99!

KEY

ECO 610
Final Exam-Sections 201/203/202/204
December 2020

100 points total. Point values for each question are as indicated. Answer each question in the space provided. General advice: show your work, including any formulas or diagrams that you use in reasoning through your answers.

1. (10 pts.) What market structure category best describes olive farming and unbranded olive oil? Explain your answer. And what market structure best describes branded olive oil? Again, explain your answer.

(a) Olive farming and unbranded olive oil markets are perfectly competitive markets. The product is a commodity - homogeneous. There are large number of small independent sellers and buyers; insignificant barrier to entry and exit; and public information available to buyers and sellers about market price. Olive farmers and producers of unbranded olive oil are price takers.

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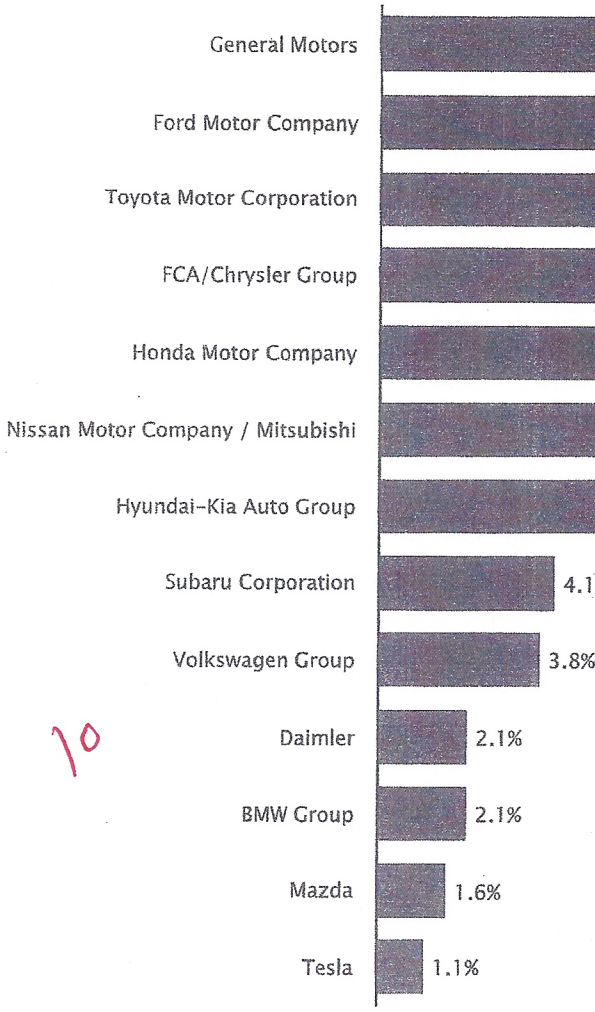
(b) The market for branded olive oil has significant barrier to entry (e.g Greek farmers could not find/access credit to help them enter the market). Although the product is relatively homogeneous, branding allows for some degree of differentiation. There are few large scale sellers (e.g Italian producers). This market is more of an oligopoly.

2. (10 pts.) Suppose Honda Motor Company were to merge with Nissan/Mitsubishi. Use the information below to calculate what would happen to the industry Herfindahl-Hirschman Index. How would you characterize (in terms of market structure) the automobile manufacturing industry?



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Market Structure is oligopoly
few sellers (13 with >1% share; only 12 >1% share after merger)
After merger only 6 firms >5%
Economies of Scale = significant entry barrier
Identifiable rivals

[Note: doesn't total to 100%, so ignore smaller firms in your calculations]

Before merger

$$\sum_{i=1}^{13} s_i^2 = 16.9^2 + 14.1^2 + 14^2 + 13^2 + 9.5^2 + 8.6^2 + 7.8^2 + 4.1^2 + 3.8^2 + 2.1^2 + 2.1^2 +$$
$$1.6^2 + 1.1^2 + 2.56 + 1.21$$
$$= 285.61 + 207.36 + 196 + 169 + 90.25 + 73.96 + 60.84 + 16.81 + 14.44 + 2(4.41)$$
$$= \boxed{1126.86}$$

(compare to after merger below)

