

Q1. (RentAPhone) RentAPhone is a new service company that provides European mobile phones to American visitors to Europe. The company currently has 80 phones available at Charles de Gaulle Airport in Paris. There are, on average, 25 customers per day requesting a phone. These requests arrive uniformly throughout the 24 hours the store is open. (Note: This means customers arrive at a faster rate than 1 customer per hour.) The corresponding coefficient of variation is 1.

Customers keep their phones on average 72 hours. The standard deviation of this time is 100 hours.

Given that RentAPhone currently does not have a competitor in France providing equally good service, customers are willing to wait for the telephones. Yet, during the waiting period, customers are provided a free calling card. Based on prior experience, RentAPhone found that the company incurred a cost of \$1 per hour per waiting customer, independent of day or night.

- a. What is the average number of telephones the company has in its store?
- b. How long does a customer, on average, have to wait for the phone?
- c. What are the total monthly (30 days) expenses for telephone cards?
- d. Assume RentAPhone could buy additional phones at \$1,000 per unit. Is it worth it to buy one additional phone? Why?
- e. How would waiting time change if the company decides to limit all rentals to exactly 72 hours? Assume that if such a restriction is imposed, the number of customers requesting a phone would be reduced to 20 customers per day.

Q2. (Mango Electronics Inc.) Mango Electronics Inc. is a Fortune 500 company that develops and markets innovative consumer electronics products. The development process proceeds as follows.

Mango researches new technologies to address unmet market needs. Patents are filed for products that have the requisite market potential. Patents are granted for a period of 20 years starting from the date of issue. After receiving a patent, the patented technologies are then developed into marketable products at five independent development centers. Each product is only developed at one center. Each center has all the requisite skills to bring any of the products to market (a center works on one product at a time). On average, Mango files a patent every 7 months (with standard deviation of 7 months). The average development process lasts 28 months (with standard deviation of 56 months).

- a. What is the utilization of Mango's development facilities?
- b. How long does it take an average technology to go from filing a patent to being launched in the market as a commercial product?
- c. How many years of patent life are left for an average product launched by Mango Electronics?