Intermediate Microeconomics

# Quiz 3

## Question 1: Cost Minimization and the Long Run Competitive Equilibrium

Consider a perfectly competitive market. A competitive firm has the following production function: $y = x_1^{\frac{1}{4}}(x_2 - 1)^{\frac{1}{4}}$. Assume that the prices of factors are $w_1 = 1$ and $w_2 = 4$, respectively.

(a) Derive the conditional demand functions for inputs $x_1$ and $x_2$ in terms of the output level $y$.

(b) Determine the firm's long-run total cost function $c(y)$.

(c) Continuing from (b), find the firm's supply function and its maximum profit given an output price $p$.

(d) Now consider the market demand for output $y$ is given by $P = 80 - Q$. Suppose all firms have access to the same technology and have the same cost function $c(y) = 4y^2 + 4$ if $y > 0$. Find the long-run equilibrium (including the equilibrium price, the supply of an individual firm, the number of firms in the market, and the total market output).