

TOPIC 8: STOCHASTIC DEMAND INVENTORY THEORY

Practice Problems

1. The Kleenway Supermarket maintains a continuous review inventory system and reorders based on an order-point calculation. The company has found that demand for canned tomatoes averages fifty cases per week and has calculated an EOQ of 200 cases. The lead time for these tomatoes average one week, with a standard deviation of ten cases during the lead time. If Kleenway wants to maintain a service level of at least 95 percent, what reorder point should be used for canned tomatoes?
2. Easy-mart is a discount store that uses a periodic review inventory control system. One item has an average annual demand of 12,000 units. Inventory holding cost for the item is \$2.40 per unit per year, and ordering cost is \$25 per order. Ordering lead time averages one-half month, and the standard deviation of monthly demand is 200 units. What should the order-up-to level be for this item if Easy-Mart wants a 90 percent service level?
3. A discount retail store uses a periodic inventory system under which each item's inventory level is reviewed twice monthly. Suppose it has been determined that a particular item has an average annual demand of 6,000 units, with a standard deviation of 100 units per month. If lead time is one-half month and the store wants a service level of 85 percent, determine the order-up-to level for this item.
4. A computer products store stocks color graphics monitors, and the daily demand is normally distributed with a mean of 1.6 monitors and a standard deviation of 0.4 monitors. The lead time to receive an order from the manufacturer is 15 days. Determine the reorder point that will achieve a 98 percent service level.
5. The amount of denim used daily by The Western Jeans Company in its manufacturing process to make jeans is normally distributed with an average of 3,000 yards of denim and a standard deviation of 600 yards. The lead time required to receive an order of denim from the textile mill is a constant 6 days. Determine the safety stock and reorder point if The Western Jeans Company wants to limit the probability of a stockout and work stoppage to 5 percent. What level of service would a safety stock of 2,000 yards provide?
6. The Corner Drug Store fills prescriptions for a popular children's antibiotic, Amoxycilin. The daily demand for Amoxycilin is normally distributed with a mean of 200 ounces and standard deviation of 80 ounces. The vendor for the pharmaceutical firm that supplies the drug calls the drugstore's pharmacist every 30 days and checks the inventory of Amoxycilin. During a call the druggist indicated the store had 60 ounces of the antibiotic in stock. The lead time to receive an order is 4 days. Determine the order size that will enable the drugstore to maintain a 95% service level.

7. The Impanema Restaurant stocks a red Brazilian table wine it purchases from a wine merchant in a nearby city. The daily demand for the wine at the restaurant is normally distributed with a mean of 18 bottles and a standard deviation of 4 bottles. The wine merchant sends a representative to check the restaurant's wine cellar every 30 days, and during a recent visit there were 25 bottles in stock. The lead time to receive an order is 2 days. The restaurant manager has requested an order size that will enable him to limit the probability of a stockout to 2 percent.
8. Grateful Fred sells souvenir T-shirts at rock concerts. The shirts are specially ordered with the city and date of the concert, so he cannot take them to another city after the concert. He buys the shirts for \$15 each and sells them for \$35 before and during the concert. He sells any remaining shirts outside the concert grounds for \$10 after the concert ends, and can usually dispose of all of them. For a typical concert, demand is normally distributed, with a mean of 2,500 and standard deviation of 200. How many shirts should Fred order?
9. The J&B Card Shop sells calendars featuring a different Colonial picture for each month. The once-a-year order for each year's calendar arrives in September. From past experience the September to July demand for the calendars can be approximated by a normal distribution with mean 500 and standard deviation of 120. The calendars cost \$3.50 each, and J&B sells them for \$7 each.
 - a. If J&B throws out all unsold calendars at the end of July, how many calendars should be ordered?
 - b. If J&B reduces the price to \$1 at the end of July and can sell all surplus calendars at this price, how many calendars should be ordered?
10. A perishable dairy product is ordered daily at a particular supermarket. The product, which costs \$1.19 per unit, sells for \$1.65 per unit. If units are unsold at the end of the day, the supplier takes them back at a rebate of \$1 per unit. Assume that daily demand is approximately normally distributed with mean 150 and standard deviation 30.
 - a. What is your recommended daily order quantity for the supermarket?
 - b. What is the probability that the supermarket will sell all the units it orders?