

**Problem Set #6 Solutions**  
**Econ. 2106H, J.L. Turner**

1. a. The midpoint method uses the following formula:

$$\varepsilon = \frac{\Delta Q / Q}{\Delta P / P} = \frac{\frac{Q_2 - Q_1}{\left(\frac{Q_2 + Q_1}{2}\right)}}{\frac{P_2 - P_1}{\left(\frac{P_2 + P_1}{2}\right)}}$$

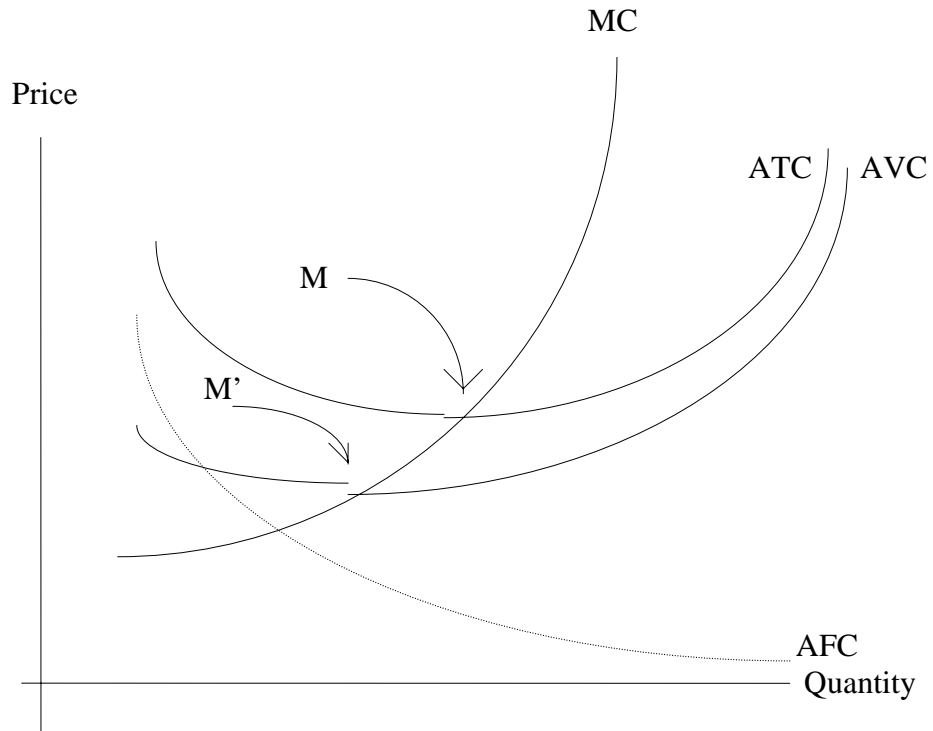
For the given observations, we have:

$$\varepsilon = \frac{\Delta Q / Q}{\Delta P / P} = \frac{\frac{1.9 - 1.74}{\left(\frac{1.9 + 1.74}{2}\right)}}{\frac{2.72 - 3.70}{\left(\frac{3.70 + 2.72}{2}\right)}} = \frac{.088}{-.305} = -.288.$$

b. Revenue is \$6.44 billion in 1998 and \$5.17 billion in 1999.

c. Revenue goes down. This is consistent with the finding in part a) that wheat is price inelastic.

2) Carefully label the curves in the following graph.



