Exercise 9 (Bakery)

Time simulation using statistical probabilities, independent periods

Suppose that the daily demand for cakes in a bakery follows a normal distribution with a mean of 80 and a standard deviation of 15. The cakes are made all at once at the beginning of each day. Profit is € 4 per cake sold. By late afternoon, the unsold cakes are discarded and the loss is € 2.5 per unit.

How many cakes do you need to make every day to maximize profit?

The sheet "Draws" of the base file contains 365 random numbers of daily demand, corresponding to a year of operation of the bakery.

A. Realization of the model for a production of 80 cakes

You choose to produce 80 cakes per day (parameter area).

1. Compute for each day of operation, using the random numbers for daily demand present on the sheet:
   − the number of sold cakes,
   − the number of unsold cakes
   − and the daily profit.

Calculate also the average daily profit over the year.

2. Make a chart showing the number of sold cakes, the number of unsold cakes and the demand for the first 50 days. What is your conclusion?
3. Make a chart showing the daily profit for the first 50 days.

B. Simulation (test of different production levels)

1. Compute using a data table the average daily profit for a daily production ranging from 75 to 95 cakes by step of 1.
2. Make a chart of your results.

C. Simulation (new random draws)

1. Find, in the Draws sheet, ten set of statistical values for daily sales with the same law.
2. Adjust your model to use these new values and compare the obtained results.