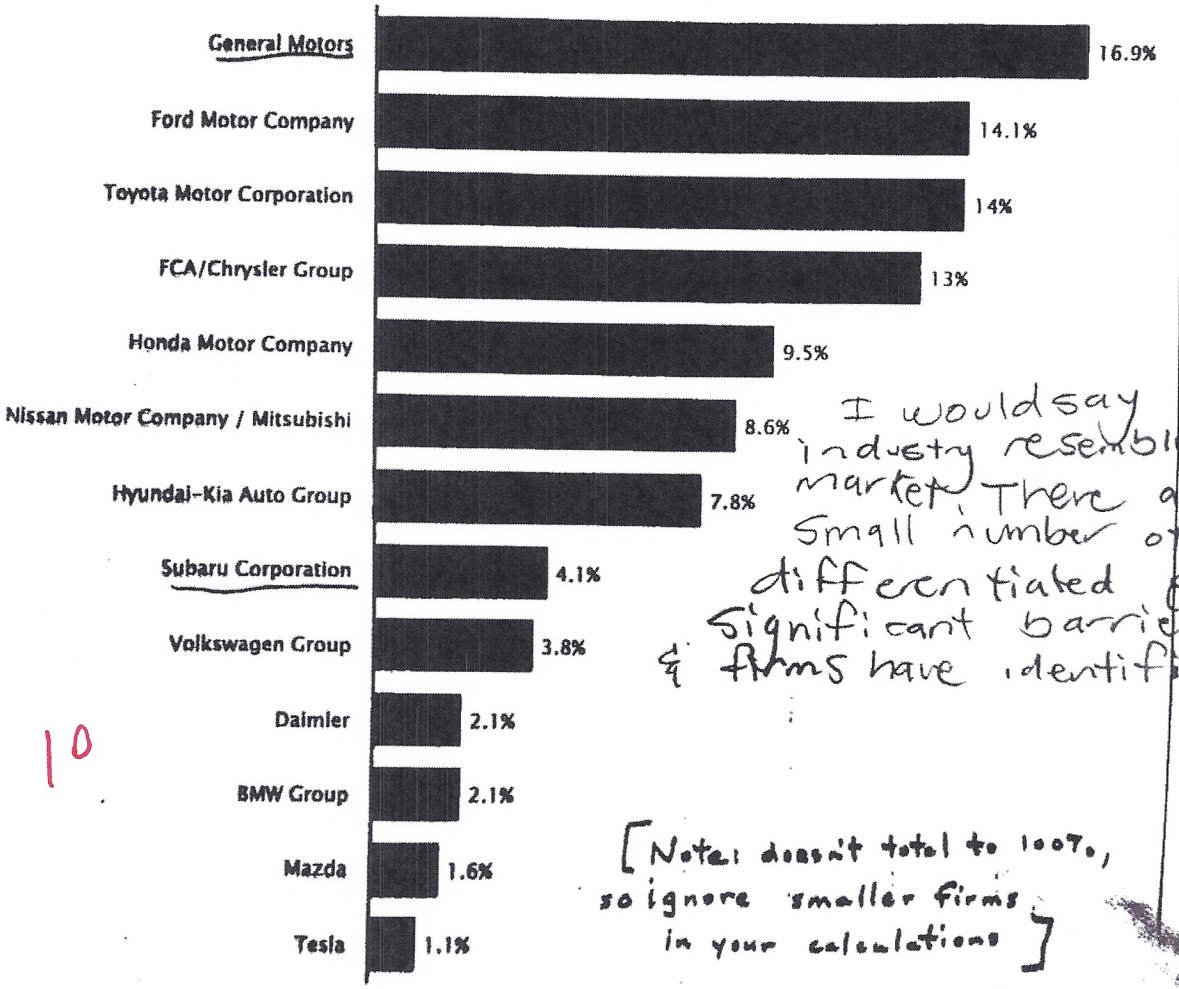
after merger

$$= 18.1^2 + 16.9^2 + 14.1^2 + 14^2 + 13^2 + 7.8^2 + 4.1^2 + 3.8^2 + 2.1^2 + 2.1^2 + 1.6^2 + 1.1^2$$
$$= 327.61 + 285.61 + 207.36 + 196 + 169 + 60.84 + 16.81 + 14.44 + 2(4.41) + 2.56 + 1.21$$
$$= \boxed{1290.26}$$

moves slightly toward monopoly after merger but still oligopoly

if HHI → 0 perfect competition ; if HHI → 10,000 monopoly

2. **(10 pts.) Suppose General Motors were to merge with Subaru Corporation. Use the information below to calculate what would happen to the industry Herfindahl-Hirschman Index. How would you characterize (in terms of market structure) the automobile manufacturing industry?**



I would say the automobile industry resembles an oligopoly market. There are a small number of sellers, differentiated product, significant barriers to entry & firms have identifiable rivals. ✓

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[Note: doesn't total to 100%, so ignore smaller firms in your calculations]

$$HHI = \sum_{i=1}^{\hat{}} s_i^2$$

GM & Subaru merge: $= (16.9+4.1)^2 + (14.1)^2 + (14)^2 +$

$(13)^2 + (9.5)^2 + (8.6)^2 + (7.8)^2 +$ $(3.8)^2 + (2.1)^2 + (2.1)^2$

$+ (1.6)^2 + (1.1)^2 = 441 + 198.81 + 196 + 169 + 90.25 +$

$73.96 + 60.84 +$ $+ 14.44 + 4.41 + 4.41 + 2.56 + 1.21$

$= \boxed{1256.89}$ ✓

No merge: $(16.9)^2 + (14.1)^2 + (14)^2 + (13)^2 + (9.5)^2 + (8.6)^2$

$+ (7.8)^2 + (4.1)^2 + (3.8)^2 + (2.1)^2 + (2.1)^2 + (1.6)^2 + (1.1)^2 =$

$(285.61) + \ldots (16.81) = \boxed{1118.31}$ ✓

3. (30 pts.) Some factoids about marijuana farming in Oregon:

- **All recreational cannabis grown in Oregon must remain in Oregon.** This is mainly due to the continued federal prohibition of marijuana.
- **Every individual bud you get has been trimmed by hand. Every single one.** For the most part, this agricultural industry is still mainly accomplished with manual labor.

Oregon legalized marijuana farming in 2016, and initially prices were above $2000 per pound for marijuana buds. People were lined up to get licenses to grow marijuana legally in the state because of the economic opportunity it offered. These individuals were very happy about becoming marijuana farmers.