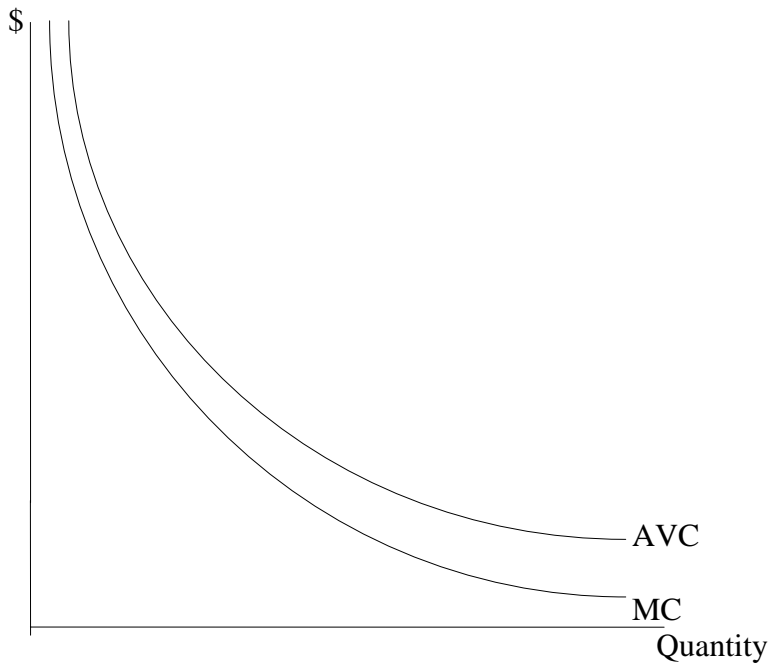
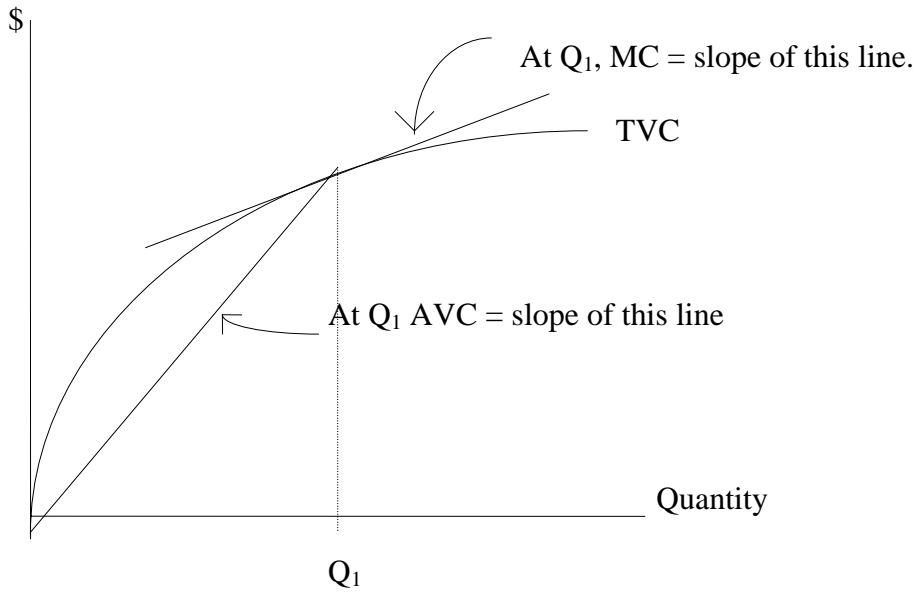
a) What are the significances of points M and M'? Carefully explain your answer.

M= Minimum ATC; This will be long run equilibrium price and output for a perfectly competitive firm if all firms have the same cost functions.

