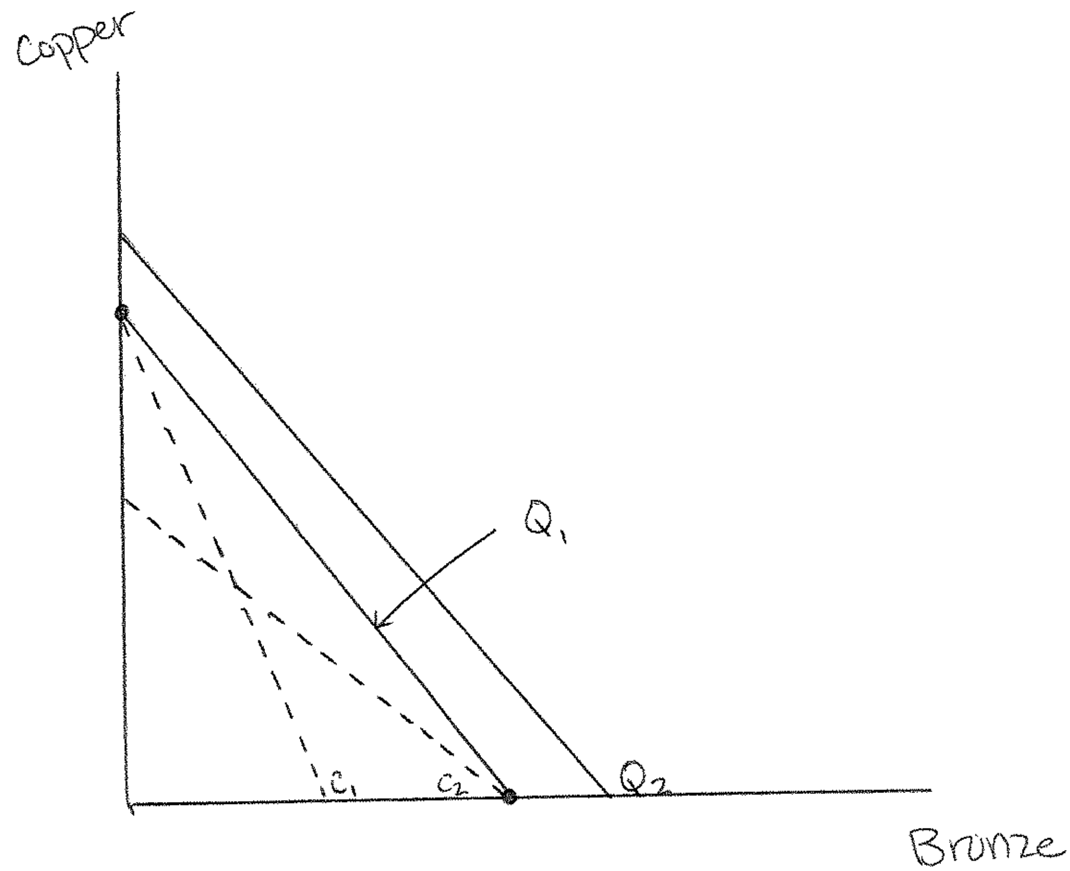
#8) Copper and bronze are perfect substitutes, she minimizes cost by using only one metal. The isoquants have a constant MRTS.



Econ 306
Problem Set #3

Chapter 8

#3) Firms produce where $MR = MC$, so 2,400 dozen eggs

b.) At $P = \$2$, market demand is 800,000. Each firm produces 2,400 eggs. Therefore, the number of firms serving the industry is

$$\frac{800,000}{2,400} \approx 333$$

c.) The long-run equilibrium price of eggs will be \$1 ⇒ the minimum of the LATC curve, the point at which firms earn zero profit, $P = LATC = MC$.

