HOME WORK 1

4.3) (a) In (i), impeachment is a dominant strategy for both players. In (ii), impeachment is a dominant strategy for Time, but not for newsweek. However, after elimination of Time’s dominated strategy (Financial Crisis), we can eliminate impeachment for Newsweek as being a dominated strategy leading to the solution (Impeachment, Financial Crisis). In (iii), there are no dominant or dominated strategies.

(b) Unique Nash equilibrium in (i) is (Impeachment, Impeachment). Unique Nash equilibrium in (ii) is (Impeachment, Financial Crisis). In (iii), there are two Nash equilibria: (Impeachment, Financial Crisis) and (Financial Crisis, Impeachment).

(c) Solutions in dominant strategies (i) requires rationality of players. Solution through iterated elimination of dominated strategy in (ii) requires common knowledge of rationality. In (iii), we need, in addition, that players have correct conjectures about other players’ strategies (Nash equilibrium).

4.6. (a) For the US, Low is a dominant strategy. The unique Nash equilibrium of this game is US choosing Low and Japan choosing high. All one requires to get this is iterated elimination of dominated strategies which only requires that players be rational and have common knowledge of rationality.

(b) US

\[
\begin{array}{c|cc}
\text{Japan} & \text{High} & \text{Low} \\
\hline
\text{High} & 1 & 3 \\
\text{Low} & 2 & 4 \\
\end{array}
\]

This is a sequential game. First US commits to high or low. This is observed by Japan who then reacts.

Solving backwards, subgame perfect equilibrium (also Nash equilibrium) : US chooses to precommit to high, Japan observes this and chooses Low.

(c) Comparing the payoffs attained in equilibrium of (a) with that in (b), we see the value of commitment to the US is $3 - 2 = 1$.

(d) Given that Japan chooses Low in the equilibrium of the game in (b), if the US could revise its decision (while keeping Japan fixed in her decision to choose Low), it would be better off revising its choice \textit{ex post} to high. Of course, if it could do this, its decision in the first stage to commit to Low would not be credible to Japan so that the latter wouldn’t choose Low!

5.4) a) \( \frac{p - mc}{p} = \frac{1}{e} \)
\[
e = 2
cmp = 0.05
\]

optimal price \( p \) = 0.10

So Sprint should raise price.

[Can also see this by calculating current marginal revenue:]
\[
MR = p(1 - \frac{1}{e}) = 0.08(1 - \frac{1}{2}) = 0.04 \\
MC = 0.05 \\
\]

so that

\[MR < MC\]

and so firm should reduce output, i.e., increase price]

b) Current profit (gross of overhead costs) = (0.08 - 0.05)200 = 6 (millions).

At optimal price calculated above, profit (gross of overhead costs) = (0.10 - 0.05)q

where \( q \) is the quantity sold at price 0.10.

To find this quantity, use elasticity of demand.

We know at price 0.08, 200 million is sold.

Using formula for (arc) elasticity of demand (as there is a big change in price this is the right formula to use here)

\[
e = -\frac{\text{new quantity-old quantity}}{\text{new quantity+old quantity}} \cdot \frac{\text{new price-old price}}{\text{new price+old price}} \\
= -\frac{q-200}{(q+200)} \cdot \frac{0.10-0.08}{0.10+0.08} \\
= -\frac{2}{9} \\
\]

and as \( e = 2 \) we have

\[
\frac{q-200}{(q+200)} = \frac{2}{9} \\
\]

so that

\[q = 127.22(approx.)\]

Thus, new profit (gross of overhead cost) at price 0.10 is = (0.10 - 0.05)127.22 = 6.36 (millions), approx.

Thus, optimal adjustment of price will add a contribution of approximately 0.36 million to the overhead costs.

[PS: If you use a different formula for elasticity such as point elasticity of demand you will get a different number.]

5.5) a) using the same markup rule \( p = 5 \)

b) Presence of close substitutes will increase elasticity and decrease price.

question 1
a) risk aversion of the managers  
b) limited liability of the managers

2. 
   a) \( q = 100 - p \)
   Total revenue = \((100 - q)q = 100q - q^2\)
   Marginal Revenue= 100 \(-2q\)
   Marginal cost = 20
   \(MR = MC\) implies
   \[100 - 2q = 20\]
   which yields
   \[q^m = 40\]
   and since \(p = 100 - q\) we have the monopoly price
   \[p^m = 60.\]

b) Socially optimal output is found at the quantity where \(p = mc\) i.e.,
   \[100 - q = 20\]
   so that
   \[q^s = 80.\]

c) Deadweight loss=0.5(80 - 40)(60 - 20) = 800

3. Rent seeking behavior of the monopolist → to acquire and retain monopoly power the monopolist may incur socially wasteful expenditures (corruption, wasteful advertising etc) that divert real resources from other productive uses in society.