M'= Minimum AVC. This is also the “shutdown point”. If the price is below this level, the firm will not operate in the short run.

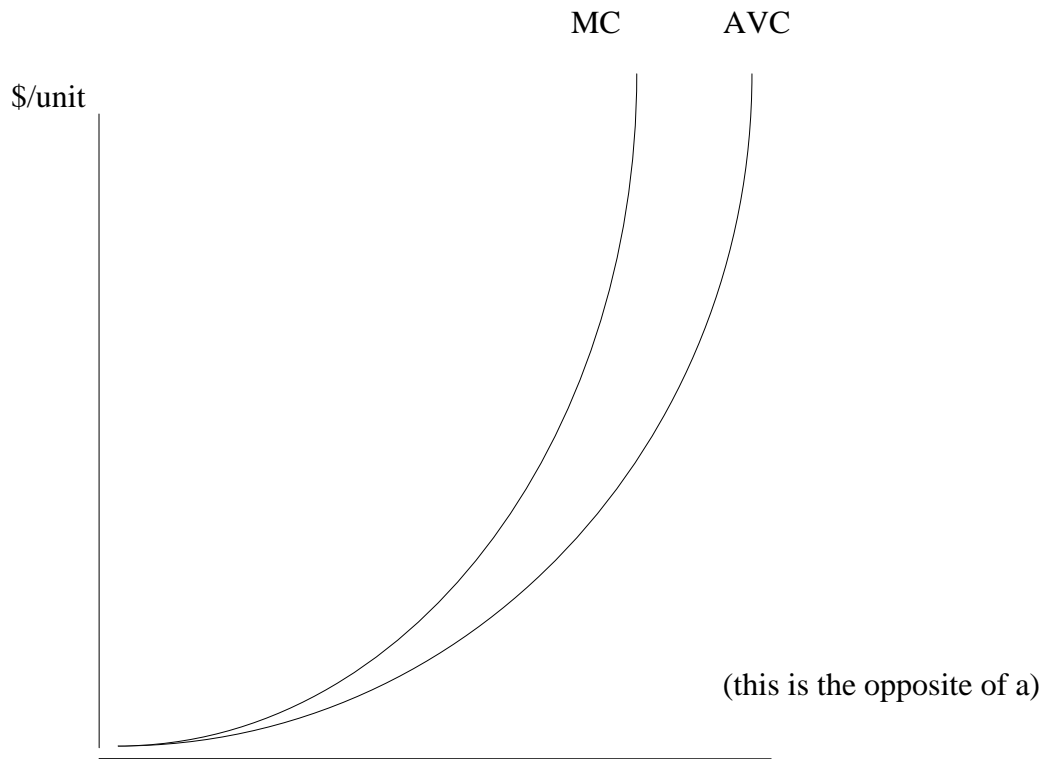
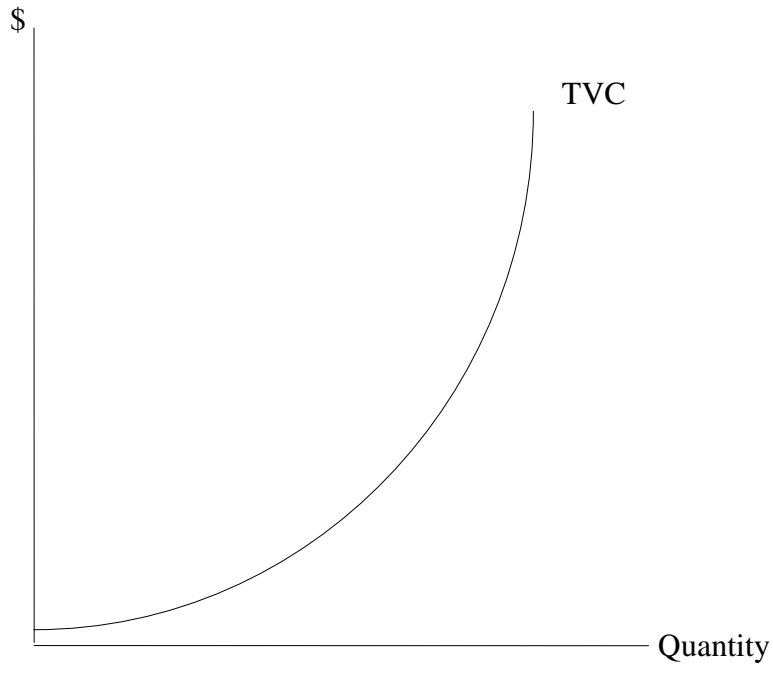
3. For the following graphs draw the corresponding **Average Cost and Marginal Cost** curves.

