1. How do you assess the statistical significance of an insight?

To find out if an insight really matters or if it just happened by chance, we can perform a test called a statistical hypothesis test. This involves:

1. Setting up two opposing statements (hypotheses).
2. Collecting data to check these statements.
3. Picking a suitable statistical method to test your data.
4. Deciding on a cutoff value (like 5%) for what we'll consider significant.
5. Calculating a statistic from your data and comparing it to your cutoff value.
6. Making a decision: if the test result is below the cutoff, your insight is significant; if not, it might just be by chance.

2. What is the Central Limit Theorem? Explain it. Why is it important?

The Central Limit Theorem says that if we take a lot of samples from any population, and calculate their averages, those averages will form a normal distribution (a bell-shaped curve), no matter what the original population looks like. This is crucial because it lets us use methods that assume a normal distribution to make predictions and conclusions from sample data, making these methods very versatile and powerful.

3. What is statistical power?

Statistical power is the chance that your test will find a real effect when there is one. High power means there's a good chance we'll catch real differences or effects if they exist, reducing the risk we'll miss something important.

4. How do you control for biases?

To keep biases from messing up your study results, we can:

- Use randomization to assign people or items to different test groups, which helps even out unknown factors.

- Blind the study so that participants and sometimes the researchers don't know who's in which test group, avoiding influence on the results.

- Include control groups as a standard for comparison.

- Statistically adjust for known biases in your data analysis.

5. What are confounding variables?

Confounding variables are factors that might trick us into thinking there’s a connection between other variables. They affect both the independent variable (what we change) and the dependent variable (what we measure), which can lead to incorrect conclusions. Identifying and adjusting for these is key to accurate research.

6. What is A/B testing?

A/B testing is a simple way to compare two versions of something to see which performs better. We change one thing between two groups while keeping everything else the same. This method is often used to figure out the best strategies in marketing, product design, and other areas.

7. What are confidence intervals?

Confidence intervals are a range of values that we expect to contain the true answer a certain percentage of the time (like 95% of the time). They give us a sense of how sure we can be about your results. A wider interval means less certainty, and a narrower one means more certainty. They help in understanding the accuracy of your estimates.