(a) Use the diagrams on the next page to illustrate market conditions giving rise to a price of $2000 per pound in 2016. (Label the market output Q_0). Also explain which average cost curve you think represents the cost conditions facing a small-scale labor-intensive grower, and then show what output such a grower would choose to maximize profits under those market conditions. Illustrate this output (label it q_0) and the profits earned by a typical grower in 2016.

Graph 1 : Supply and Demand curves for 2016 cross where Price = $2000/lb and $Q = Q_0$

30

Graph 2: The MR is the line at P = 2000 (horizontal)

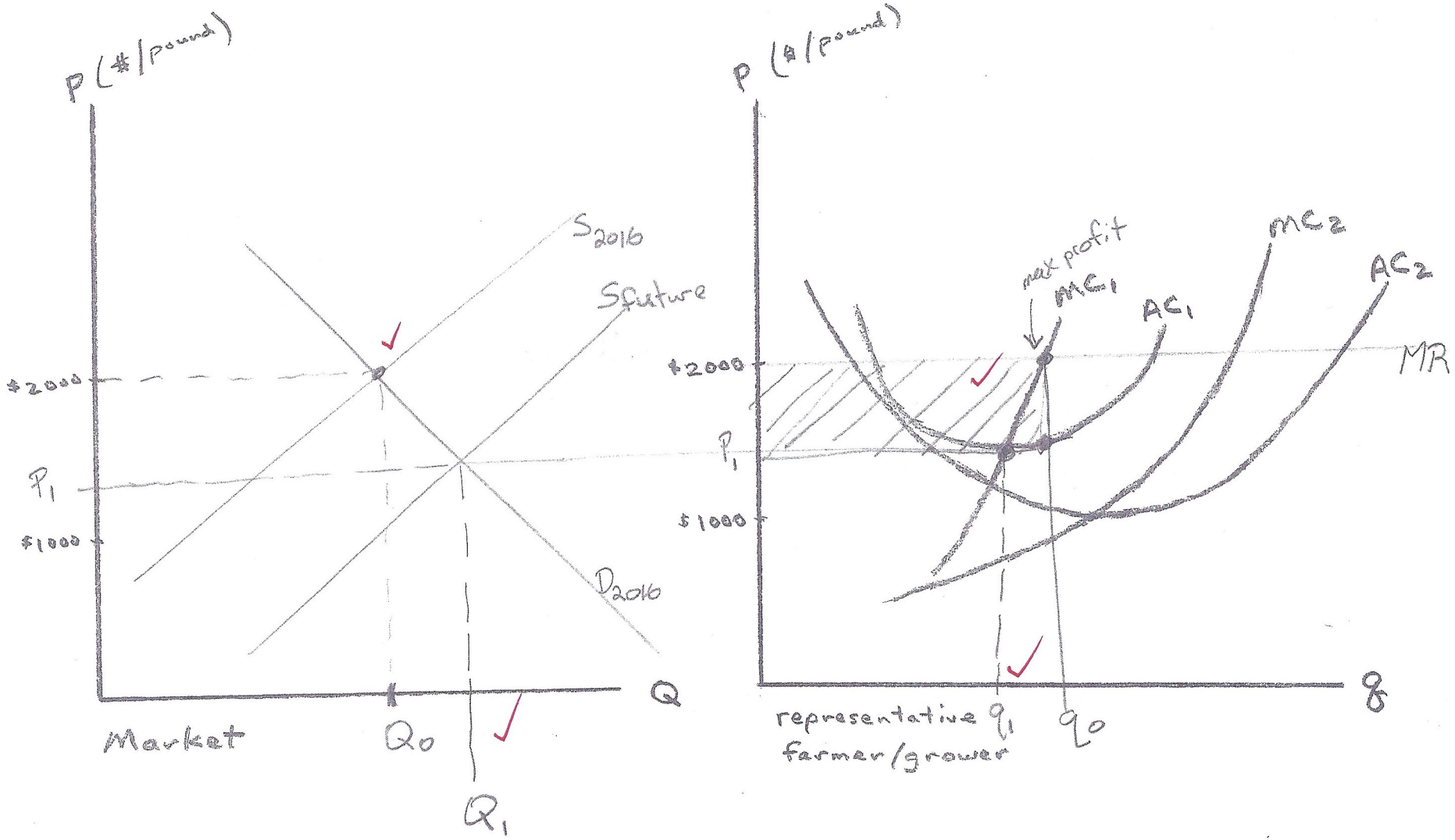
✓ The AC1 cost curve is more likely than AC2 because this crop is labor intensive and small farmers do not get economy of scale

Max profit output is where P=2000 intersects MC1, so it is labeled q_0 (on x-axis). Profits earned are in shaded area

(b) As long as Oregon remains a self-contained market, with production and consumption confined to state boundaries and governed by state regulations, explain and illustrate what you think will happen over time to market price and output (label the new market output Q_1). Also explain and illustrate the optimal output (label it q_1) for the representative farmer and what her economic profits will be in long-run equilibrium.

