Problem Set 5

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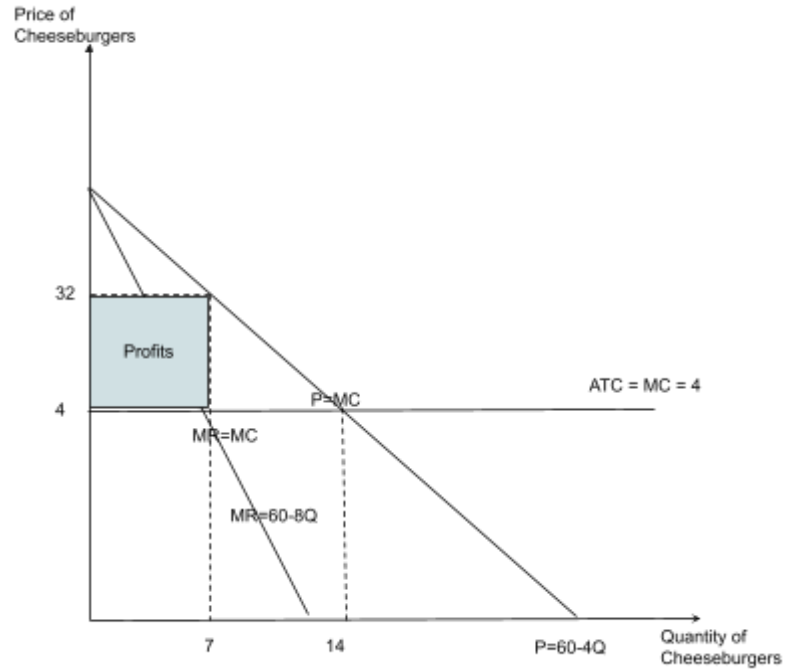
Section B

1. a.
A monopolist will always produce at the quantity where MR = MC. Since MC is assumed to be positive for all quantities, MR is also positive when it intersects with MC. At this quantity, when MR is positive, one additional unit of goods sold will translate to an increase in TR (Total Revenue) which signifies that the demand curve is elastic at this quantity. Therefore, at the profit-maximizing quantity, demand curve is elastic

b.
Let P be a function which calculates price given quantity. We know that $TR = P \times Q$ and $MR = \frac{d\,TR}{dQ}$. So, $MR = P + P' \times Q$ by product rule.
Note that $P' = \frac{dP}{dQ} = 1/\frac{dQ}{dP}$ is less than 0 at all quantities for a monopolist as an increase in P will lead to a decrease in Q.
Since $P' < 0$, $MR = P + P' \times Q < P \Rightarrow MR < P$

c.
Yes, for example let $P = 60 - 4Q$. Then using results from part b, $MR = 60 - 8Q$. MR is negative when $Q > 7.5$.

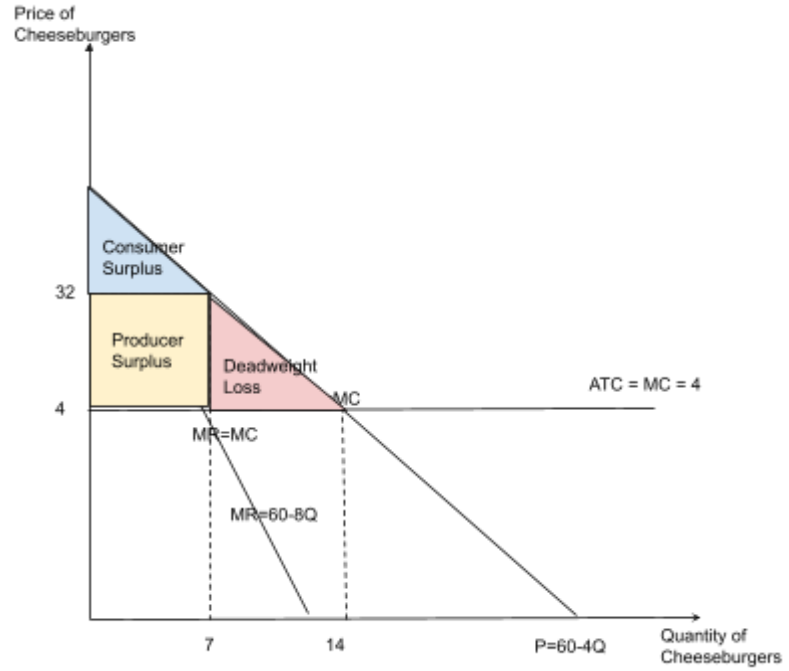
2. a.



