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**Lecture 17: Review, Monopoly Model**

1. Recall the Monopoly Model

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**

**D**

**MC**

**MR**

* 1. We produce where MC = MR
  2. At that quantity, how much can we charge per unit? (Reference the demand curve.)
  3. At that quantity, how much does each unit cost? (Reference the ATC curve.)
  4. In this example, the monopoly is making $35 million dollars (produces at 7 million pounds, making $5/pound). The deadweight loss is about $14 million (the difference between MR and Demand at 7 million pounds is $7; the difference between what’s produced and what’s optimally produced is about 4 million)

1. The shape of things
   1. Marginal revenue always bisects demand.
   2. We start with a generic demand curve, say P = a – bQ
   3. That means total revenue is QP = aQ – bQ2
   4. Take the derivative to find marginal revenue: P = a – 2bQ
      1. Note the slope is twice as much as the demand curve
2. Calculating monopoly profit and production
   1. Start with a demand curve and a total cost curve
   2. Determine the marginal revenue and marginal cost curves
   3. Set them equal to each other to determine optimal Q.
   4. Insert that Q into an average total cost curve to determine cost per unit.
   5. Insert that Q into the demand curve to determine price per unit.
   6. The difference is the profit per unit; multiply that by Q is total profit (or loss).
   7. Example
      1. Demand: P = 12 – Q; Total Cost: TC = 6 + Q2
      2. MR = 12 – 2Q; MC = 2Q
      3. 2Q = 12 – 2Q, or QM = 3
      4. PM = 12 – 3 = 9; CostM = (6 + 9)/3 = 15/3 = 5
      5. ∏M = (9 – 5)3 = 12
3. Calculating deadweight loss
   1. From society’s standpoint, we want to produce where MB = MC, but we instead produce where MR = MC. So how much deadweight loss do we get?
      1. Remember, another word for MB is demand.
   2. We must determine where optimal Q is. So we set MB = MC.
   3. We then take the integral of the demand curve from QM to Q\* and subtract the integral of the MC cost curve from QM to Q\*.
   4. Example
      1. 12 – Q = 2Q, Q\* = 4
      2. [12(4) – 0.5(4)2] – [12(3) – 0.5(3)2] = (48 – 8) – (36 – 4.5)

= 40 – 31.5 = 8.5

* + 1. (4)2 – (3)2 = 16 – 9 = 7
    2. DWL: 8.5 – 7 = 1.5