Over time this profitable market will bring in new growers and supply will increase (S curve move to right; new supply curve labeled S future). The new market output will be Q_1. This new price, P_1, will now be at the minimum of the AC1 curve. The farmers will now produce q_1 output and have normal returns (zero economic profit) in the long-run

✓


P ($/pound)
$2000
$1000
P1
S2016
Sfuture
D2016
Q
Market
Q0
Q1
P ($/pound)
$2000
P1
$1000
next profit
MC1
AC1
MC2
AC2
MR
q
representative farmer/grower
q1
q0

(c) Now, suppose that a friend who grows marijuana in Oregon asks you to advise her on what the future holds if Congress legalizes recreational marijuana for the entire country, eliminating state regulations and controls. At the farm level, legalization would mean that marijuana would become a commodity that could be produced anywhere in the U.S. and shipped across state lines. Based on your experience with tobacco and hemp production in other states like Kentucky and North Carolina, you know that larger scale mechanical production can reduce the costs of growing crops like tobacco, hemp, and marijuana. In words, but referencing your diagrams, explain what you think will happen as this new national market evolves. And explain to your friend the ramifications for Oregon growers like herself.

In this new national marijuana situation, the economies of scale will bring down the costs to produce the product (and possibly technology will eliminate most hand labor) so the new cost curves will be AC2 and MC2 for the large firms across the country. The supply curve will also move further to the right, further bringing down the price. Demand might go up or down depending on the reaction across the country.

In the long run the price will settle where it is at the minimum of the AC2 curve giving normal returns and zero economic profits. However this is much below the AC1 zero economic profits minimum that the Oregon farmer had. The Oregon farmers will need to shutdown (due to long term losses) or change methods to the economy of scale methods used across the country OR differentiate their product so it does not compete with the commodity product grown across the US (maybe on quality or organic labeling)

good answer

5

Lola Adedokun

4. (15 pts.) Your sister-in-law has spent several decades as an accountant, specializing in auditing small retail establishments. She has developed a good sense of the accounting and the economic costs of operating a variety of different types of such businesses. She decides to make a career change and try out her entrepreneurial instincts. She informs you of her intent to open a boutique shop in Lexington specializing in unique and expensive women's clothing and accessories. While she knows about costs, she isn't so confident about making economic forecasts. She asks for your thoughts on the expected long-run profitability of her idea.

(a) What type of market structure is she entering into? Explain.

She is entering into a monopolistic competition. Boutique for unique and expensive women clothing is a market consisting of many small independent sellers and buyers, insignificant entry barriers, and differentiated products — Designs at each boutique are unique. Lexington is a large market and can support several boutiques who are at MES.

(b) She is good with graphs, and has sketched in the diagram below her understanding of the per unit costs of operating such a boutique, but she needs your MBA knowledge to help her assess demand, pricing, and output. Explain and illustrate your assessment of the long-run profitability of such a venture. The expected longrun profitability is normal returns.

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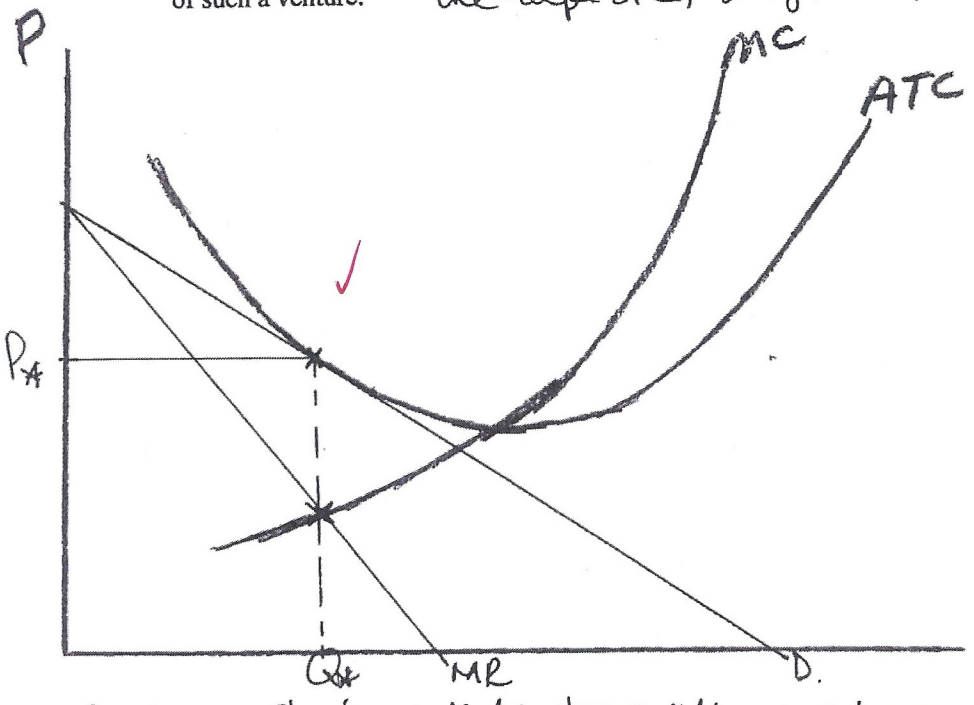

Given that Lexington is a very big city that can support many MES boutiques, I anticipate my sister-in-law's demand curve to be around her ATC when she enters the market.

