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**Lecture 01: Review, Competition Model**

1. Recall the competitive model
   1. Price is flat because all firms are price takers.

2

4

6

8

10

12

14

16

18

20

2

10

8

6

4

22

20

18

16

14

12

22

P ($/lb)

Candy (millions of pounds)

**ATC**

**P**

**MC**

* 1. We produce where MC=MR.
  2. Then we ask: “at that level of production, how much does each unit cost?” In other words, we see what the ATC is.
  3. The difference between ATC and price is the profit per unit.
  4. Multiply the profit per unit by the quantity gets our total profit or loss.

1. Mathematics
   1. To do a mathematical treatment, all we need is a total revenue curve and a total cost curve.
      1. TR = TR(Q), or Q multiplied by a price, P. Why? Because the marginal revenue is the price and to find the marginal revenue, you take the derivative.
      2. TC=TC(Q), or total cost as a function of Q. To find MC, take the derivative of TC. To find ATC, divide TC by Q.
   2. When you have both derivatives, set them equal to each other. Remember, we produce when MC=MR.
   3. The resulting Q is our optimal Q. But that Q into our total cost function and then divide by Q to get ATC.
   4. Just like in our diagram, the difference between ATC and MR is the profit per unit. Multiply that by how much Q we produce to get our total profit or loss.
   5. Example
      1. Suppose TC = 4 + 2Q2 and TR = 8Q. What is optimal Q?
      2. MR = 8; MC = 4Q. Q = 2
      3. (4 + 2(2)2)/2 = 12/2 = 6
      4. (8 – 6)2 = 4
      5. The firm will make $4 in profit. We know, since it is perfectly competitive, that this will attract more entrants until there is zero economic profit.
2. Zero economic profit
   1. We know that, in the long-run, we will get zero economic profit. What will the price be in the long run?
   2. Recall it happens when MC=ATC=MR. Since MC intersect ATC at its minimum, we know that MR will then intersect at the minimum cost per unit.
      1. Note the efficiency implications of this. In the long-run, the good will be as cheap as possible to produce.
   3. To do this, we consider what we know:
      1. MC = MR = ATC
      2. MR = P (to highlight that we don’t know the price)
      3. ATC – MR = 0
      4. First determine where MC = ATC.
      5. Then determine what the price is (either using MC or ATC).
   4. Example
      1. Using the information before, we know that (4 + 2Q2)/Q = 4Q
      2. Or 4=2Q2, or Q = 20.5
      3. Thus P = 4(20.5), or 5.657
      4. Note this is lower than the price of 8 from the example. This makes sense: recall that there was new entry which bid the price down.