a)

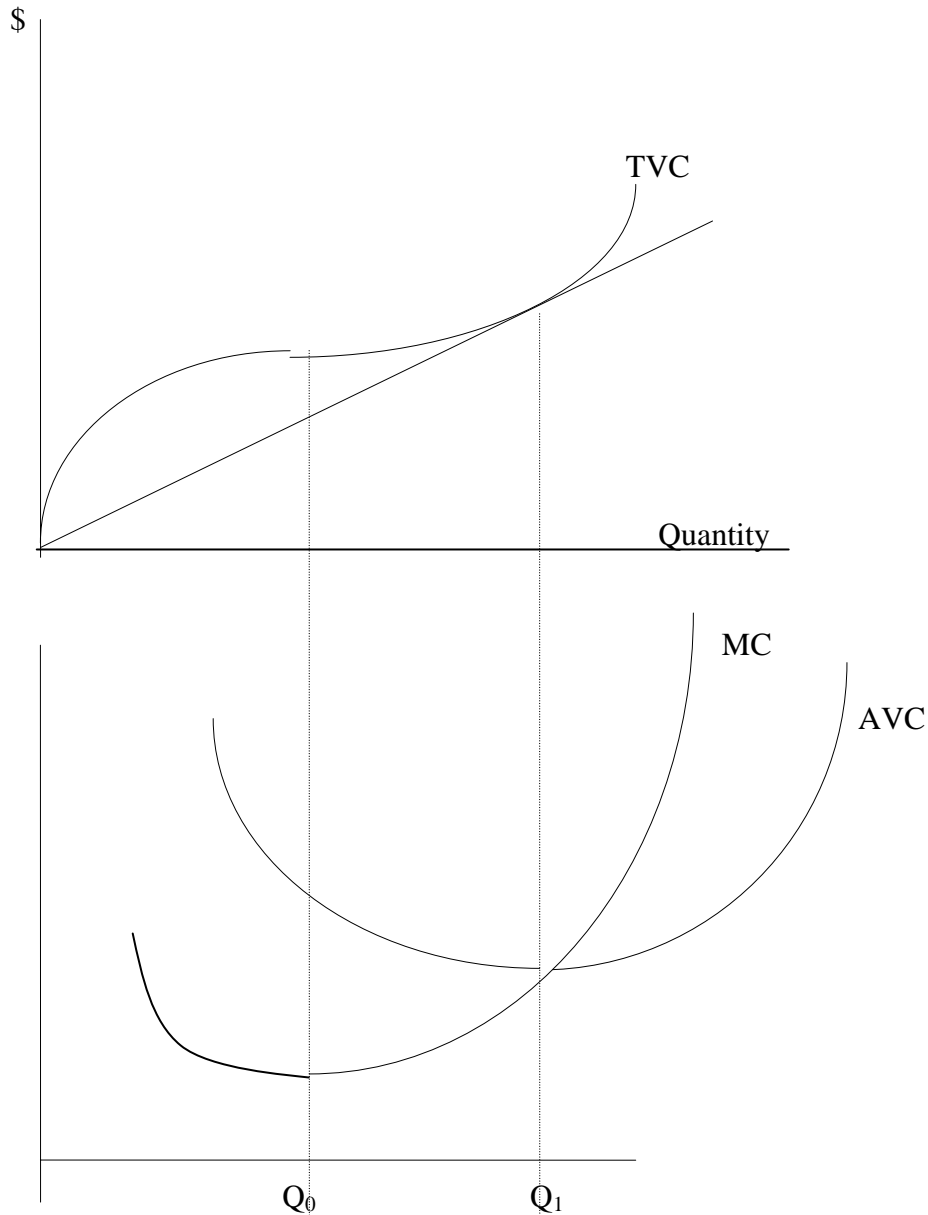


1. Both slopes decrease as  $Q$  increases. Therefore,  $AVC$  and  $MC$  are decreasing in output.
2. At all  $Q$ ,  $MC < AVC$

b)



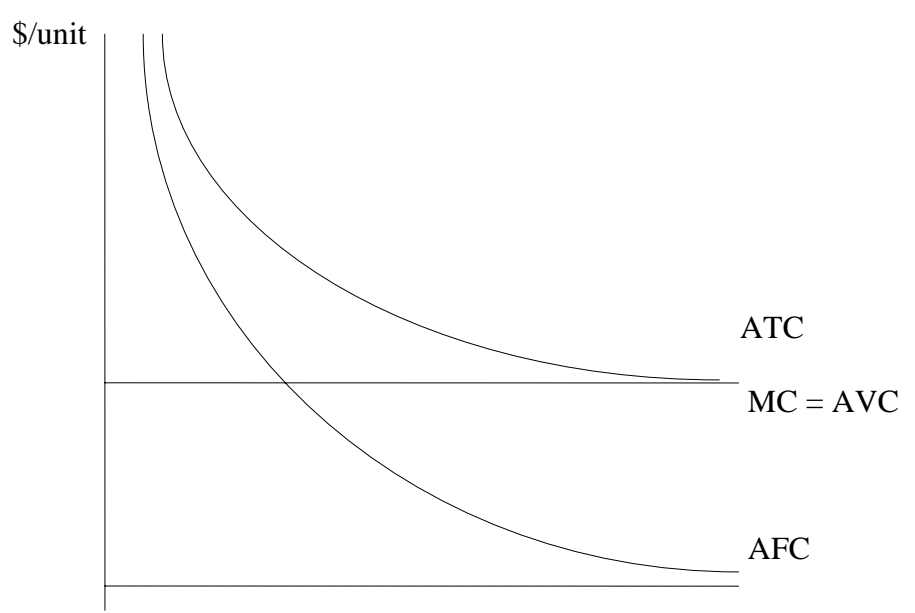
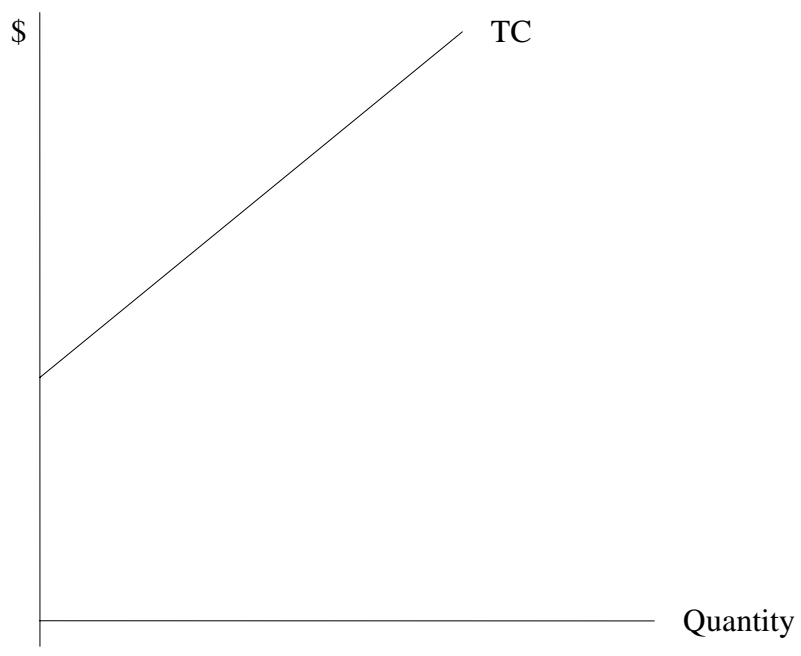
c)



