Intro Microeconomics | Homework E Demo

Question 1 | A Favourite Muggle Candy

Sherbet Lemons were one of Dumbledore's favourite muggle foods, which dramatically spiked in popularity after (spoiler!) his death. To ensure the newly popular treat didn't carry unwanted health effects for witches and wizards, the Ministry of Magic's Health and Safety branch decided to keep an eye on their production by allowing only one shop, Weasleys' Wizard Wheezes (WWW), to sell the candy. Monopoly

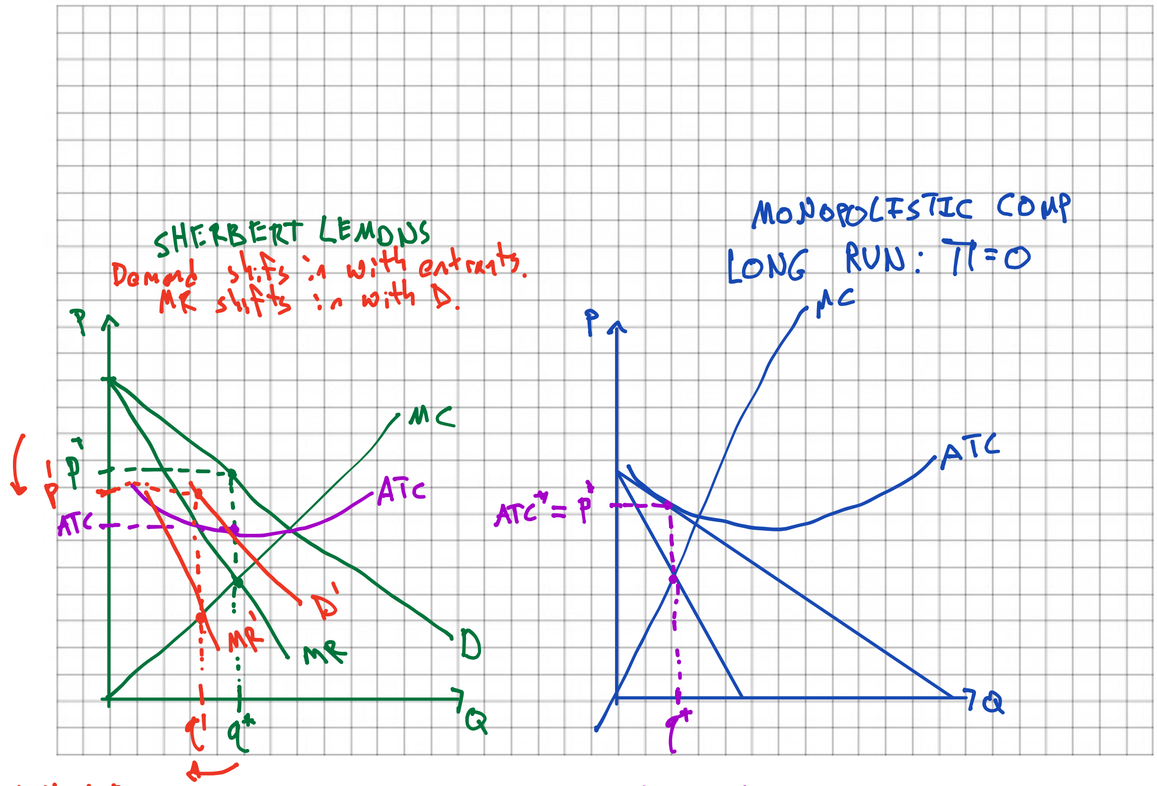
As it became clear that the muggle candy didn't need to be regulated, the Ministry began allowing many new candy makers to sell Sherbet Lemons. Each seller had their own individual recipes which allowed anyone to find the recipe and seller they preferred. Heterogeneity

Monopolistic Comp.

Today the number of Sherbet Lemon makers has been constant for many years.