From 1.c., $MR = 60 - 8Q$. The profit maximizing level of production is at $Q = 7$ where $MR = MC$ i.e. $60 - 8Q = 4$.
The price it will charge would be $P = 60 - 4Q = 60 - 28 = 32$.
Profits $= TR - TC = P \times Q - ATC \times Q = 32 \times 7 - 4 \times 7 = 196$

b.
The competitive industry will produce at $Q = 14$ where $P = MC$ (by solving $60 - 4Q = 4$)

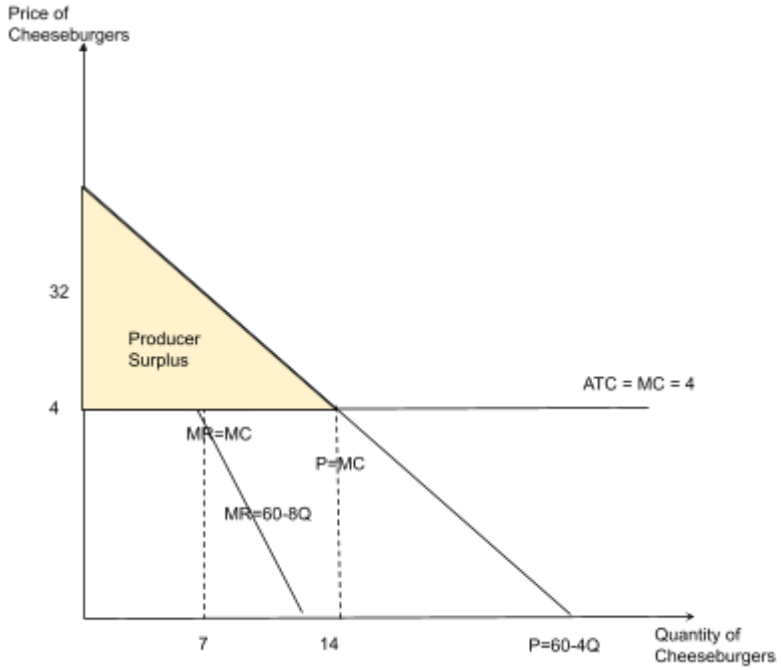
c.



A monopoly will produce at Q=7 where MR=MC and since MR<P, P>MC. This means society's valuation of the good at Q=7 will exceed the cost of producing the unit. There will be deadweight loss as Q=7 does not maximize total society welfare

Deadweight loss = area of red triangle = ½ x (14-7) x (32-4) = 98.

d. When the monopolist is able to perfectly price discriminate, Q=14 where P=MC. However, all the consumer surplus will be captured by the firm because every consumer will pay a price equal to their Willingness to Pay (WTP). Therefore, there will be zero Deadweight loss, and society's welfare is fully captured by producer surplus.



3.
The Pixar animation illustrates a market structure that closely resembles an oligopolistic market in which there are a few sellers (i.e. the performers) offering similar products (i.e. live music). The individual sellers aim to capture the market by playing music to a single buyer (which represents a small market or a few buyers). The sellers are acting in their own self interest to capture the entirety of the market, however, if they were to collude and work together, they would both be better off. In the video, it was depicted that the competition between the two parties was very strong. However, if they were to come to an agreement prior, there would be less competition and both the performers would benefit.

4.

(a) P = 10, MC = 10, ATC = 6

Profit maximisation occurs when MR = MC. Since (ATC) is below the market price, the firm will earn economic profit.

(b) P = 12, MC = 10, ATC = 12

When the price (12) is equal to the ATC (12) of the firm, the firm will earn zero economic profit in the long run.

(c) P = 11, MC = 8, ATC = 10

Firm is making economic profit, however is not maximising profit since MC, P and ATC are all different values.

(d) P = 10, MC = 12, ATC = 8

Firm's ATC (8) is below the market price so the firm will be making profit. However, the firm will not be maximising profits as they are not producing MR = MC.

(e) P = 8, MC = 5, ATC = 10

In this scenario, ATC (10) exceeds the market price and the firm will suffer economic losses. The losses will equal to the average total cost minus the market price multiplied by the quantity produced. The losses would be minimised if the firm produces MR = MC.

