Econ 3012 - Final

1. Briefly answer the following in a way that a person who has not studied economics or mathematics would understand:

A. What are **monotonic** preferences?

B. Why does a firm maximize profit where **marginal revenue is equal to marginal cost**?

C. What does is it never optimal for a monopolist to operate where consumer demand is inelastic?

2. Fill in the blank:

A. For a firm, **profit maximization** implies _____ **minimization**.

B. If a firm **doubles its inputs,** and **output increases by less than double**, the firm's production function has _____ **returns to scale**.

C. A consumer is **indifferent** between $(2,0)$ and $(0,2)$ but **strictly prefers both** of these bundle to $(1,1)$. This consumer's preferences are **not** _____.

3. A firm has production function $f(x_1, x_2) = x_1^{\frac{1}{2}} x_2^{\frac{1}{2}}$. The input price for x_1 is $w_1 = 4$ and the input price for x_2 is $w_1 = 1$.

A. Does this production function have increasing, decreasing, or constant **returns to scale**?

B. Write down an expression (in terms of x_1 and x_2) that gives the **slope of this firm's isoquants** for any input bundle.

C. What is the slope of this firm's **isocost curves**?

D. Find the cost minimizing amount of x_1 and x_2 for producing output y. That is, find the firm's **conditional factor demands**.

E. What is the firm's **cost function** for producing output y?

4. **There several firms each with cost function** $c(q) = 10q$. **Market demand is given by:** $q = 1000 - 10p$.

A. What is the **inverse demand function**?

Suppose first that there is only one such firm, who acts as a monopolist in this market.

B. What is this firm's **profit function**?

C. What is this firm's **optimal quantity** q and what **price** p does it charge?

Suppose now that there are two firms that compete in Cournot oligopoly in this market.

D. What is firm 1's **profit function** in terms of q_1 and q_2?

E. What is firm 1's **optimal quantity** in terms only of q_2? And what is firm 2's optimal quantity in terms only of q_1? That is, find the firm's **best response functions**.

F. Find the quantity for both firms q^* in a **symmetric equilibrium.**

G. What is the **market quantity** and **price** in this equilibrium?

5. Consumer demand is $q = 100 - p$. **Producer supply is** $q = 4p$.

A. What is the **price elasticity of demand** for consumers in this market? Make sure to write this only as a function of p.

B. What is the **equilibrium price** and **equilibrium quantity** in this market?

C. What is the **consumer surplus** in this market?

D. If the government imposes a **quantity tax** of $t = 50$ what is the new **equilibrium quantity** in this market. How much do **consumers** pay per unit?

E. What is the new **consumer surplus** after this tax is imposed?

6. A consumer has utility function $u(x_1, x_2) = min\left\{x_1, \frac{1}{2}x_2\right\}$ **and income** $m = 40$. **Prices are** $p_1 = 2$ **and** $p_2 = 1$.

A. **Sketch** a few of this consumer's **indifference curves**.

B. On the same graph, sketch the consumer's **budget line**. Label the value of the **intercepts**.

C. Does this consumer have **convex** preferences? Are they **strictly convex**?

D. What is the consumer's **demand** for x_1?