Microeconomics II
Brief Solutions
Final Exam
9 June 2017

1. (a) If we normalize so there is one consumer of each type, total demand is D(p)=(42 – 2p)+(38 – 2p)=80 – 4p. Profit is (p-2)(80-4p) which is maximized at **p=11**. The normal type buys 16 gadgets at p=11 and gets **consumer surplus (19-11)16/2=64**. (b) In general, under optimal 2nd degree price discrimination, the "low" type gets 0 consumer surplus while the "high" type gets the efficient consumption. Hence, the normal consumer gets zero surplus. The rich get the efficient consumption level, as if p=MC, where demand equals 42-2(2)=38. So **each rich type purchases 38 gadgets**.
2. (a) ACME maximizes (p-5)(44-4p), which implies p=8. The quantity produced is 44-(4)8=12. The efficient quantity (with p=MC) would be 44-(4)5=24. The deadweight loss is then **DWL=(1/2)(8-5)(24-12)=18**. (b) If the consumers receive a subsidy s per widget, demand becomes 44-4(p-s) and ACME will maximize (p-5)(44-4p+4s) by setting p=8-s/2. Efficiency requires that consumption is 24, which requires p-s=5. Thus, 5+s=8-s/2, **so the optimal subsidy is s=6**.
3. (a) We can find the efficient public goods level by maximizing individual 1's utility, holding individual 2 fixed at fixed utility u: max x_1y subject to $x_2y=u$ and $y=300+300-x_1-x_2$. The solution yields the **efficient public good level y=300**. (b) Let z_n denote individual n's contribution. Individual 1 will choose z_1 to maximize his utility $(300-z_1)(z_1+z_2)$ taking z_2 as given. The solution (his best-response) is $z_1=(300-z_2)/2$. By symmetry, we will have $z_1=z_2=300/3=100$, so **the total public goods level is $y=z_1+z_2=200$**. This is **less than the efficient amount** (due to the free-rider problem).
4. (a) Adam has two pure strategies: Enter or Stay Out. Bruno has four pure strategies: BB,BD,DB,DD. For example, BD denotes the strategy "Buy a machine if there is no entry, Don't buy if there is entry". The payoff matrix reveals **three Nash equilibria: (Stay Out, DB) and (Enter,BD) and (Enter,DD)**. (b) **Only (Enter, DD) is subgame perfect**, because in the second stage, it is never rational for Bruno to buy a machine.

	BB	BD	DB	DD
Stay Out	0 , 200	0 , 200	0 , 250	0 , 250
Enter	-50, -50	100, 0	-50, -50	100, 0

5. (a) Each fisherman will catch $100\cdot n^{1/2}/n$ fishes. Thus, the gain from fishing is $100/n^{1/2}$ which will equal 5 (the disutility) in equilibrium. Thus, **the equilibrium number of fishermen is n=400**. (b) In an efficient outcome, n maximizes $100n^{1/2} - 5n$. **The efficient outcome is therefore n=100**. Hence, **the equilibrium from (a) is inefficient** (there is over-fishing).
6. (a) **There is no Condorcet winner** because majority rule has a cycle: F beats S, S beats H, and H beats F. (b) **The first vote should be S versus F.** If S wins the first vote, it will go on to defeat H in the second vote; if F wins the first vote it will be defeated by H in the second vote. Thus, the sophisticated voters realize that the first vote is really S versus H; and since a majority prefers S, it will win.