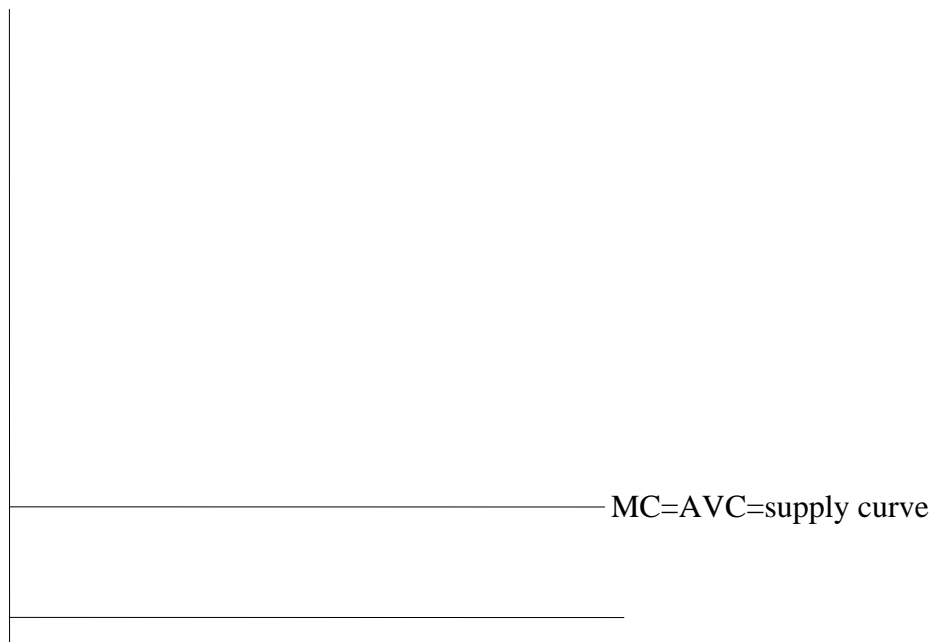
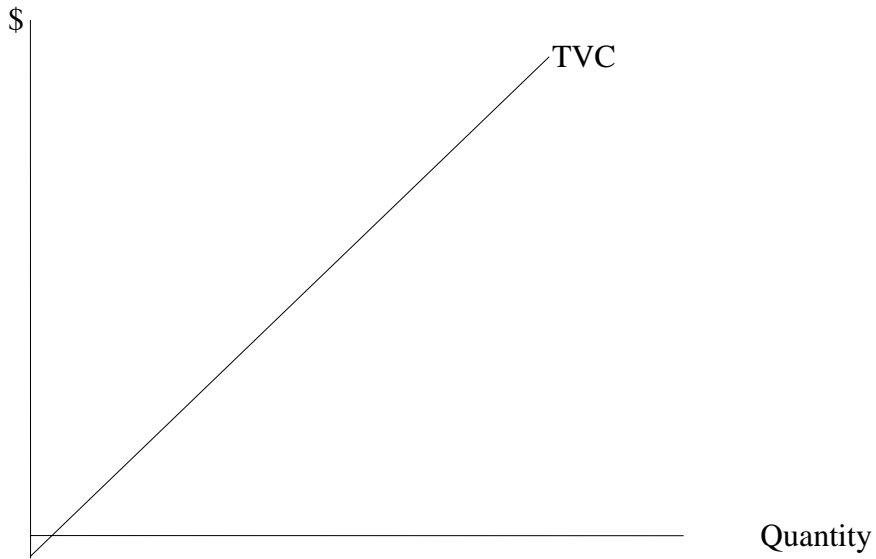
1. First, note that the MC is the slope of the line tangent to TVC.
2. AVC is the slope of a line from the origin (0,0) to that point on the TVC.
3. Therefore, for any output,  $Q$ , to the left of  $Q_1$ ,  $AVC > MC$ , since the line tangent to the TVC curve is flatter than a line segment from the origin to that point.
4. Any output  $Q$  to the right of  $Q_1$   $AVC < MC$ .