5.a

Payoff matrix of the game		THE ROAD KILL CAFÉ	
		Ignore	Clean up
Sal Monella's	Ignore	both profit $7000	Sal Monella's loses $3000 THE ROAD KILL CAFÉ profits $12000
	Clean up	Sal Monella's profits $12000 THE ROAD KILL CAFÉ loses $3000	both profit $5000

b.
Looking at it from Sal Monella's perspective:

If their competitor chooses to ignore the health code violations, they stand to gain by cleaning up the place. (earning $12000 is better than $7000);
If their competitor chooses to clean up, they minimise any losses if they clean up the place. (earning $5000 is better than losing $3000);
Hence, regardless of what their competitor chooses, Sal Monella's would clean up their place (their dominant strategy is to clean up)

Sal Monella's perspective if:		THE ROAD KILL CAFÉ	
		Ignore	
Sal Monella's	Ignore	both profit $7000	This is good,
	Clean up	Sal Monella's profits $12000 THE ROAD KILL CAFÉ loses $3000	but this is even better! (choose this)

Sal Monella's perspective if:		THE ROAD KILL CAFÉ	
		Clean up	
Sal Monella's	Ignore	Sal Monella's loses $3000 THE ROAD KILL CAFÉ profits $12000	This is the worst,
	Clean up	both profit $5000	though this is not as bad! (choose this)

The situation is similar for THE ROAD KILL CAFÉ. They will also choose to clean up the place regardless of what their competitor does, because either way they would be better off than choosing not to.

c.
Both players' dominant strategy is to clean up. This would result in them both ending up with $5000 profit. Even though they could have both benefited by continuing to ignore the health code violations($7000 good ending), their self-interest and distrust of their competitor would drive them both to the bad ending of $5000 profit as they chase the best ending of $12000 profit and evade the worst ending of $3000 loss.

d.
Considering long run operations, the two restaurants might decide to collude instead. If they know that both of them will be sticking around for a long time and future interactions like this would be inevitable, it would be in both restaurants' best interest to strike up an agreement, such that none of them will clean up their acts and both restaurants will enjoy the good ending of $7000 profit. (since earning $7000 is better than earning $5000).

It should be noted that this would still very much be dependent on whether both parties uphold their part of the agreement. The moment one restaurant decides to "rip off" their competitor and not clean up the place, it would make it extra difficult for any future cooperation to form.

e.
Dominant strategy:
One that will always benefit the firm, regardless of what others in the market choose to do.

Nash equilibrium:
Situation when players interact with one another, each choosing the best strategy given the choices others have made. (in this case, cooperation is unlikely to take place in the short run because both firm's dominant strategy is to not follow the mutually beneficial agreement and clean up)

Prisoner's dilemma:
Oligopoly(duopoly in this case) market power is now reduced, because the dominant strategy of both players result in inefficient outcomes. (the two restaurants would essentially be sabotaging each other instead of working together)

6a.

Formation of oligopolies and monopolies

A lack of competition will result in the formation of oligopolies and monopolies. As the government slackens antitrust restrictions with the intentions of allowing firms to grow in size and achieve economies of scale, what actually ends up happening is the firms holding onto their new found market power and driving out competitions.

Self-perpetuating cycles

As firms gain significant market power, they would start to artificially raise the barriers of entry. One such example would be simply buying out any potential future competitors, as mentioned in paragraph 8: “They(Alphabet, Amazon, Apple, Facebook and Microsoft) have bought 519 firms, often embryonic rivals, in the past decade, and may stifle them.” This in turn allows firms to earn higher economic profits, which then provides the fundings for them to engage in more anti-competition behaviours. In the USA, they would even go as far as “spend(ing) $3bn a year on lobbying” to “get cosy treatment” from politicians.(paragraph 7)

Threats of oligopolies and monopolies

(after going full circle,) The effect of firms with increased market power would be as such:

a) Firms will be producing at profit maximising output, which is lower than the socially optimal quantity. This leads to lower consumer surplus and welfare deadweight loss.They also charge higher prices, affecting equity.
b) Innovation will be stifled as firms will not be pressured to improve their product to stand out, especially if they are the sole player in the market. Variety and quality of products will not improve as much either, leaving consumers with fewer choices and subpar goods.

b.

Market composition and number of new firms can show the level of competition in an economy (not counting natural monopoly). If there are very few new players entering the market, and the existing firms are taking up more and more market share, the competition in the market is falling.