Using a graph to illustrate your answer, tell the story of the Weasleys' Wizard Wheezes Sherbet Lemon market as the Health and Safety regulations were lifted. Begin with a graphical description of the market with the regulation, what happened in the short run after the regulation was lifted, and finish in a long run equilibrium.

Graph 1 [1. Monopoly (Initial)
2. Entry of substitutes (Short Run)]
Graph 2 3. Monopolistic Comp. (Long Run)



CONCLUSIONS
1. P↓, q↓
2. π↓

In the long run, after entry and exit have stopped, firms make zero profits.

Question 2 | Wizard's Chess

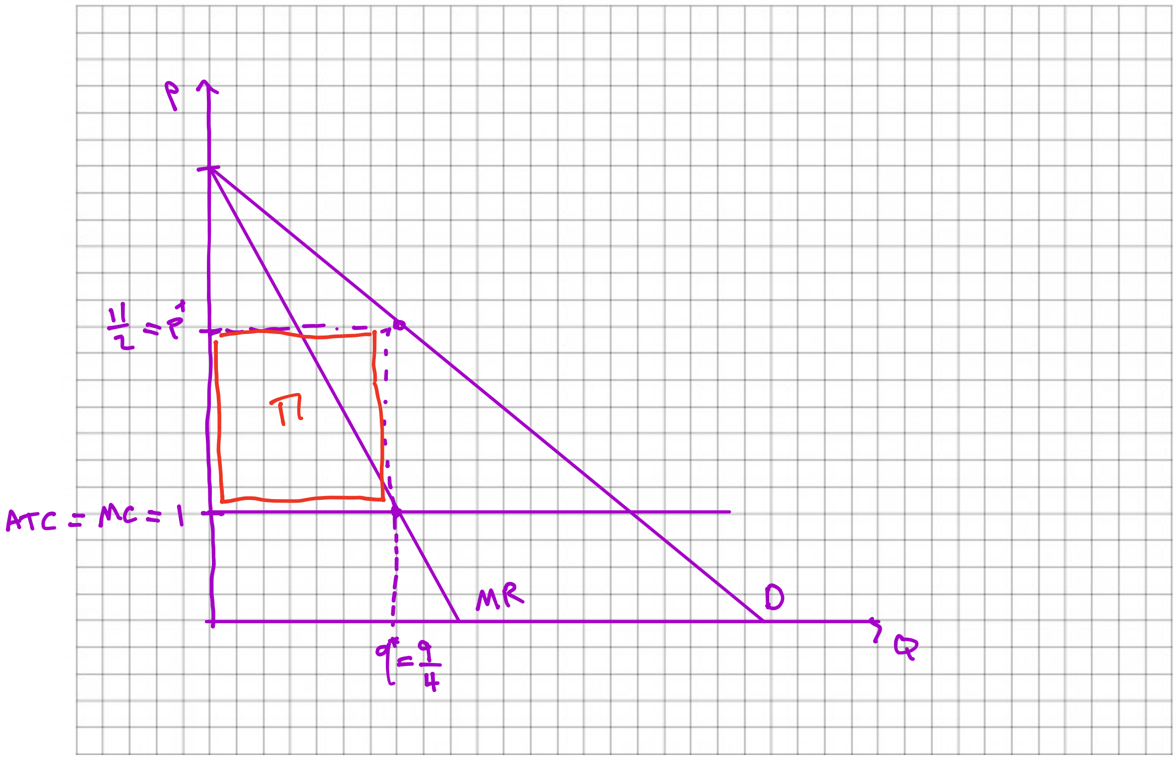
Wizard's Chess is a somewhat common game played by witches and wizards, similar to chess but with self-moving pieces. Due to it's proprietary production process the game can only be obtained at Weasley's Wizard Wheezes through a secretive supplier, X. The demand for Wizard's Chess is given by:

$$P = 10 - 2Q$$

The marginal cost of producing each game is a constant 1 galleon, and there are no fixed costs. The marginal revenue per game is:

MC = 1

$$MR = 10 - 4Q$$



Part A. Quantity

What is the profit maximizing number of games X should sell? Label on the graph above.

