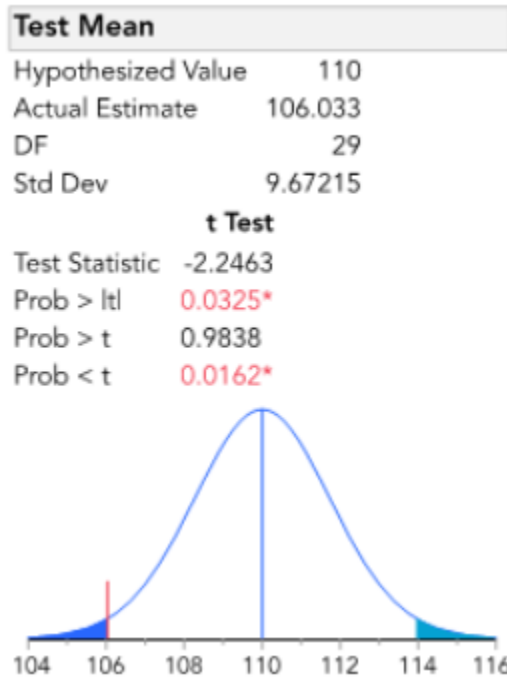


Questions Module 4.3

You are testing the null hypothesis that the mean weight of components is 110 against the alternative that the mean is less than 110. Based on the following output, what is the p -value for this test?



- ☐ a. -2.2463
- ☐ b. 0.0325
- ☐ c. 0.0162
- ☐ d. 0.9838

Incorrect.

The correct answer is **c**. The output includes multiple p -values. You are interested in the p -value for a one-tailed test with a "<" alternative hypothesis.

You conduct a two-sample t test to compare the means for Process A and Process B. The target for the process is 30 mm. Which of the following is a possible null hypothesis?

- ☐ a. The mean difference is zero.
- ☐ b. The mean difference is greater than 30.
- ☐ c. The mean difference is less than zero.
- ☐ d. The mean difference is greater than or equal to zero.

Which of the following scenarios describes dependent samples consisting of pairs measurements?

- ☐ a. Two batches of parts arrive from two different vendors. Random samples of parts from each vendor are weighed, and the weights are compared.
- ☐ b. A sports shoe firm is testing a new material for the soles of its shoes. The company makes 50 prototype pairs of shoes, where one shoe has the new material, and the other has the current material. It distributes the

shoes to 50 people, and asks them to wear the shoes for 6 months of normal activity and then return them. When the shoes are returned, the shoe company measures the soles to see whether there is a difference in wear.

- ☐ c. In a university, one faculty member is experimenting with a new method of instruction. In one section of a class, she uses the traditional method, and in the second section, she uses the new method. After several weeks, she administers the same exam to both sections and compares the exam results.
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Incorrect.

The correct answer is **b**. Measuring two shoes from individuals describes paired, dependent samples. Two batches from two different vendors and a faculty member teaching to separate classes describe independent populations.

Incorrect.

The correct answer is **a**. In a two-sample t test, your null hypothesis is that the mean difference is zero. This is equivalent to stating that the mean for Process A is equal to the mean for Process B.

You want to compare the average yield for four processes using ANOVA. Your null hypothesis is that all of the means are equal. What is the alternative hypothesis?

- ☐ a. All of the means are equal.
- ☐ b. All of the means are different.
- ☐ c. At least two of the means are different.
- ☐ d. One of the means is different.
-

Incorrect.

The correct answer is **c**. If you reject the null hypothesis, the most you know is that at least two of the means are different from one another.

In the White Polymer case study, an important output variable is Melt Flow Index (**MFI**). The target for **MFI** is 195 +/- 3. Remember that if you can improve **MFI**, you can improve the polymer yield.

The file **VSSTeamData.jmp** includes data about **MFI**, along with information about two categorical input variables, **Shift** and **Quarry**.

How can you apply the methods introduced in this lesson to help understand **MFI**, and the relationship between **MFI** and the two categorical variables?

Solution (there are many possible answers):

- You can use a 95% CI to estimate the mean of MFI.
- You can use a one-sample t test to test the null hypothesis that MFI is on target.
- You can use an equivalence test to determine whether the mean of MFI is practically equivalent to the target (assuming that you have an acceptable interval).
- You can use ANOVA to see whether there are significant differences in MFI for the different shifts and quarries.
- You can use ANOM to see whether there are significant differences from the overall mean for different shifts and different quarries.