IE 375 Comments on Mini-Homework #4

General Comments

To receive full points, I strongly recommend that you write the formulae before making the calculations since it is very likely that you make errors while dealing with the numbers. Unless you write the formulae at the beginning, incorrect numbers will indicate that you use an incorrect formula, thereby reducing your points from the homework.

Homework 2 (out of 2) – Statistics: Average**:** 1.16 and Standard Deviation: 0.59

Grade (G)	**1.8<=G<2**	**1.5<=G<1.8**	**1<=G<1.5**	**G<1**	**Not Submitted**
# of students	10	8	18	8	7

Question 1

Comments regarding your performance:

1. (i) In *part a*, to calculate R, many calculated $n(R)$ by stating that when $Q = 2500$, the formula $Q = \sqrt{\frac{2\lambda[K+pn(R)]}{h}}$ must hold. An implicit assumption in this approach is that the optimal order quantity $Q = 2500$ is found by using the formulae $Q = \sqrt{\frac{2\lambda[K+pn(R)]}{h}}$ and $1 - F(R) = Qh/p\lambda$. However, it is entirely possible that the supply chain planner finds the optimal order quantity $Q = 2500$ by considering other parts of the production system (e.g. contracts with suppliers to purchase the item, quantity discounts). Therefore, in *parts a* and *b*, we need to accept that optimal order quantity is $Q = 2500$, and find the values of $R, n(R), F(R)$ accordingly (see point (iii)).

   (ii) Also, please note that, in *part a*, if the optimal order quantity had been found by the formulae $Q = \sqrt{\frac{2\lambda[K+pn(R)]}{h}}$ and $1 - F(R) = \frac{Qh}{p\lambda}$, and if the resulting optimal order quantity had been 2500, you should have obtained $Q^* = 2500$ in *part d*.

   (iii) Finally, for a given Q, we can still use the formula $1 - F(R) = \frac{Qh}{p\lambda}$ to find the best re-order level R^*. The reason is that for a fixed Q value, the minimizer R of total annual average cost $G(Q, R)$ should satisfy the equation $1 - F(R) = \frac{Qh}{p\lambda}$. Please see this in Equation (3), Appendix 5-C, on page 308 of our textbook (7^{th} Ed.)

   (iv) You received near to full points if you realized the inconsistency mentioned point (ii), and received full points if you have tried to deal with it.

   (v) In *part a*, the true answer is much simpler than finding $n(R)$. This gives an important message that doing homework before digesting the concepts and topics can make you lose both points and time.

   (vi) In general, please note that a question might involve multiple optimal decision variables based on the problem formulation. In this question, for instance, there are three optimal order quantity Q^*. First, $Q^* = 2500$ is given in the question. Second, you obtain Q^* in *part d*. Third, you obtain Q^* in *part e* for a deterministic EOQ problem with no backorders. Please keep track of such optimal decision variables, since it is likely that you will compare those optimal decision variables in order to compare possible formulations (for instance, deterministic EOQ vs. (Q,R) policy).

2. In *part a* and c, many assumed that $n(R) = \sigma L(z)$. Please note that this formula holds only when the demand distribution is a normal distribution. See page 271, sentence starting with "When the demand is normally distributed…".
3. In *part a*, although some used yearly expected demand, those did not convert the holding cost from \$/item-week to \$/item-year. Please note that the units must be consistent. I suggest that you write the formulae with the units so that you can keep track of the units.
4. In *part c*, while finding $F(R)$ for any R, some stated that

$$F(R) = 1 - \frac{Qh}{p\lambda} = 1 - \frac{\sqrt{\frac{2\lambda[K + pn(R)]}{h}}\,h}{p\lambda}$$

   This argument is accepted since it answers the question, yet there is a much easier solution. Please see the key.

5. In *part d*, almost all of you could apply the algorithm. Thanks!

<u>Question 2</u>

<u>Comments regarding your performance:</u>

1. You did a great job in this question. Thanks! Please see the key.