**HW1 Solutions**

**Chapter 1**

9)

a. B(Q)= 25(2)-(2)^2 and B(Q)= 25(10)-(10)^2

b. MB(Q)= 25-2(2) and MB(Q)=25-2(10)

c. Total benefit is maximized when MB=0. Set MB=0 and solve for Q to get Q=25/2

d. plug into cost function.

e. plug into MC function.

f. Obviously cost is minimized when Q=0.

g. Maximal benefit is attained when MC=MB. set them equal and solve for Q to get Q=25/4

14)

Tara would be giving up her job if she started the pen company, so off the bat we know her opportunity cost is 56,000. Tara's total revenue from first year of operation is 160,000 x 20 = 3,200,000. A profit margin of 25 percent means she expects profits are .25 x 3,200,000 = 800,000. Tara's accounting costs are her incurred expenses during the year equaling 3,160,000, which leaves her with accounting profits equaling 3,200,000-3,160,000= 40,000. Her implicit costs are her business expenses plus her opportunity cost which equal 3,216,000. Tara needs at least this much in revenue in order to make economics profit and no less than 3,160,000 to make accounting profit.

17)

For all but part (a) follow the formula PV = (profits)/(r-g), where r is the discount rate and g is the growth rate. In part (a), PV = [Sum {from t=0 to infinity} of discounted cash flow at time t] is the sum of an infinite number of positive terms that get larger and larger in t], ans so is infinite. It is unrealistic for the growth rate to exceed the interest rate forever. The formula on the first line is only valid when the denominator is positive.

**Chapter 2**

10)

To solve this problem we must first find the competitive equilibrium by setting demand equal to supply. Doing so gives us an equilibrium price of 22 and quantity of 12. However, the government has set the price floor at 25, which means that at this price seller are willing to sell 15 but buyers are only willing to buy 6, leaving an excess supply (surplus) of 9, which the government is willing to buy at the price floor. The total cost to the government is 25 x 9 = 225. The deadweight loss, or the triangle area created by the price floor which has been removed from the consumer and producer surplus, is 1/2 x 6 x 9 = 27.

20)

Substituting into the demand equation yields . Similarly, substituting into the supply equation yields. The competitive equilibrium level of industry output and price occurs where, which occurs when industry output  (in thousands) and the market price is per unit. Since 100 competitors are assumed to equally share the market, Viking should produce 26.92 thousand units. If , . Under this condition, the new competitive equilibrium occurs when industry output is 2672 thousand units and the per-unit market price is $78.60. Therefore, Viking should produce 26.72 thousand units. Since demand decreased (shifted left) when the price of desktops increased, memory modules and desktops are complements.

**Chapter 3**

10)

Since the demand function given is in log form, then the coefficients on the right hand side represent the elasticity of demand for X with respect to that variable. The coefficient on Px represents the own price elasticity, since it is greater than 1 in absolute value then demand is elastic. Income elasticity is the coefficient on M, which is negative indicating that it's an inferior good.

15)

To maximize revenue, GM should charge the price that makes demand unit elastic. Using the own price elasticity of demand formula, . Solving this equation for P implies that the revenue maximizing price is . Or you can just use calculus directly on the revenue function R=pQ, using the first order conditions

**Chapter 4**

12)

See Figure 4-3. When there is no food stamp program, the market rate of substitution is –0.5. The Food Stamp program leaves the market rate of substitution unchanged, and a consumer can purchase $170 of food without spending her income. A dollar-for-dollar exchange of food stamps for money further expands a consumer’s opportunity set, potentially making her better off.



Figure 4-3

Part 2:

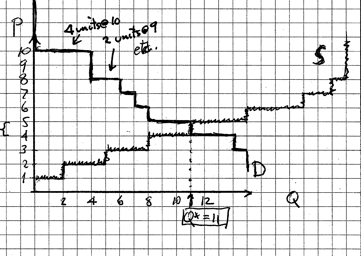
For C(q,r), compare C(0,r) +C(q,0) with C(q,r), and we find that C(0,r) +C(q,0) > C(q,r), it’s economies of scope.

We calculate to get the marginal cost, and it’s negative. It shows economies of scale.

There is a learning curve effect as when you produce more(Q increases), the total cost decreases.

Part 3: parts 1-3

Note: Excel doesn’t draw the true stair-step form of supply and demand that the data imply; see below for a by-hand sketch using the exact raw data. The exact equilibrium is 11 units traded at any price between 4 and 5.



4.

|  |  |  |  |
| --- | --- | --- | --- |
| Transaction prices |  |  |  |
|  | Period 1 | Period 2 | Period 3 |
|  | 6 | 5.1 | 4.8 |
|  | 5 | 5.1 | 4.8 |
|  | 5.5 | 5 | 4.5 |
|  | 5.1 | 5 | 4.9 |
|  | 5 | 5 | 4 |
|  | 5 | 4.9 | 4.8 |
|  | 5.6 | 4.8 | 5 |
|  | 5.6 | 4.9 | 4.5 |
|  | 5 | 4.95 | 5 |
|  | 5 | 5 |  |
|  | 4.9 | 5 |  |
|  | 4.5 |  |  |
| mean | 5.183333333 | 4.9772727 | 4.7 |
| median | 5 | 5 | 4.8 |
| std | 0.408619257 | 0.087646 | 0.3201562 |

5. Predicted CS is at least the area above the p=5 line below D, which (by counting squares) is 29. Predicted PS is at least the area below the p=4 line above S, which (by counting squares) is 15. The 11 units between p=4 and p=5 could be part of either PS or CS.

Since we have no public record of the values and costs behind each trade (these are known to the buyer and the seller, but we did not announce them), we can’t determine exactly the actual CS and PS. But if we assume that the most urgent trades (high V, low C) occur first, we can conclude that SV = PS + CS achieved its CE value of 29+15+11= 55 in period 2, since Q\*=11 trades took place that period. In period 3 (when we ran out of time), only 9 units traded, so SV was at most 55-2= 53. In period 1, an extra unit traded, so SV was at most 55-1 = 54. It is reasonable to guess that you and your classmates on average extracted at least 90% and probably 95% of the potential gains from trade (SV).

6. In the first period, several prices fell outside the CE range of [4, 5]. After that, only the first 2 prices fell outside that range, and they just barely did (at 5.1). The mean and median prices in periods 2-3 are well inside the CE range, and the StdDev is not large. So CE price predictions did quite well. The average Q across the 3 periods is 10.67, very close to the CE prediction of 11. So the CE model did amazingly well, considering that nobody (not even the professor and TA’s) knew S and D at the time the market was open.