$MC = MR$

$1 = 10 - 4Q$

$4Q = 9$

$q^* = \frac{9}{4}$

Part B. Price

What price should X charge per game? Label on the graph above.

$P\left(\frac{9}{4}\right) \longrightarrow P = 10 - 2q = 10 - 2 \cdot \frac{9}{4} = 10 - \frac{9}{2} = \frac{20}{2} - \frac{9}{2} = \frac{11}{2}$

$P^* = \frac{11}{2}$

Part C. Profit

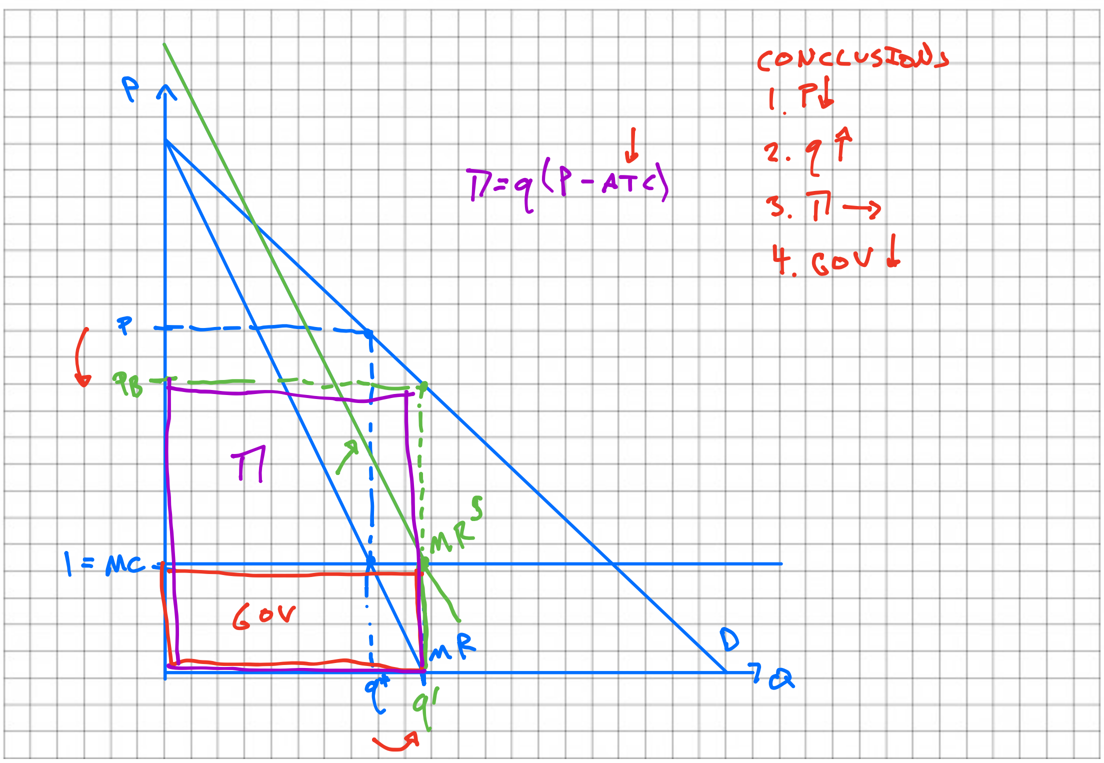
What is X's profit from selling the games? Label on the graph above.

$$\Pi = q^*(P' - ATC) = \frac{9}{4}\left(\frac{11}{2} - \frac{2}{2}\right) = \frac{9}{4} \cdot \frac{9}{2}$$

$$\Pi = \frac{81}{8}$$

Part D. ~~Lumpsum Tax~~ Subsidy

As TikTok began to capture the attention of the magical world's youth, the Ministry of Magic implemented a 1 galleon subsidy on Wizard's Chess in an attempt to encourage more cognitively challenging pastimes. Use a graph to show the affect this subsidy had on the market.



