

Background

This take-home test is part of the application process for the Optimization Analyst position at RadiumOne. Our goal is to **see how you think through problems involving data.**

For all answers you provide, please include screenshots or original files **showing how you manipulated the data** to arrive at your answer, along with a brief description of your reasoning and **any assumptions** you may need to make to answer the question.

You may use any program(s) of your choosing to analyze the data. You may also submit your responses back in any format that you choose.

Timing

We expect that this test will take you around 1 hour. However, you may take up to an hour and a half if needed. Within an hour and a half of receiving this test, email your response back to optitakehome@radiumone.com.

The Test

-Part 1-

You just purchased a tiny pastry shop that was open 24 hours a day, Monday through Friday. You see potential for it to be more profitable with some changes to how it's managed.

Attached is data on the number of people that came into the pastry shop, by hour, the last week it was open. For example: Hour_of_day = 1 is the hour from 1:00:00am – 1:59:59am. Also included in the dataset is the average amount spent by *each* customer who came in to the pastry shop during the corresponding time interval.

Question #1(a): What trend(s) do you see in consumer behavior? Assume you are explaining it to someone who may not be data-savvy. Include your evidence.

Question #1(b): What might these trends say about consumer behavior?

-Part #2-

Assuming you keep the same fixtures and power supplies – it costs \$10/hour to keep the store open. (Power the lights, appliances, etc). It costs an additional \$20/hour to pay each employee, and you only ever need one employee at a time. The variable cost on each pastry sold – the ingredients, etc - is about 30% of revenue.

Question #2: Which hours of the day tended to be profitable last week? Include your evidence.

-Part #3-

You have one employee who remains from the former business – Karl. Karl can work a maximum of 8 hours a day, although he may work less. (Note: Any lunch hour or other breaks given Karl do not count towards his 8 hour max).

Karl expresses that he thinks he can attract more business if he uses some of his paid hours to promote the pastry shop around town. You agree that it would be worthwhile to test if promoting the business has a positive impact on sales.

Question #3: Given that you want to maximize your profit, but given that you also want to allow Karl to take some of his paid hours to promote the business and see if it has a positive impact: What is your plan for how to decide what hours you should open the pastry shop? (Assume Karl is your only employee - you are not able to work any hours at the shop, and you may not hire an additional employee, at least in such a short term). Please be specific, and justify your answer.