**ANSWERS TO ASSIGNMENT 4**

**Please refer to the excel file, “Assignment4\_Analysis\_for\_SkiRetail\_Case\_2002-2012” on the course website for all the analysis. Here are just the snapshots of the tables and answers.**

Q1: Vertically integrated Firm, Optimal Qty = 17000 and Optimal Profit = 1,195,455. Here are the calculations:



**Q2: Note that in this case, the question asks you to optimize the retailer’s profit (and not the manufacturer’s profit or the total supply chain profit). This is implied by the statement “**Bergard believes that SkiRetail should place an order for a quantity that is in its best economic interest.” **Hence, the Optimal Qty = 9000 and Optimal Retailer’s Profit = 450,000. Refer to the calculations below:**



**Using the above template, we can compute the profits of retailer, manufacturer, and the supply chain for different order quantities:**



**From this table, we observe the following:**

* The retailer’s optimal order quantity is 9000 as it maximizes the retailer’s profit ($ 450,000).
* The supply chain profit is maximum at 18,000 units (profit is 1,195,455), however the distribution of profits to the retailer and manufacturer (21%-79%) makes this an unattractive proposal.
* The order quantity of 9000 and the total profit of 920,000 is a feasible proposition as the distribution of profits to retailer and manufacturer is almost equal.
* Another interesting proposal for the two parties would be to resort to order quantity of 18,000 and distribute the total (maximum profit) of 1,195,455 equally, i.e. **retailer’s Profit = 597,772 and manufacturer’s profit = 597,772 (both of these are better off than order qty of 9000).**

**Q3:** Here are the calculations:

* Please note that it is sufficient to compute the profits at the breakpoints of service level (or cumulative probabilities of demand) to find the upper and lower limits of BB price.



**From this table, we observe the following:**

* The total supply chain profit is maximum at a buyback price ranging from 113.52 to $140 approximately. The total (maximum) profit is 1,060,909.
* At BB price of 139.98, the profit distribution is also uniform (49% and 51%), the retailer’s profit is 519967 and the manufacturer’s profit is 540,942.

**Q 4:** Here are the calculations

Please note that it is sufficient to compute the profits at the breakpoints of service level (or cumulative probabilities of demand) to find the **optimal wholesale price.**



**From this table, we observe the following:**

* The total supply chain profit is maximum at wholesale price range of 115.45 to 129.30. The total (maximum) profit is 1,195,455. However, the profit distribution is not equitable.
* At wholesale price of 157.05, the profit distribution is equitable (51% and 49%), the retailer’s profit is 526,768 and the manufacturer’s profit is 509,595. **Hence, this is an interesting proposal.**
* The proposal that the two parties resort to the wholesale price range of 115.45 to 129.30 and distribute the total (maximum profit) of 1,195,455 equally, i.e. retailer’s Profit = 597,772 and manufacturer’s profit = 597,772 does not work as the retailer’s profit is worse off.

**Q 5:** This is left as an exercise as there are multiple answers to the questions. One is better off using some optimization software (e.g. excel solver) as the question asks for optimization of multiple decision variables: wholesale price as well as distribution of sales revenue. If you have provided some sample calculations, it would be sufficient.