Also note  $Q_0$  is the minimum MC, since at  $Q_0$  the line tangent to the TVC at this point is flat (i.e. small slope) as possible. This is an inflection point.

d) (For this problem, also include the Average Fixed Cost Curve)

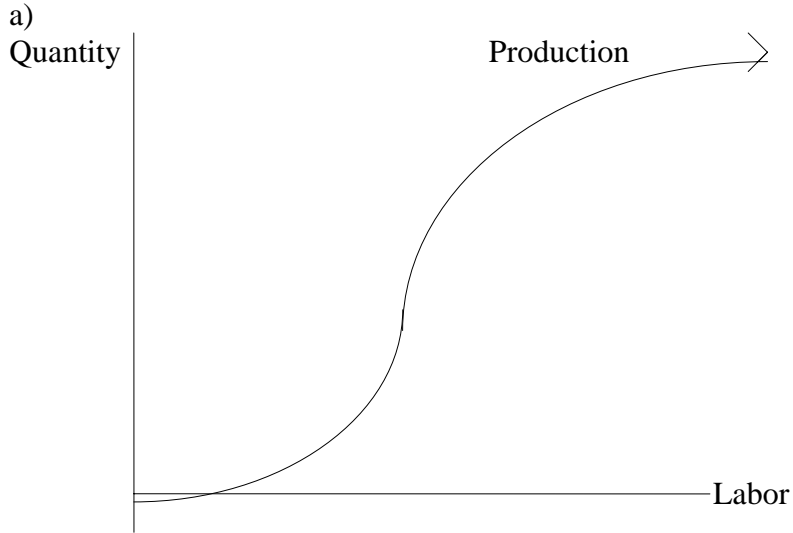