The visible effect of this would be the prices of goods in those markets. By default, firms with market power trying to maximise profit (producing at MC=MR) would charge a higher price than their marginal revenue. The lower the level of competition, the lower the substitutability of the good. Think of a monopoly that is the only one producing the goods in the country, say bread, the demand for bread would then be very price inelastic. With the monopoly then restricting output to maximise profit, the reduction in output is going to lead to a more than proportional increase in price.

In other words, if the price of a good in the given market is much higher than that in a competitive market, the competition in the given market has likely weakened significantly. From paragraph 7: “In regulated industries that don’t face competition from imports — health care, airlines and telecommunications — prices are at least 50% higher than in other rich countries, and returns on capital are high.”

c.
This goes back to part a. The USA is an interesting case because it is one of the few developed countries where if you are rich enough, you can rent a politician(or as they call it, lobbying). Firms can affect government decisions by simply “donating” to the election funds of politicians, and once the politicians become elected officials, the firms are given favourable treatment. This effectively allows firms to raise barriers of entry and lower cost of production as the government now makes it harder for new entries into the market all while relaxing environmental and labour regulations. Think of gun ownership in America: the reason why it is basically impossible to implement any gun control in the USA is not just because “bearing arms was what the founding fathers intended”, but also because gun companies donate huge sums to politicians (especially Republicans).

This cycle of firms weeding out competition and gaining political influence also started with the government. It was thought that because firms were not allowed to expand in size, they would not be able to achieve economies of scale. Lower production volumes prevented them from spreading the initial cost of more efficient manufacturing techniques and equipment over larger outputs, making investments and innovations prohibitive. It was also thought that once the firms grow in size, they would willingly pass their cost savings down to the consumers. Unfortunately, they were wrong. As restrictions were lifted, mergers happened and barriers to entry were created. The profits from increased size were instead spent on more lobbying, predatory pricing, buying up competitions and advertising, with whatever was left pocketed by shareholders.

d.
The tech industry is interesting. On one hand, firms like Apple and Samsung all have significant market power because their products are unique. Sure, both firms make popular smartphones that have very similar base functionalities(make calls and text) and even form factor(a screen that never seems to get big enough, and missing headphone jacks on all their flagships), yet they all have their own cult following. This is because the phones are still very differentiated. Operating systems, aesthetics and hardware specifications all differ from one manufacturer to another, which is what allows their product to stand out. With the aggressive marketing behaviours all major manufacturers engage in, consumer loyalty tends to be high as well. New firms would also find it challenging to compete with existing firms whose reputation has been established(and might even be holding certain patents), notwithstanding the common practice of tech giants to simply buy out their competition. When buying attempts fail, the incumbent firms might even resort to lawsuits or other underhanded practices just to drive out competition. In this case, we can argue that the tech industry is not competitive.

However, we still see frequent new entrants into the tech market. New start-ups often manage to upset the balance of the market with innovative designs. While they lack the experience and funding of the bigger firms, the tech industry is not as tightly regulated as other markets like healthcare. Talents are also free to move around, going from one firm to another or even starting their own new entrepreneurship as they grow discontent with the company they were working at. In this sense, the barriers to entry into the tech industry are much lower than other markets. The novelty of a new brand challenging the existing firms is also exciting in this day and age, often serving as free advertisement. Think of Tesla: a new electric car company that turned EVs into actual usable vehicles. They became immensely

popular even though the charging infrastructure and customer service left much to be desired, and Tesla is a successful business. To top it off, one of the chief engineers who worked at Tesla became unhappy with how Elon Musk was running the company. He then left Tesla to create Lucid Motors, yet another electric car company that shook up the industry(although the success of Lucid Motors is still indeterminant).

The quality of new tech is also much easier to quantify. A new phone is a better phone if it lasts longer than the old one, is faster than the old one or looks better than the old one. Consumers can directly compare the price and quality across different brands and models, making the demand for technology high but price elastic. Firms are then forced to be more careful with their pricing strategies, as blatant price gouging will surely lead to more than proportionate falls in revenue and profit. Except for certain highly specialised components, products in the tech industry also tend to be close substitutes of one another. The cross price elasticity of Apple's and Samsung's smartphones is probably positive and higher than 1, giving the manufacturers incentive to either lower prices or further differentiate their products by developing unique features. Looking at it this way, we can argue that the tech industry remains competitive.