The Small Shop

Suppose you are considering opening a new shop from your garage. This shop has been on your mind for some time. However, you want to have a good projection of when you will breakeven, and you want to know how much money you should ask from a bank as an inital loan. Your buddy the “data scientist,” has done you a favor and determines that based on current data for this product, the product has the potential for exponential growth. Based on information from other retailers he finds the following:

1. The equipment costs $5,000 dollars and is a onetime only cost.
2. The Loan available based on you credit score, will have an interest rate of 2.5% for a 12-month loan.
3. Each unit of the product costs you $10 per unit ordered, which include all costs such as manufacturing costs, materials, and shipping to you.
4. Since, this is a mail order business, you find that it will cost $8 dollars for each unit shipped to a customer. Thus, if you sell 10 then the postage cost will be $80.
5. The demand for the product is given by the equation: A e^(x\*t), where your friend has determined, A=10, t= month number (e.g. month 1 of business and so on, this increments upward). The longer you are in business the more demand you will have. Finally, x=0.157, which is a demand coefficient your fried found based on data. The demand will be given by this equation in decimals (i.e. 11.69, thus you will need to round up to 12 as there is no .69 of a product). There is a function in Excel called ROUNDUP(), the way it works is =roundup(8.9,0) would return 9. The first argument to the function is the number you want to round up, 0 indicates you want an integer.
6. You sell each product for a fixed amount of 40 dollars.
7. Thus, Revenue is Price \* Demand, in month 0, your initial month the demand will be 10, thus, your revenue is 400.
8. You will not have a loan payment in month 0 but payments start on month 1 of operations. Thus, you need to start making payments on month 1. This can be found by using the PMT() function in Excel. =PMT(interest rate /12, number of periods, negative loan amount). For example, if I were to take loan for 1000 at a rate of 2.5%, and must be paid in full within 12 months it would look like this =PMT(2.5%/12, 12,-1000), which would give me my monthly loan payment.

Thus, your cashflow on month zero should consider the loan amount as a positive, you will have 10 units to sell, thus you will have some revenue, which is a positive, the initial cost of the equipment is a negative, the cost of the initial 10 units is a negative, you will sell those 10 units in month 0. However, for month 1 you will need to carry over the cash at the end of month 0 as the cash for month 1.

Develop a spreadsheet model that can show you the cashflow in the business for the next 12 months, including Month 0 (initial month of the business). The goal of the spreadsheet is to determine the loan amount (minimize it as much as possible) to assure you stay in the black (positive cash flow) for the entire year as you know by month 12 the demand will be 66 units given by the demand equation. You can assume that you can order the demanded amount in the same month and sell it in the same month (you live next to the manufacturer). Thus, what is demanded is what you have in inventory. Thus, given all the information above, construct a simple spreadsheet model. The spreadsheet should use names for variables and must be stored in the name manager. The spreadsheet should have an interface sheet, a data sheet, and a model / computation sheet.

The interface should have all twelve months of cashflow and must be graphed. It should have a loan amount as an input, so that you can see how the loan amount changes the cashflow in all the twelve months. The computation sheet should include the monthly computations starting in month 0 and should be modularized for easy reading. Ans, this worksheet should contain the monthly computations of revenue, postage costs, loan payments, demand, and cashflow.

Hints:

Begin by creating the data sheet and naming the variables. Then move into the computation sheet, by using the vector data variables and storing them.

The goal of this assignment is to get you to implement the structure that we have discussed in the videos prior to this assignment. This should not take longer than 1 hour to complete. IF you are spending too much time on this assignment, reach out to me, attend virtual office hours, or reach out to Joshua our TA for help.