ECO 610
Problem Set #4
Fall 2019

Instructions: This is a team assignment, so turn in one paper per team. Due 11/19/19.

1. (10 pts.) Suppose that the 117 existing alligator farmers in the U.S. are able form an agricultural cooperative and effectively monopolize the market for alligator skins and meat. Your boss Ralph wonders what that is going to do to alligator prices in the short run and in the long run. He asks you to conduct a Porter's Five Forces analysis of the alligator market, and then predict and explain the trajectory of prices over the next 5-10 years.

Upstream supplier power: alligator farmers acquire inputs in generally competitive markets. No input suppliers (alligator feed, used school buses, etc.) possess significant market power that would allow them to extract surplus from their downstream customers—alligator farmers.

Downstream buyer power: the customers of alligator farmers are largely companies that buy alligator skins to use in manufacturing products such as handbags, shoes, briefcases, belts, etc. Some of the larger buyers may purchase skins in large enough quantities that they are able to negotiate small discounts. But for the most part, alligator farmers have numerous buyers competing for their skins.

Threat of substitutes: Crocodile skins? Snake skins? Other exotic animal skins? Fashion trends change regularly, and what is the hot style this year can change in short order. So it is not clear that alligator skins are a particularly unique product.

Threat of entry: This is a huge problem for any cartel/cooperative that successfully restricts market output and raises price. The resulting economic profits will attract new firms to enter the market. Since there are no significant barriers to entry into alligator farming, entry will occur. Over time, market output will increase and market price will fall, defeating the cooperative's attempt to monopolize the market.

Internal rivalry: If the cooperative/cartel is able to convince members to cooperate, i.e. each farmer adheres to a production quota, then internal rivalry will be suppressed. While the 117 current alligator farmers collectively have an incentive to cooperate, they each have an incentive to cheat on their quota if the cartel successfully raises market price above the competitive level. If cheating occurs, then output will increase and prices will fall.

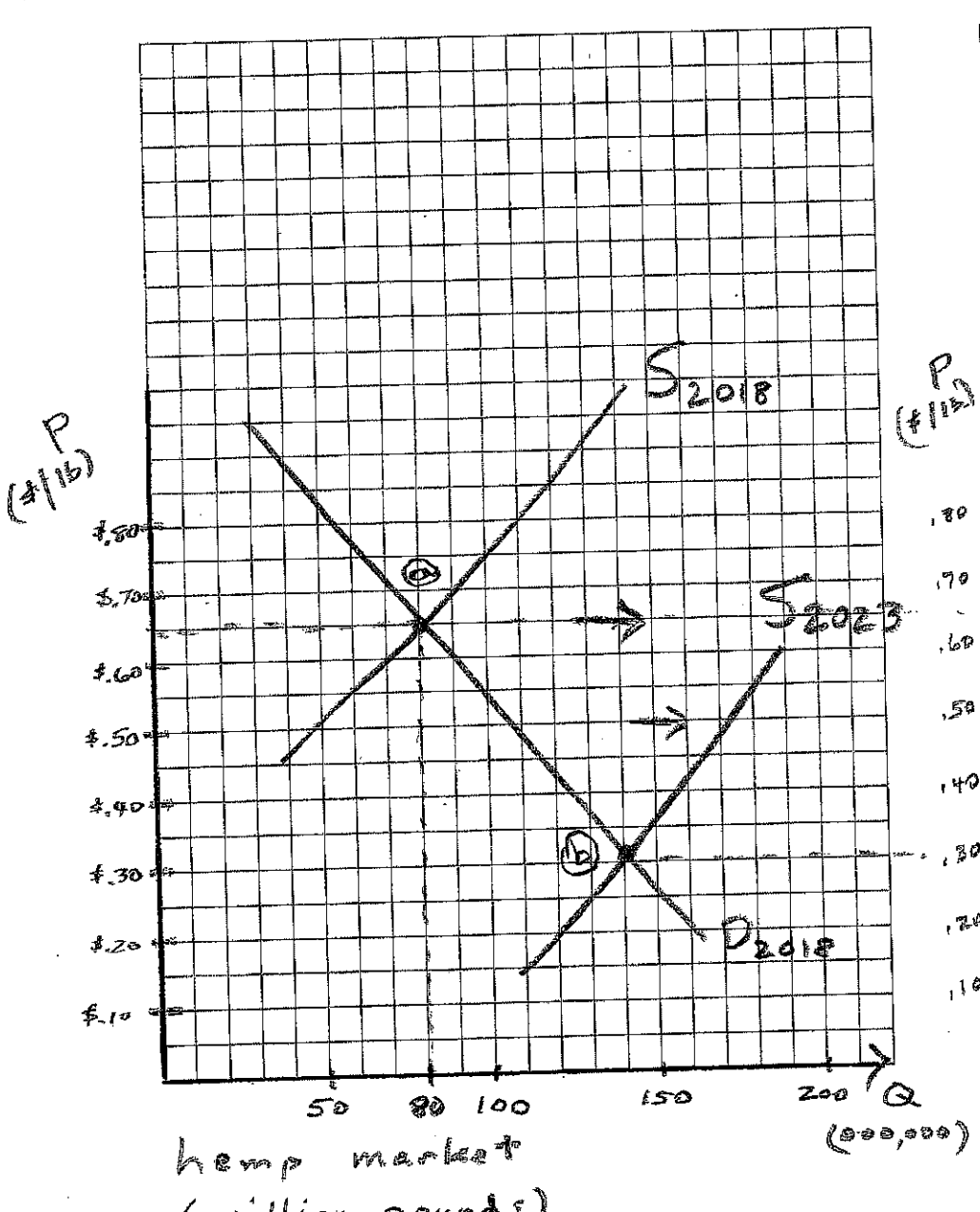
Prediction: The cooperative may be successful in the near term (one or two years) in restricting output and raising price, with ensuing positive economic profits, As time passes, however, entry of new alligator farmers and cheating on production quotas by cooperative members will cause market output to increase and price to fall. In five years prices are likely to have returned to their pre-cartel level.