4. For the following graph, derive the shape of the supply curve, and explain your answer.

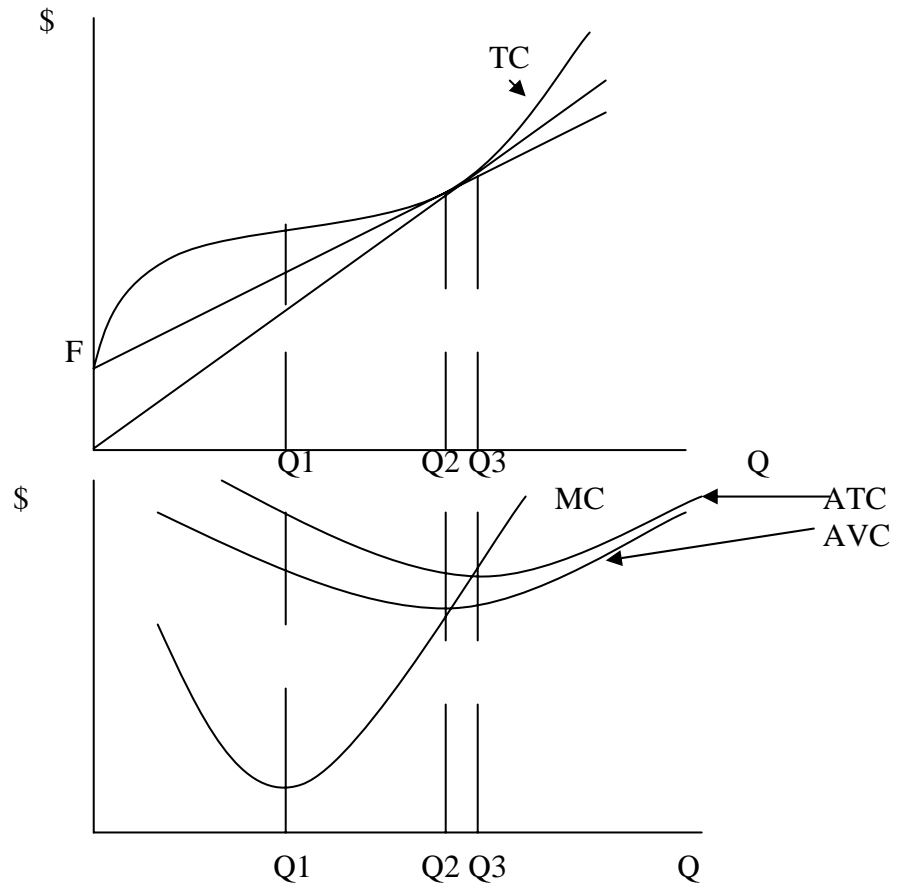


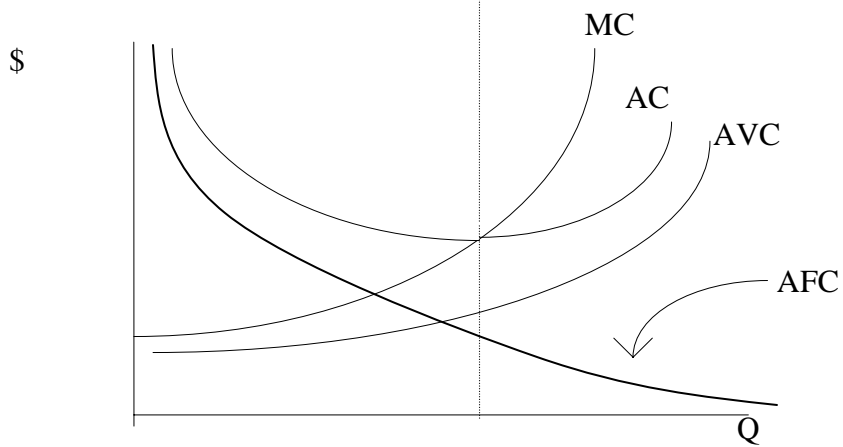
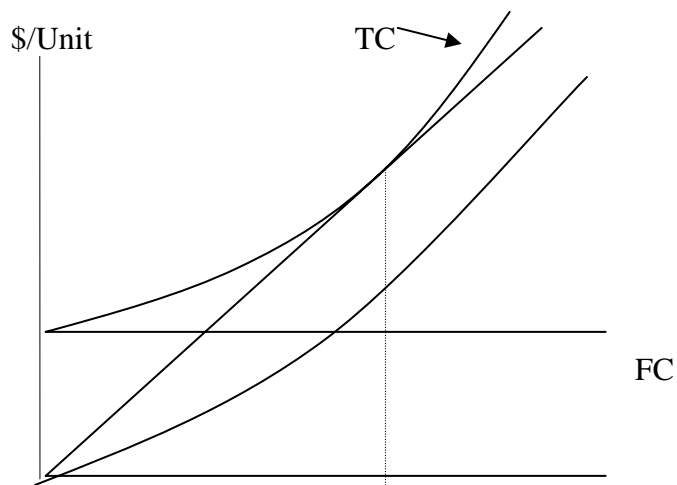
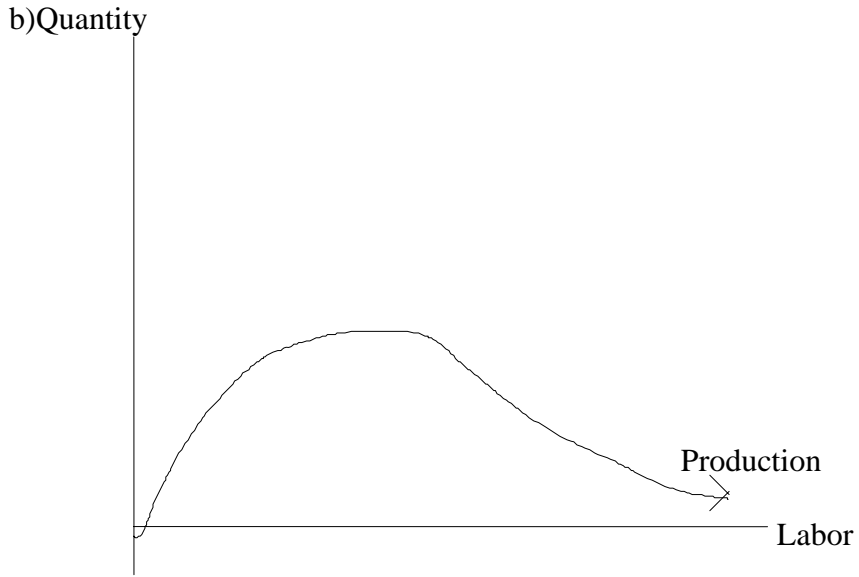
5. For the following production functions, derive:

