ECN 453: Homework 3

Due: Start of class Thursday 17th November
Please work in groups of 2-3 people and hand in one solution per group.*

Instructions Please neatly write your answers, staple them together, and submit this homework at the start of class on Thursday 17th November. If the work is too messy/hard to read it will not be graded. Don't forget to put the names of everyone in your group on the front. If you have questions come and talk to me in office hours, after class, or by email: nvreugde@asu.edu. Good luck!

1. New technology and market structure (30 points)

Consider an industry with market demand $Q = a - p$ and an infinite number of potential entrants with access to the same technology. Initially, the technology is given by $C = F + cq$. A new technology allows for a lower marginal cost $c' < c$ at the expense of a higher fixed cost $F' > F$.

a. (30 points) Suppose that $a = 10, F = 2, F' = 3, c = 2, c' = 1$.[1] Determine the equilibrium price under both the old and new technologies.

*Note: I will accept individual submission (groups of 1) but this is not recommended because people who work in groups have done better in the past.

[1]To map it exactly onto the formula discussed in class, note that the demand curve implies that market size $S = 1$.

2. Repeated games (50 points)

Consider the following game and suppose that it is repeated an infinite number of times. Players have a discount value of δ.

Player 1 \ Player 2	L	R
T	10, 10	12, 0
B	0, 12	1, 1

a. (20 points) For what values of δ can collusion on (T,L) be sustained under the following grim trigger strategy:

- Play (T,L) if (T,L) has been played in all previous periods
- Otherwise play (B,R).

b. (20 points) Suppose instead that the payoffs from playing (B,R) are (0,0) (i.e. not (1, 1)). For what values of δ can collusion on (T,L) be sustained under the following grim trigger strategy:[2]

- Play (T,L) if (T,L) has been played in all previous periods
- Otherwise play (B,R).

c. (10 points) Explain in 1-2 sentences: why does your answer change between Part a and Part b?

[2] This is the same grim trigger strategy in (a) but you will need to compute it with different payoffs.