4301 A, 2019 Fall, HW 3, Due: 9/10

1. (45) A manufacturer makes truck brakes. The average demand is 500 per week, with variance of 2002. The changeover cost for one model is $1700 per batch. The transportation cost to ship a batch to distribution center is $800 per trip. The production leadtime is 3 weeks. The holding cost is $10 per break per week. If short, the manufacturer either has to run emergency production or suffer the penalty. The expected cost is $50 per break per week.
   1. (5) Please discuss the assumptions of the economic order quantity, and find the quantity and and production cycle time.

* 1. (5) Find the window of uncertainty.
  2. (12) Discuss the assumptions and find the safety stock level
  3. (8) Please find the total cost of inventory, including both cycle stocks and safety stocks.
  4. (10) Please find the cost due to uncertainty.
  5. (5) Please sketch the expected inventory over time.

1. (20) Through “lean” drive, the manufacturer reduces the changeover cost to $300. The production leadtime is reduced to 1 week. The truckload shipping cost is still $300 per trip. The share for the original product is assumed to be $100. The other costs stay the same.
   1. (15) Please repeat 1.1 – 1.6, and circle your important results.
   2. (5) Please compare the results in 1 and 2 and state your insight clearly with 80 words or less.
2. (20) The store sales in last 3 months of an item are shown in the table below where Day is the weekday, M for Monday, … etc. D are the demand. Please
   1. Please find the coefficient of variation if all days are analyzed together.
   2. Please find the coefficient of variation for MTW, and for RFS.
   3. What have you learned from this simple analysis?

|  |  |  |  |
| --- | --- | --- | --- |
| Day | D | Day | D |
| M | 15 | R | 31 |
| T | 15 | F | 32 |
| W | 24 | S | 17 |
| M | 21 | R | 49 |
| T | 9 | F | 43 |
| W | 23 | S | 17 |
| M | 20 | R | 37 |
| T | 20 | F | 15 |
| W | 22 | S | 46 |
| M | 11 | R | 14 |
| T | 12 | F | 48 |
| W | 19 | S | 46 |
| M | 11 | R | 33 |
| T | 9 | F | 16 |
| W | 12 | S | 47 |
| M | 20 | R | 42 |
| T | 22 | F | 42 |
| W | 12 | S | 26 |
| M | 14 | R | 35 |
| T | 10 | F | 33 |
| W | 24 | S | 41 |
| M | 5 | R | 30 |
| T | 20 | F | 25 |
| W | 15 | S | 35 |
| M | 19 | R | 24 |
| T | 18 | F | 46 |
| W | 5 | S | 15 |
| M | 17 | R | 35 |
| T | 19 | F | 37 |
| W | 8 | S | 42 |
| M | 24 | R | 44 |
| T | 25 | F | 48 |
| W | 24 | S | 17 |

1. (20) The historical average daily demand for a stomach medicine at a store is 1, with variance of 32.
   1. (5) What is the coefficient of variation?
   2. (8) What is the coefficient of variation in a week? The store opens 7 days a week. Please state your assumptions before you compute.
   3. (7) A distribution center supplies to 100 stores. What should be the coefficient of variation for this thermometer the distribution center face? Please state your assumptions.