

## Econ 101 | Demo E4

### Question 1 (of 2) | Parallel Wandmaker's Dilemma

Suppose the demand for wands is given by

$$P = 100 - Q$$

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 wand sellers 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.*

#### Q1.a Olivander's Quantity

What is the Nash equilibrium quantity for Olivander?

### **Q1.b Gregorovitch's Quantity**

What is the Nash equilibrium quantity for Gregorovitch?

### **Q1.c Equilibrium Price**

What is the Nash equilibrium price in this market?

### **Q1.d Subsidizing Wands**

In a highly unethical move, the Ministry of Magic imposed a 10 galleon subsidy 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.

## **Question 2 (of 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 its 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:

$$MR = 10 - 4Q$$



**Q2.a Quantity**

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

**Q2.b Price**

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

### Q2.c Profit

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

### Q2.d Subsidizing X

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.