Question 3 | Parallel Wandmaker's Dillemma

Suppose the demand for wands is given by

$$P = 100 - Q$$

Duopoly!

and there are two main wand sellers, Olivander and Gregorovitch. Olivander can make wands at a constant marginal cost of 10, while Gregorovitch can make wands at a constant marginal cost of 5. The marginal revenue for Olivander is

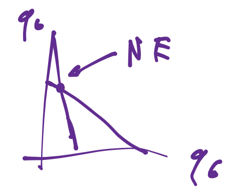
$$MR_O = 100 - 2q_O - q_G$$

and for Gregorovitch it is

$$MR_G = 100 - 2q_G - q_O$$

Units are in galleons and stones. Calculate the Nash equilibrium level of output for the two wandsellers and put it in the blanks below.

Note. *This Oligopoly is not symmetric. So the trick we used in class won't work here. Simply solve for both firm's optimization decisions separately.*



Part A. Olivarnder's Quantity

What is the Nash equilibrium quantity for Olivander?

$BR_O: MC_O = MR_O$

$10 = 100 - 2q_O - q_G$

$2q_O = 90 - q_G$

$\boxed{q_O = 45 - \frac{1}{2}q_G}$

$q_O = 45 - \frac{1}{2}q_G = 45 - \frac{1}{2}\left(\frac{95}{2} - \frac{1}{2}q_O\right)$

$q_O = 45 - \frac{95}{4} + \frac{1}{4}q_O$

$\frac{3}{4}q_O = \frac{180-95}{4} = \frac{85}{4}$

$\boxed{q_O = \frac{85}{3}}$

Part B. Gregorovitch's Quantity

What is the Nash equilibrium quantity for Gregorovitch?

$BR_G: MC_G = MR_G$

$5 = 100 - 2q_G - q_O$

$2q_G = 95 - q_O$

$\boxed{q_G = \frac{95}{2} - \frac{1}{2}q_O}$

$q_G = \frac{95}{2} - \frac{1}{2}\left(\frac{85}{3}\right)$

$q_G = \frac{285}{6} - \frac{85}{6} = \frac{200}{6}$

$\boxed{q_G = \frac{100}{3}}$

$q_G = \frac{95}{2} - \frac{1}{2}\left(45 - \frac{1}{2}q_G\right)$

$\frac{3}{4}q_G = \frac{95}{2} - \frac{45}{2} = \frac{50}{2}$

$\boxed{q_G = \frac{100}{3}}$

Part C. Equilibrium Price

What is the Nash equilibrium price in this market?

$P = 100 - Q = 100 - \frac{100}{3} - \frac{85}{3}$ $\quad Q = q_G + q_O$

$= \frac{300 - 100 - 85}{3}$

$\boxed{P^* = \frac{115}{3}}$

Part D. ~~Subsidizing~~ Taxing Wands

In a highly unethical move, the Ministry of Magic imposed a 10 galleon ~~subsidy~~ tax on wand sales, ensuring only the wealthiest were able to attend wizarding school. Model this as a 10 galleon increase in the marginal cost of making a wand and find the Nash equilibrium quantity and price after the tax.

$10 + MC_G = MR_G$

$15 = 100 - 2q_G - q_O$

$2q_G = 85 - q_O$

$BR_G: q_G = \frac{85}{2} - \frac{1}{2} q_O$

$10 + MC_O = MR_O$

$20 = 100 - 2q_O - q_G$

$2q_O = 80 - q_G$

$BR_O: q_O = 40 - \frac{1}{2} q_G$

NE

$q_G = \frac{85}{2} - \frac{1}{2}\left(40 - \frac{1}{2} q_G\right)$

$= \frac{85}{2} - 20 + \frac{1}{4} q_G$

$2 \cdot \frac{3}{4} q_G = \frac{45}{2}$

$q_G = \frac{90}{3}$

$\boxed{q_G = 30}$

$q_O = 40 - \frac{1}{2} \cdot 30 = 40 - 15$

$\boxed{q_O = 25}$

$P_B = 100 - 25 - 30$

$\boxed{P_B = 45}$

$\boxed{P_S = 35}$