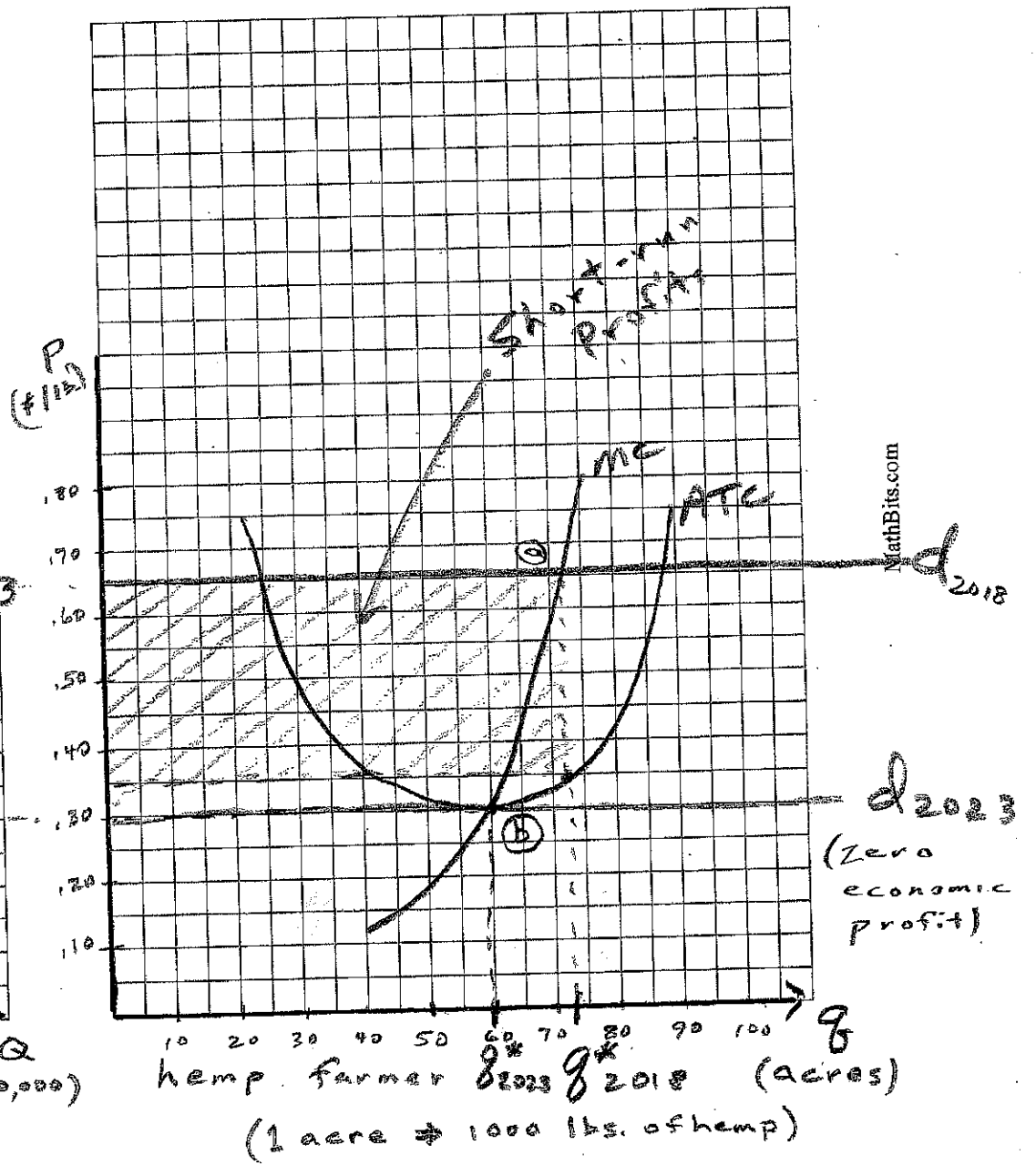
2. (20 pts.) *Lexington Herald-Leader*: "Flourishing hemp industry bringing jobs to Kentucky." *Los Angeles Times*: "As Tobacco Sales Dry Up, Kentucky Farmers Look to State's 'Original Crop'—Hemp."
   Information to use in your analysis: Hemp grain is currently selling for anywhere between $0.60-$0.65 per pound, and on average, a typical hemp farmer gets about 1000 lbs. of hemp grain per acre. After taking into account all economic costs, which can range from $300 to $350, farmers can currently make economic profits of around $250 to $300 per acre. In 2018 approximately 80,000 acres of hemp were planted in the U.S., i.e. 80 million pounds of hemp were produced. A typical hemp farmer in Kentucky devoted 60 acres to hemp production.
   Now for the question:
   a) In the attached diagrams illustrate the current conditions in the U.S. hemp market and explain how the price of hemp is determined. Also illustrate and explain the situation facing a typical Kentucky hemp farmer. Sketch in the farmer's ATC and MC curves, and show the farmer's optimal output and economic profits.