~~In the Shortrun, She is likely to make positive economic profits.~~ ~~However~~, In the Longrun, She will make zero economic profits (i.e., normal returns)

D = Her Demand curve & MR = her marginal revenue curve
Q_* = Her optimal average Output
P_* Her optimal Price

5. (15 pts.) You are mayor of a remote community in southeastern West Virginia. Your town has no connection to the outside world, except for copper telephone lines, over-the-air television signals, and some individually owned satellite dishes. In your travels you have noticed that other towns like yours have allowed a cable TV/internet provider, Outtasight Cable and Internet, to build infrastructure and sell broadband TV and internet services to local residents. After doing some marketing research, you determine that demand in your town for such services is given by the following algebraic equation: $Q = 2000 - 10P$, where Q is the number of households who subscribe and P is the price per month in dollars for cable TV and internet service. Outtasight's cost structure is very simple: MC = AC = $40 per month per household served. If you grant a monopoly franchise to Outtasight, what price do you anticipate that they will charge per month, how many households will subscribe, and what will their profits be each month? Illustrate in the diagram below and explain.

I would charge $120 per month and there would be 800 households subscribing. Monthly profit would be $64,000 per month. ✓

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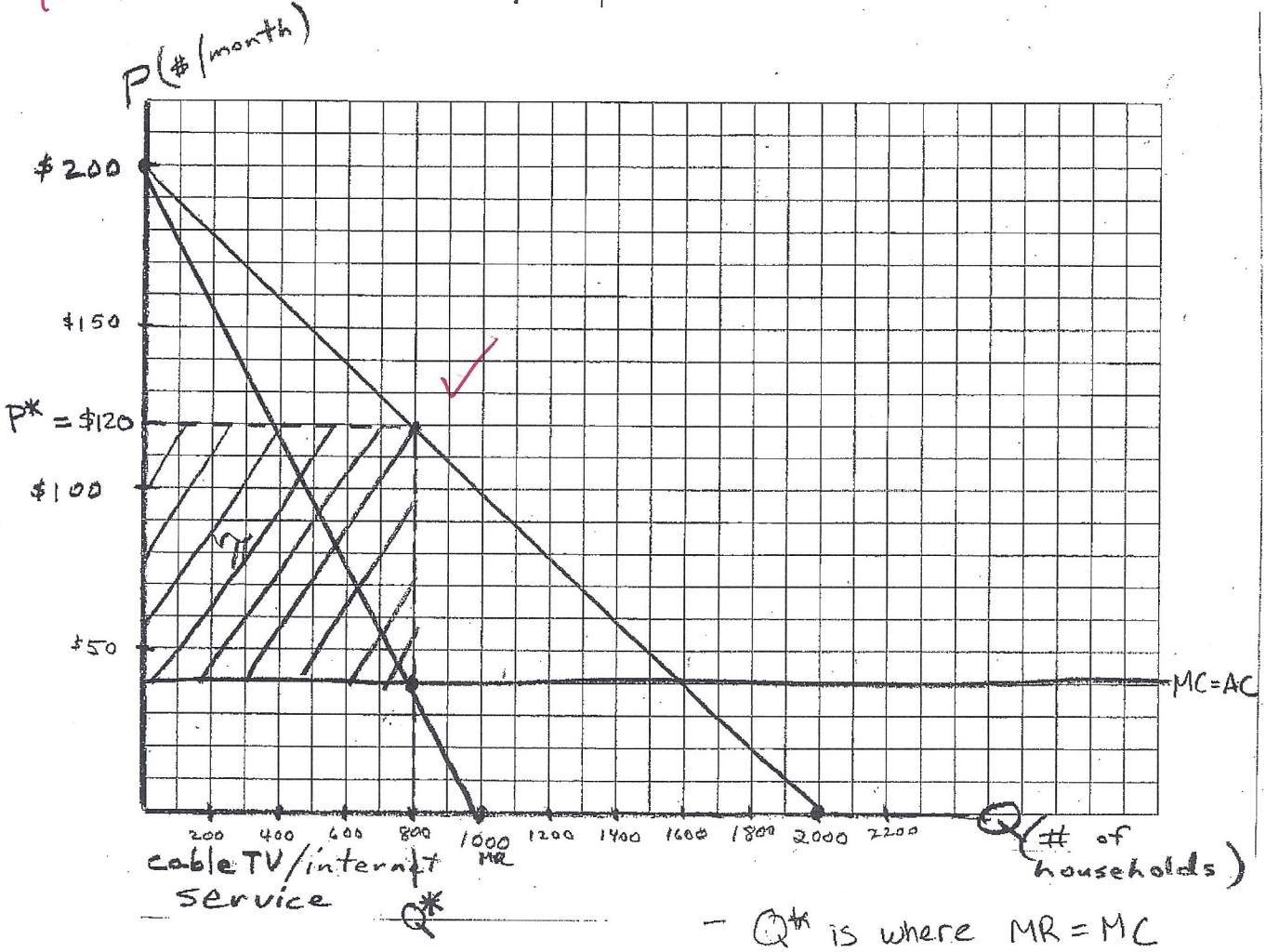

- Q^* is where MR = MC
- P^* is from intercection of MR=MC to demand curve,

$\pi = (P^* - AC)\, Q^*$

$\pi = (120 - 40)(800)$

$\pi = \$64{,}000$

5. (15 pts.) You are mayor of a remote community in southeastern West Virginia. Your town has no connection to the outside world, except for copper telephone lines, over-the-air television signals, and some individually owned satellite dishes. In your travels you have noticed that other towns like yours have allowed a cable TV/internet provider, Outtasight Cable and Internet, to build infrastructure and sell broadband TV and internet services to local residents. After doing some marketing research, you determine that demand in your town for such services is given by the following algebraic equation: $Q = 1000 - 5P$, where Q is the number of households who subscribe and P is the price per month in dollars for cable TV and internet service. Outtasight's cost structure is very simple: MC = AC = $40 per month per household served. If you grant a monopoly franchise to Outtasight, what price do you anticipate that they will charge per month, how many households will subscribe, and what will their profits be each month? Illustrate in the diagram below and explain.