- i) Total Cost Curve
- ii) Average Cost Curve
- iii) Marginal Cost Curve

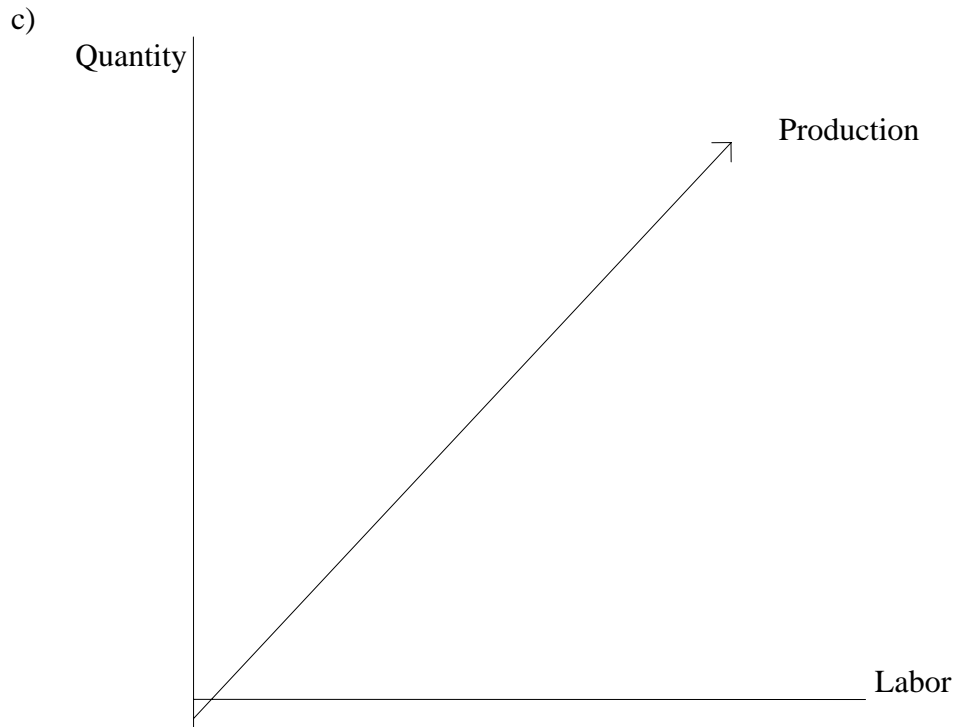


Assuming  $FC=0$  (i)-(iii) are identical to 2) (c)  
 If  $FC = F > 0$ , then we have:



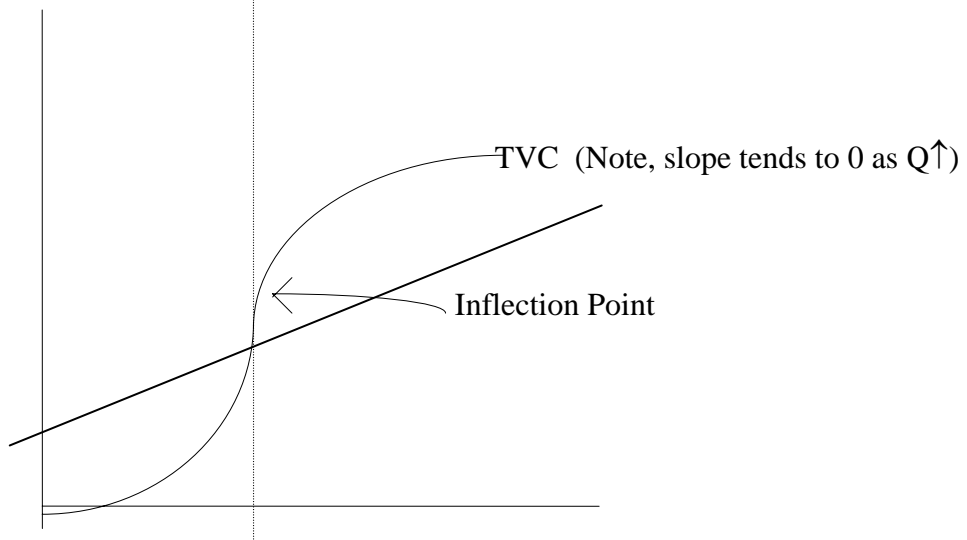
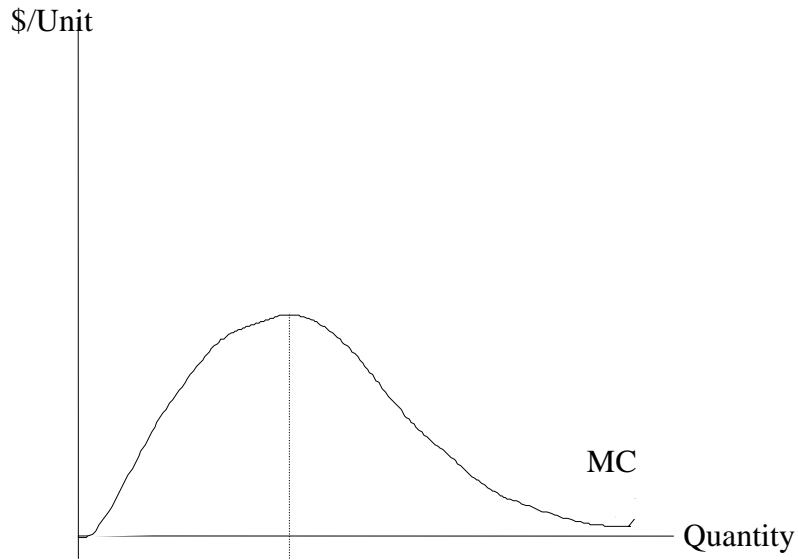


Eventually costs slope straight up, then bend backwards, but don't worry about that part.



Answer identical to 2) (d) where the slope of the TC and TVC curves is  $w$  and  $MC=AVC=w$ .

6. For the following Marginal Cost Curve, derive the Total Variable Cost:



7. For the following graph, draw the corresponding Total Cost Curve:

