent that units previously sold at a higher price now sell for a lower price; however, the additional unit sold brings in new revenue
c. marginal revenue increases when total revenue increases
d. the net effect on total revenue is typically zero since the price must fall
e. the net effect on total revenue is typically negative since the price must fall

8. Suppose that a non-discriminating monopolist lowers its price from $75 to $70 in order to sell more output. Marginal revenue will

a. equal $75
b. equal $70
c. be between $75 and $70
d. be less than $70
e. be greater than $75

9. What is the total profit (or loss) for the (single-price) monopolist shown in Figure?



a. profit of cbgf
b. loss of fcbg
c. profit of egbd
d. loss of edcf
e. profit of edcf

10. The Figure shows a single-price monopolist. The maximum level of profit that could be achieved is:

Price	Quantity	Total Cost	Total revenue	Profit
$100	1	$150	$100	($50)
$90	2	$180	$180	$0
$80	3	$220	$240	$20
$70	4	$300	$280	($20)
$60	5	$400	$300	($100)
$50	6	$550	$300	($250)

a. -$20
b. $20
c. $300
d. $280
e. $40

11. Suppose that for a monopolist, MR = MC = $10 and P = $15 at the profit-maximizing level of output. At this level of output, the firm
a. is earning a profit
b. will shut down if AVC > $15
c. is making $5 profit on each unit sold
d. will shut down if ATC > $15
e. is losing $5 per unit produced

12. If a firm earns zero economic profit in the long run, then it
a. must be in a perfectly competitive market
b. must be in a monopolistically competitive market
c. cannot be in a monopolistically competitive market
d. could be in any of the four major market structures
e. is not in an oligopoly

13. If a monopolistically competitive firm engages in a successful advertising campaign resulting in above positive economic profits then in the long run that firm will
a. continue to earn positive economic profits because successful advertising is one of the barriers to entry
b. earn zero economic profits because the government will begin to regulate the industry
c. earn negative economic profits because it won't be able to advertise indefinitely
d. earn zero economic profits because other firms will also begin to advertise
e. continue to earn positive economic profits because most monopolistically competitive firms can earn economic profits in the long run

14. Consider the town of Springfield with only three residents, Sophia, Amber, and Cedric. The three residents are trying to determine how large, in acres, they should build the public park. The table below shows each resident's willingness to pay for each acre of the park.

Acres	Sophia	Amber	Cedric
1	$10	$24	$6
2	8	18	5
3	6	14	4
4	3	8	3
5	1	6	2
6	0	4	1
7	0	2	0

a) Suppose the cost to build the park is $24 per acre. How many acres should the park be to maximize total surplus from the park in Springfield? **3 acres because at two acres total willingness to pay equals to cost of building the park, while at 4 acres, total benefit is less than the cost of adding one more acre**

b) Suppose the cost to build the park is $9 per acre. How large should the park be to maximize total surplus from the park in Springfield? **5 acres**

c) Suppose the cost to build the park is $24 per acre and that the residents have agreed to split the cost of building the park equally. If the residents vote to determine the size of park to build, basing their decision solely on their own willingness to pay (and trying to maximize their own surplus), what is the largest park size for which the majority of residents would vote "yes?" Answer the same question when the cost per acre is 9$. **2 acres, 4 acres.** ***The logic is that at 24$ per acre, each of them will have to pay 8 dollars with equal split. Sophia will be willing to say "yes" up until 2 acres, Amber will be willing to say "yes" up until 4 acres and Cedric will not be willing to say yes at all, Therefore, majority votes will be "yes" to 2 acres. With 9$ per acre, the cost for each will be 3 dollars and in that case majority will vote for maximum 4 acres.***

d) Suppose the cost to build the park is $24 per acre and that the residents have agreed to split the cost of building the park equally. To maximize his own surplus, how many acres would Cedric like Springfield to build? **0**

e) Suppose the cost to build the park is $24 per acre and that the residents have agreed to split the cost of building the park equally. If the residents decide to build a park with size equal to the number of acres that maximizes total surplus from the park, how much total surplus will Sophia receive? What about Amber? **0$; 32$.**

Total surplus is maximized when 3 acres are built. At that allocation Sophia pays 8$ per acre, while receives 24$ as benefit (10+8+6), therefore, her surplus is 0. At 3 acres Amber pays 24$ in total while receives 24+18+14 dollars as benefit, hence her surplus is 32$

15. The privately-owned school system in Smalltown has a virtually unlimited capacity. It accepts all applicants and operates on both tuition and private donations. Although every resident places value on having an educated community, the school's revenues have suffered lately due to a large decline in private donations from the elderly population. Since the benefit that each citizen receives from having an educated community is a public good, which of the following would *not* be correct?

a. The free-rider problem causes the private market to undersupply education to the community.

b. The government can potentially help the market reach a socially optimal level of education.

c. A tax increase to pay for education could potentially make the community better off.

d. The private market is the best way to supply education.

16. Highway engineers want to improve a dangerous stretch of highway. They expect that it will

reduce the risk of someone dying in an accident from 5.3 percent to 2.1 percent over the life of the highway. If a human life is worth $10 million, then the project is worth doing as long as it does not cost more than

a. $53,000.
b. $210,000.
c. $320,000.
d. $2.1 million.

10000000*(5.3-2.1)/100=320000