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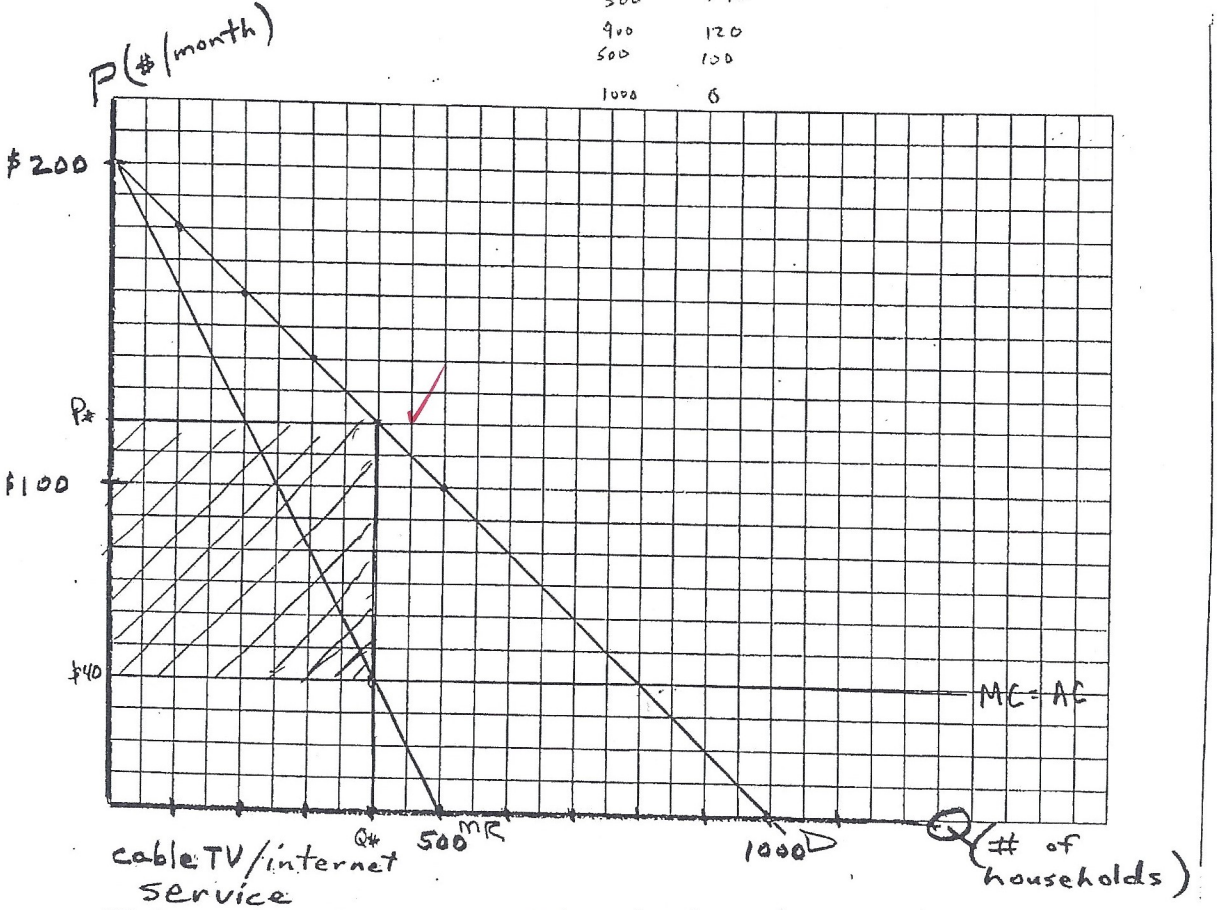
Q	P	TR	MR
100	180		
200	160		
300	140		
400	120		
500	100		
1000	0		



Q* is where MR = MC, P* up to demand curve at Q*.

Based on the demand curve and marginal revenue curve Outtasight will charge P* = $120/month and Q* = 400 households will subscribe.

Their profits each month will therefore be $\pi = (P^* - AC)\,Q^*$

$\pi = (\$120 - 40)\,400 = \$32{,}000$

as demonstrated by the shaded region.

6. (10 pts.) While reading the Wall Street Journal, and before city council has granted any licenses, you learn that a new fiber-optic cable startup company is offering the same services as traditional copper-wire cable companies supply. If both companies are granted licenses to operate in your town, they would play the following simultaneous-move game, wherein each would have to choose whether to build infrastructure capable of providing high quality (500 mbps internet speed, 100 cable channels, telephone), medium quality (200 mbps, 70 channels, telephone), or low quality (100 mbps, 40 channels, no telephone) service to customers who sign up with them. They would obviously price their services according to the quality they provide. Their economic profits from each strategy pair possibility is given in the following payoff matrix, where the first number in each cell represents the economic profit (in thousands of dollars per month) to Outtasight and the second number represents the profit to NetroMet:

		NetroMet Fiber Cable and Internet		
		High Quality	Medium Quality	Low Quality
Outtasight Cable and Internet	High Quality	32 , 32	20 , 36	16 , 32
	Medium Quality	36 , 20	24 , 24	12 , 16
	Low Quality	32 , 16	16 , 12	0 , 0

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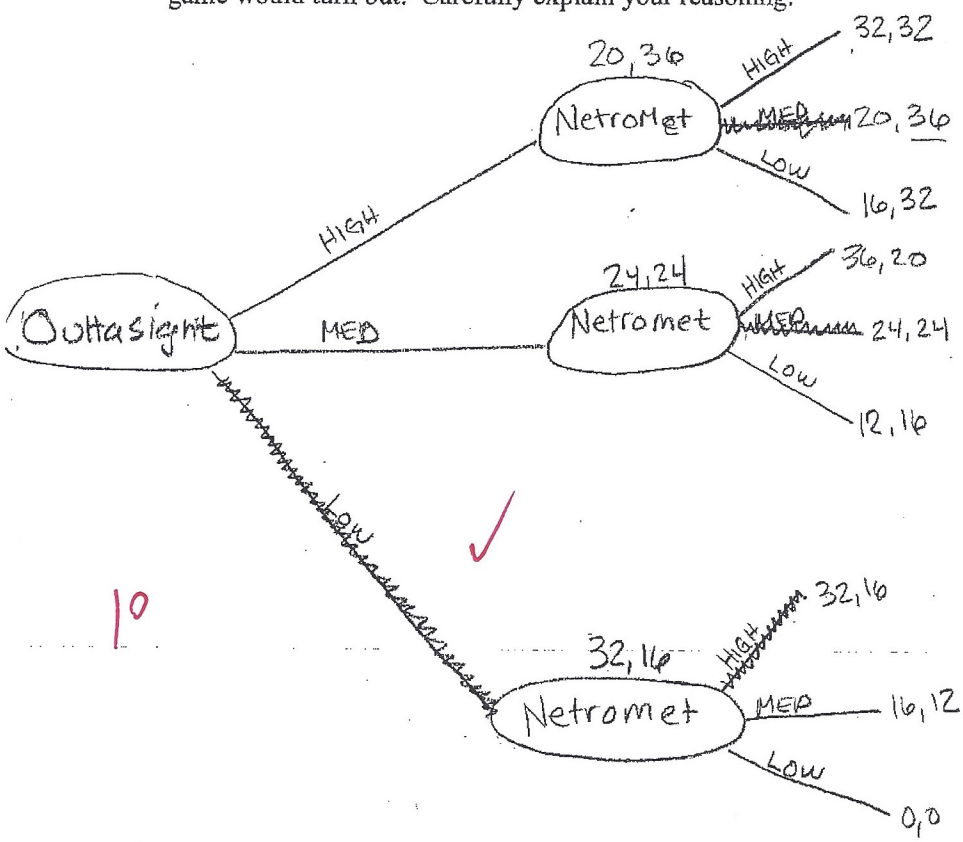
Solve the game using solution strategies we developed in class. Carefully explain each step you use in arriving at your answer.

Neither have a dominant strategy, but Netro Met's choice of low quality is dominated by it's choice of medium quality. Outta sight's low quality is dominated by it's choice of medium quality as well. Thus giving a playing field of:

		NetroMet	
		HIGH	MED.
OUTTA-SIGHT	HIGH	32, 32	20, 36
	MED	36, 20	24, 24

In this solution both companies have a dominant decision of offering Medium Quality services yielding 24, 24 as the Nash equilibrium.

7. (10 pts.) Suppose it would be a year before NetroMet would be ready to build infrastructure and start laying fiber-optic cable to households in your town. People are pressing for connectivity, so city council asks you how things would turn out if Outtasight were permitted to proceed with their infrastructure construction immediately, and then NetroMet would be allowed to come along a year from now and make their infrastructure investment decision, given what Outtasight had already built. Drawing a game tree, explain to city council how you think this sequential-move game would turn out. Carefully explain your reasoning.



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Outtasight would choose to produce Low QUALITY in this game field. Netromet subsenquently would choose to provide HIGH QUALITY to give them the highest possible payoff of 16 given Outtasight would have a payoff of 32 with thier choice.

Outtasight's monthly profit with Low QUALITY = $32,000/MONTH

NetroMet's monthly profit with HIGH QUALITY = $16,000/MONTH (a year later)

6. (10 pts.) While reading the Wall Street Journal, and before city council has granted any licenses, you learn that a new fiber-optic cable startup company is offering the same services as traditional copper-wire cable companies supply. If both companies are granted licenses to operate in your town, they would play the following simultaneous-move game, wherein each would have to choose whether to build infrastructure capable of serving 400, 300, or 200 households. Their economic profits from each strategy pair possibility is given in the following payoff matrix, where the first number in each cell represents the economic profit (in thousands of dollars per month) to Outtasight and the second number represents the profit to NetroMet:

STEP 1

		NetroMet Fiber Cable and Internet		
		Q = 400	Q = 300	Q = 200
Outtasight Cable and Internet	Q = 400	0 , 0	8 , 6	16 , 8
	Q = 300	6 , 8	12 , 12	18 , 11
	Q = 200	8 , 16	11 , 18	16 , 16

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As mayor representing the best interests of your town's residents, are you happy with how this game would turn out (as compared with granting a monopoly to Outtasight)? Solve the game using solution strategies we developed in class. Carefully explain each step you use in arriving at your answer.

STEP 2

Q = 300 is dominate over Q = 400 for Outtasight.

Q = 300 is dominate over Q = 400 for NetroMet.

	Q=300	Q=200
Q=300	12, 12	18, 11
Q=200	11, 18	16, 16

✓

∴ Both Outtasight and Netomet will choose Q=300.

This strategy pair is a Nash Equilibrium because neither player experiences ex post regret. ✓

The mayor should be happy. More people in his town will be getting internet (600 over 400) and they will be getting it at a lower price ($80 over $120). ✓

12,000 ÷ 300 = $40 profit + $40 MC = $80

good answer!

7. (10 pts.) Suppose it would be a year before NetroMet would be ready to build infrastructure and start laying fiber-optic cable to households in your town. People are pressing for connectivity, so city council asks you how things would turn out if Outtasight were permitted to proceed with their infrastructure construction immediately, and then NetroMet would be allowed to come along a year from now and make their infrastructure investment decision, given what Outtasight had already built. Drawing a game tree, explain to city council how you think this sequential-move game would turn out. Carefully explain your reasoning.

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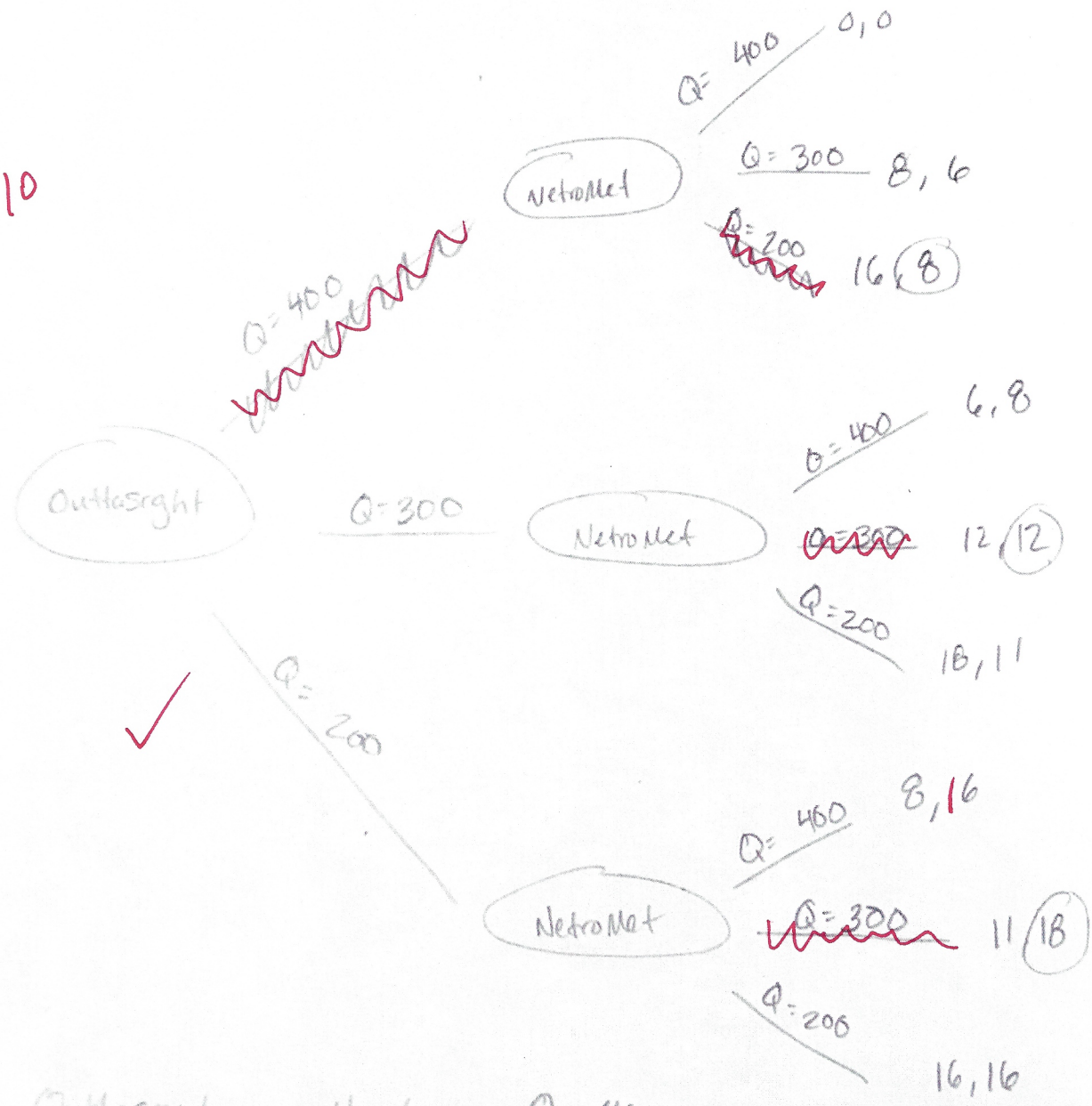

Outtasight would choose Q=400 and NetroNet would choose Q=200. At the terminal nodes, choose the second movers best choice then work backwards to see which of those best suites the first mover.