From the above information, we can infer that market demand and supply intersect at a price between $.60 and $.65 per pound, with equilibrium output being 80 million pounds. That gives rise to the demand facing each firm being perfectly elastic at that market price. We can also infer that a typical firm's average total cost curve bottoms out at a cost per pound between $.30 and $.35 (=$300/1000 lbs.) and output of 60,000 pounds (or 60 acres of hemp). At such an output, and given current market conditions, a hemp farmer can earn between $.25 and $.30 per pound in profit. The market conditions are illustrated in the left-side diagram, and the farmer's demand, cost, and profit position are illustrated in the right-side diagram.

   b) What do you think will happen over time? Do you expect these rosy conditions to last? Illustrate and explain the changes you think will occur over the next five years. What will happen to the price of hemp? The number of hemp farmers? The economic profitability of hemp farming? Illustrate in your diagrams and link your verbal explanation to your diagrams.

Hemp farming is characterized by insignificant barriers to entry. If existing hemp farmers are currently earning positive economic profits, new farmers will enter the market. The market supply curve will shift to the right and market price will fall. Economic profits will decline as a result. In five years, hemp prices will likely fall to a level close to the minimum LRAC of producing hemp. At such a price, farmers will earn zero economic profits, i.e. a normal return. The long-run equilibrium is labeled (b) in each diagram.


P ($/lb)
$.80
$.70
$.60
$.50
$.40
$.30
$.20
$.10
S_{2018}
S_{2023}
D_{2018}
a
b
50
80
100
150
200
Q (000,000)
hemp market (million pounds)


P ($/lb)
.80
.70
.60
.50
.40
.30
.20
.10
Short-run Profit
mc
ATC
d_{2018}
d_{2023} (zero economic profit)
a
b
10
20
30
40
50
60
70
80
90
100
q
q^*_{2023}
q^*_{2018}
hemp farmer (acres)
(1 acre → 1000 lbs. of hemp)
MathBits.com