FYI: Look at Excel spreadsheet for data analysis for answers with calculations.

1. What is the total annual inventory cost of the current run size of 500 units?
    - The total TAIC for a run size of 500 is $18000.34. The cost breakdown is below which will better help understand some of the tradeoffs between run size moving forward. The purchase cost is $16036.36, the holding cost is $131.25, and the setup cost is $1832.73.
2. What run size would you recommend the brewery use to produce 4-packs of "Knecht 3"? Specify why your recommendation is better if you recommend something other than the current run size.
    - The run size that we recommend for the brewery to produce 4-packs of "Knecht 3 is 3200. Overall, out of conducting three total annual inventory cost (TAIC) evaluations, this run size minimizes the TAIC by nearly $1200 dollars in comparison with the 500 & EOQ run size. Additionally, the run size has a direct implication on economies of scale quantity discounts. One of the distinguishing features in comparison is the setup cost. Having a lower run size will increase the amount of changeover.
3. How robust is your solution to some of the key parameters that Lance collected (i.e. guessed) data for?
    - If the parameters were standard (stable) and consistently universal, I think it would be a robust solution, but business entails different price structures, disruptions, risk, complexity, different units of measures, and ambiguity. Overall, the solution is not robust or nearly sophisticated to some of the key parameters that Lance collected. It can barely adapt to too many variations in inputs. I can already forecast certain use cases where functionality will be limited in the supply chain. For example, the biggest thing we encountered was embedding quantity discounts for economies of scale (EOS) for the 3200-run size. As a result, I got the wrong outcome. Additionally, located in my three-sensitivity analysis for setup cost, holding cost, and TAIC by run size will accurately describe my example of price discount exclusion.
    - Furthermore, you will see how setup cost and holding cost are inversely related and will vary by run size. In this case order quantity/batch size will be the main determinant of the TAIC because it has a direct implication. From a budgeting standpoint, it doesn't really consider financial or allocated flowing capacity constraints which makes it extremely difficult from a reliable aspect.

Lance talked to the brew master, and it takes 2 weeks from when they get notification that they need to can a product before they can schedule and complete production. This is because they currently only can on Mondays and Thursdays. He said that they also need time to print the labels from the cans. The twice per week production schedule means that the standard deviation

of the production lead time is approximately 2 days. Use this data to answer the following questions regarding the reorder point of "Knecht 3".

4. What service level would you recommend for this product? Provide support for your response.
    - After conducting market research and formulating assumptions our service level came out to be 99.12% for "Knecht 3". Some assumptions that I made for my calculations are the price of the beer. After conducting market research (price comparison), we chose benchmark Xul Beer Co.'s cost of $4.19 because they are one of the best in Knoxville in the industry, aside from other major players. Additionally, within our price structure breakdown, we tried to get granular and as much to reality as possible. With that being said, we decided to add 50% of the total price due to the convenience on Saturday, a high-quality player in the Knoxville industry. We also embedded a 10% markup which brought the cost out to $6.70. Another assumption that I made is that inventory turns monthly (12), which explains the holding cost percentage of 2.50%.
5. What should the reorder point be set at for "Knecht 3" at the service level you specified in Question 4?
    - Given our service level (SL) of 99.12% is 583 cans of "Knecht 3".

Lance says it still sounds like there will be way too much inventory of "Knecht 3" and you should listen better in class. Answer the following to let him know why he needs to lay off his own product.

6. What is the total average inventory of "Knecht 3" 16-oz cans based on the order quantity and safety stock that you previously calculated?
    - The total average inventory of "Knecht 3" 16-oz cans is 369.
7. You want to discuss some ways that you could begin to reduce inventory of the product. Should you start with cycle stock or safety stock? Support your answer. Additionally, there are a lot of options for what to focus on to achieve a reduction. What parameter would you focus your improvement efforts (e.g., lead time variation, lead time, holding cost)?
    - There are a multitude of efforts that can be pursued to receive a reduction.
        i. Service Level or Lead time variation.

- Lead Time variation is a parameter that we want to reduce to make these improvements. According to the chart in the Excel spreadsheet, the further that you get out in the LT standard deviation the more safety stock will grow on hand. Reducing lead time will minimize the need for excessive safety stock. By reducing the likelihood of supply disruptions or delays, it is possible to operate at a lower safety stock without compromising service levels.

- Additionally, “Feels Like 98” Brewery should proactively make sure their service levels are optimal. As service levels increase according to the graph, safety stock increases. Measuring service level is correlated with demand. This allows us to properly have “Knecht 3” product availability as the demand increases. Utilizing service level will help prevent stockouts or overstock making the process more efficient.