# ECO101: Introduction to Microeconomics
# Practice Sheet 2

1. Consider a market for electric cigarettes where the demand and supply functions are given by:

$$Pd = 2000 - 3Qd \text{ and } Ps = 300 + 2Qs$$

   There is a lump-sum tax on sellers of $6 per unit imposed by the government.

   a) What is the equilibrium price and quantity before tax was imposed on electric cigarettes?
   b) What would be the new supply function after tax is imposed of $6 per unit on sellers?
   c) After the tax imposition, what is the new price paid by consumers and price received by sellers?
   d) What is the total tax revenue earned by the government?
   e) Calculate the change in total surplus as a result of the tax.

2. a) Complete the table below on a firm's costs.

| Quantity | Total Cost | Marginal Cost | Variable Cost | Average Total Cost | Average Variable Cost |
|---|---|---|---|---|---|
| 0 | 10 | | | | |
| 1 | | 20 | | | |
| 2 | | 10 | | | |
| 3 | | 8 | | | |
| 4 | | 18 | | | |
| 5 | | 24 | | | |

ProPainters hires students at $250 per week to paint houses. It leases equipment at $500 a week. The table below sets out its product schedule

| Labor ( hours per week) | Output (houses painted per week) |
|---|---|
| 1 | 2 |
| 2 | 5 |
| 3 | 9 |
| 4 | 12 |
| 5 | 14 |
| 6 | 15 |

b) If ProPainters paints 12 houses a week, calculate its total cost, average total cost and marginal cost.

c) Explain why the gap between ProPainters' total cost and total variable cost is the same no matter how many houses are painted.

d) If ProPainters leases twice the amount of equipment, what will happen to its Average Total Cost Curve?

3. Consider a perfectly competitive market in the short run. Assume that market demand and supply is given by

$$\boldsymbol{P = 100 - 4Q_d \ and \ P = Q_s}$$

Since all firms are identical in a perfectly competitive market setting, all firms will have identical cost structures. Denoting firm level quantity by q, assume

$$\boldsymbol{TC = 50 + 4q + 2q^2 \ and \ MC = 4 + 4q}$$

a) What is the equilibrium price and quantity in the market?
b) How many firms will operate in the industry in the short run?
c) Calculate an individual firm's profit/loss in the short-run
d) Given your answer in part c, what will happen to the market in the long run?

4. Suppose the following equations represent the market for airpods

**Demand:** $\boldsymbol{P = 150 - 2Q}$
**MC:** $\boldsymbol{MC = 10 + 3Q}$

a) Assuming the Monopolist MC is the market supply curve, find the market equilibrium price and quantity
b) Suppose more firms start producing airpods and the market becomes perfectly competitive. What would be the new market equilibrium price and quantity?
c) What is the total deadweight loss created as a result of the monopoly?