

## 1 Review

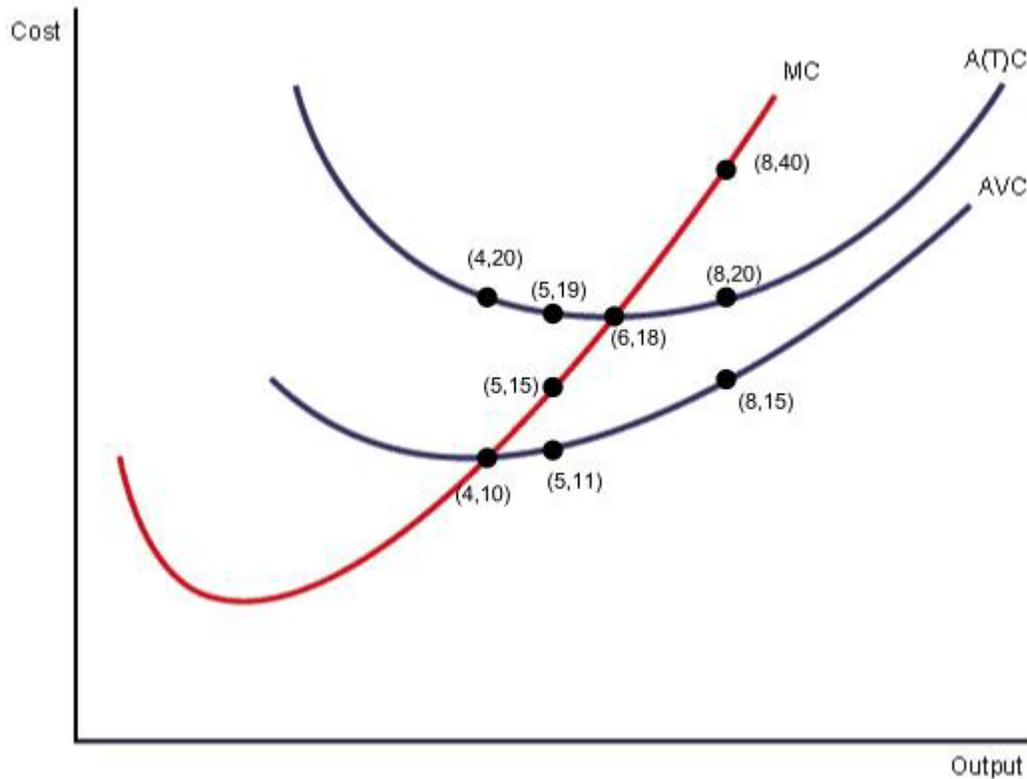
- Production function
  - Capital\Labor
  - Diminishing Marginal Productivity
- Costs
  - Total Cost
  - Fixed Cost
  - Variable Cost
  - Average costs
  - Marginal cost

## 2 Problems: Producer Theory

1. 1. Black Swan Clothing is a firm producing costumes for residents in Econ Town. Assume Black Swan Clothing takes prices as given when choosing the quantity it will produce (perfectly competitive market). If  $q$  is the number of costumes made by Black Swan Clothing, their costs are given by  $TC = 0.5q^2 + q + 2$   $MC = q + 1$ 
  - (a) What are Black Swan's fixed costs? What are their variable costs?
  - (b) Give equations for Black Swan's AFC, ATC and AVC.
  - (c) Find the quantity where  $ATC = MC$  (we need this to plot the cost curves).
  - (d) Draw a graph that represents Black Swan Clothing's MC, AVC, and ATC curves.
  - (e) How many costumes will the firm produce when price,  $P$ , is given as  $P = \$2$ ?
  - (f) More generally, if the price is some unknown amount  $P$ , how many costumes will the firm produce?
  - (g) Suppose there are 10 firms in the market, including Black Swan Clothing, which all have the same cost curves. Assume that this market is perfectly competitive. What is the market supply curve given this information?
  - (h) Suppose demand is given by the equation  $Q_d = 50 - 10P$ . Calculate the equilibrium price and quantity. How much quantity does each firm produce in this equilibrium, and what are their profits?
  - (i) Calculate the producer surplus in equilibrium. What is the difference between profit and producer surplus?

2. Examine the following graph which shows the cost curves of an individual firm in the market for widgets, which is perfectly competitive:

Figure 1: Costs



- (a) What are the fixed costs of this firm?  
 (b) How many widgets will the firm produce if the price is \$10?  
 (c) What will be this firm's profit if the price is \$10?  
 (d) Find the profit and the total variable cost of the firm when the widget price is \$15. Give an argument that the firm should not produce a quantity of 0 at this price.  
 (e) What is the firm's profit when the price is \$18? f. What is the firm's profit when the price is \$40?
3. (More practice at discrete cost curve calculations) Dunkin Donuts operates with a weekly fixed cost \$1000 and hires workers, paying each worker \$500 a week. They only need workers and the bakery to make delicious donuts. Fill in the table below for Dunkin Donuts' weekly costs. Also find the break-even price and quantity.
- | Q | L | FC   | VC | TC   | AFC | AVC | ATC | MC |
|---|---|------|----|------|-----|-----|-----|----|
| 0 | 0 | 1000 | 0  | 1000 | -   | -   | -   | -  |
| 1 | 1 |      |    |      |     |     |     |    |
| 2 | 2 |      |    |      |     |     |     |    |
| 3 | 4 |      |    |      |     |     |     |    |
| 4 | 8 |      |    |      |     |     |     |    |
4. (Kelly Fall 2013 midterm 2 question) Given the following total cost function, derive the fixed cost.  
 $TC = 5/(q + 1) + 5 + 5q + q^2$