d.) In the LR, the typical firm will produce 2,000 dozen eggs

e.) In the long-run, at a market price of \$1, the market demand is 1,600,000 dozens of eggs. Each firm produces 2,000 dozen eggs. Therefore,

$$\frac{1,600,000}{2,000} = 800 \text{ firms}$$

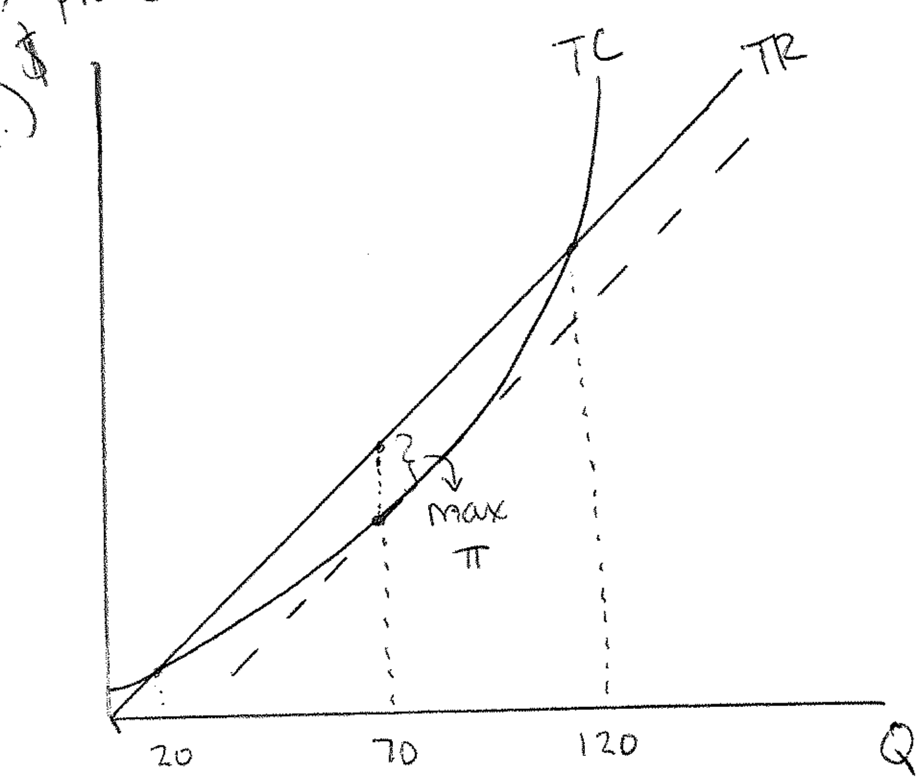
#4)

a.) At 20, 120 units of vodka, the profit is equal to 0 where TR=TC.

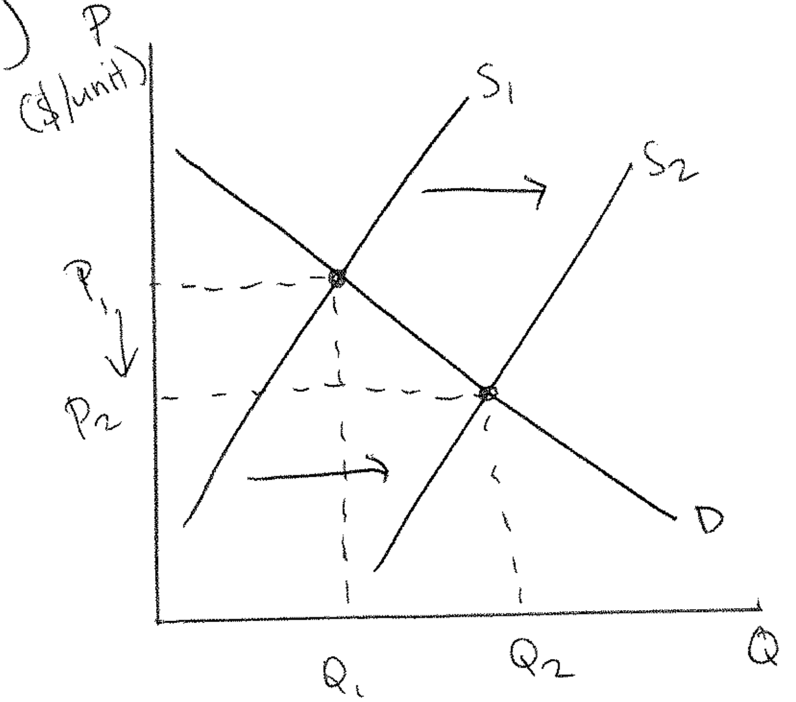
b.) At 70 units of vodka, the firm earns its highest profit, where the difference between TR and TC is maximized

c.) profit will decrease

d.)

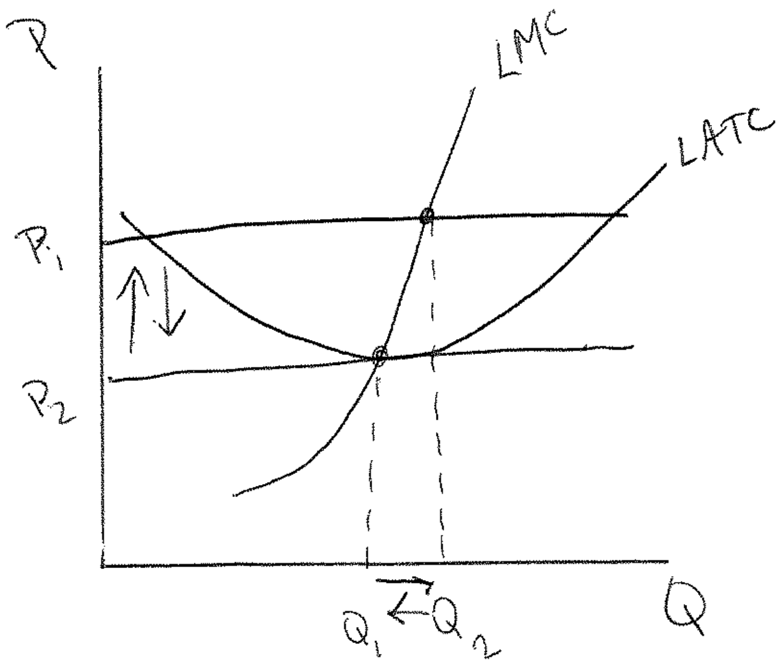


#16)



A.) The # of suppliers will increase

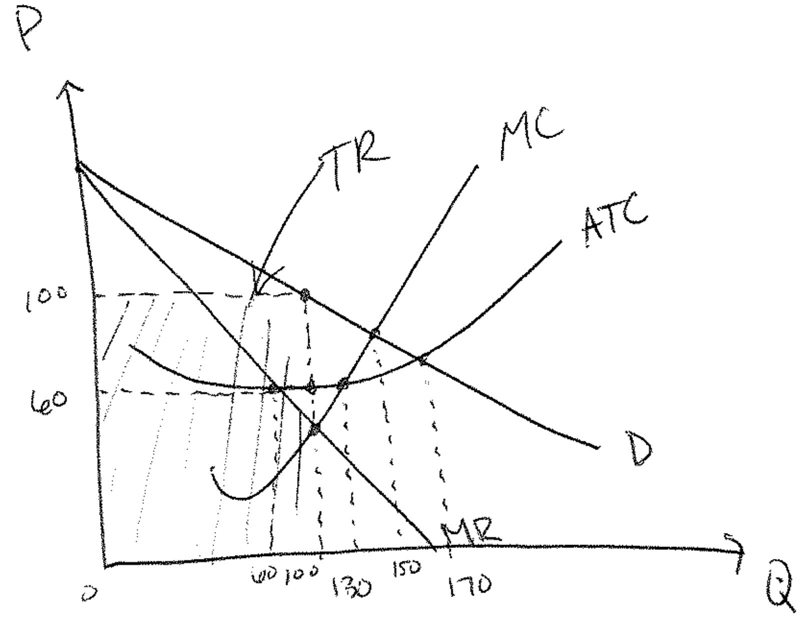
B.) The supply curve of jelly will shift out to the right



C.) since supply shifts right, $P_{jelly} \downarrow$

D.) In the LR, Martha will decrease her production such that she earns zero economic profit.

#9)

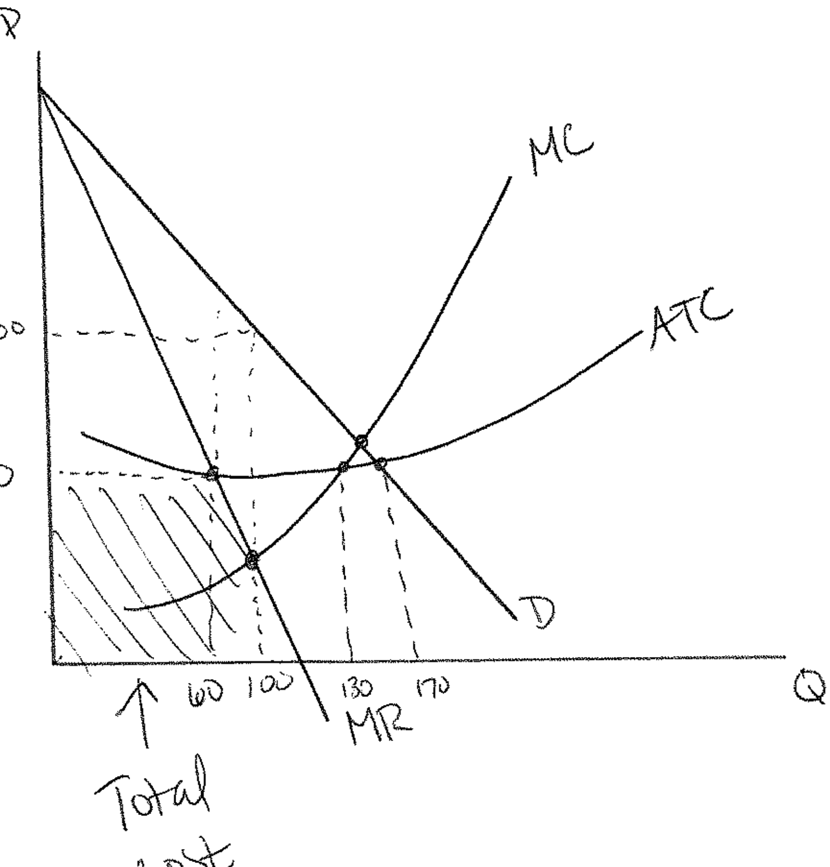


A.) MR = MC ⇒ π-max, 100 dozen eggs

B.) The monopolist will charge $100 to maximize profit

c.) See above

d.)



e.) π = TR − TC = (100 x $100) − (100 x $60) = $4,000

1. $TC = 300 + 30Q$

$$AFC = \frac{FC}{Q}. \quad FC = 300 \Rightarrow \boxed{\frac{300}{Q} = AFC}$$

$$AVC = \frac{VC}{Q}. \quad VC = 30Q \Rightarrow \frac{30Q}{Q} = \boxed{30 = AVC}$$

$$ATC = \frac{TC}{Q}. \quad \frac{300 + 30Q}{Q} = \boxed{\frac{300}{Q} + 30 = ATC}$$

$$MC = \underbrace{\partial/dQ \; 300 + 30Q}_{\text{first derivative of total cost}} = \boxed{30 = MC}$$

3.) a.) $Q = \max(2K, 4L)$

Let $K, L = 1$. $Q = \max(2(1), 4(1))$

$$\boxed{\Rightarrow Q = 4}$$

Let $K, L = 2$. $Q = \max(2(2), 4(2))$

$$\boxed{\Rightarrow Q = 8}$$

since Q doubled as K+L doubled $\Rightarrow$ constant returns to scale

B.) $Q = 5K^{.25}L^{.75}$ $(5)(1)^{.25}(1.)^{.75} = 5$

$(5)(2)^{.25}(2)^{.75} = 5(1.89)(1.68)$

using the 'trick' from class, we see that α and β from this Cobb-Douglas $= 1$.

$\Rightarrow$ we have constant returns to scale

c.) $Q = 2L^2 + 3K^3$

Let $K, L = 1$ $Q = 2(1)^2 + 3(1)^3$

$2 + 3 = \boxed{5}$

Let $K, L = 2$ $Q = 2(2)^2 + 3(2)^3 =$