Econ 302
Tutorial 5

1. Consider a Stackelberg duopoly where firm 1, the "leader", faces cost of the form $c_1(y_1) = y_1^2$ and firm 2, the "follower" faces cost of the form $c_2(y_2) = 2y_2^2$. The inverse demand function is given by $P = 10 - 2Y$ where $Y = y_1 + y_2$.

(a) State the maximization problem of the "follower" and use the first order condition to derive his reaction function.

(b) State the maximization problem of the "leader" and use the first order condition to derive firm 1's optimal production level.

(c) What will be the follower's optimal quantity?

(d) Find the market price, and firms' profits. Show your results graphically.

2. Consider a Stackelberg duopoly where firm 1, the "leader", faces cost of the form $c_1(y_1) = y_1^2$ and firm 2, the "follower" faces cost of the form $c_2(y_2) = 8y_2 + 2y_2^2$. The inverse demand function is given by $P = 10 - 2Y$ where $Y = y_1 + y_2$.

(a) State the maximization problem of the "follower" and use the first order condition to derive his reaction function.

(b) State the maximization problem of the "leader" and use the first order condition to derive firm 1's optimal production level.

(c) What will be the follower's optimal quantity?

(d) Find the market price, and firms' profits. Show your results graphically.

3 Two firms, producing an identical good, engage in price competition. The cost functions are $c_1(y_1) = 1.17y_1$ and $c_2(y_2) = 1.19y_2$, correspondingly. The demand function is $D(p) = 800 - 50p$. The firm that charges the lowest price gets the entire demand, while, if prices are equal, each firm gets exactly one half of the total demand. Firms can only charge prices that correspond to denominations of Canadian dollars (*i.e.*, prices change by one cent).

(a) Suggest an equilibrium pricing scenario (*i.e.*, one price per firm). Given the prices you propose, find the quantities that each firm is selling, the total market quantity, and the corresponding profits. Justify why the prices you propose are equilibrium prices (by showing that NO firm wants to deviate from the prices you propose).

(b) Repeat part (a) after the Bank of Canada has announced that the 1 cent coin is withdrawn fro circulation (*i.e.*, prices can change only in multiples of five cents).