Answers: Introduction to hypothesis testing

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Summary

Answers to questions relating to the guide on introduction to hypothesis testing.

*These are the answers to* [*Questions: Introduction to hypothesis testing*](../questions/qs-hypothesistesting.qmd)*.*

**Please attempt the questions before reading these answers!**

## Q1

The following questions are on defining hypotheses.

1.1. Set the average number of pages (mean) to $μ$. Here, $H\_{0}:μ=350$ and $H\_{1}:μ<350$, and you would need a lower one-tailed test.

1.2. Set the percentage of defective products to be equal to $D$. Here, $H\_{0}:D=0.1$ and $H\_{1}:D>0.1$, and you would need an upper one-tailed test.

1.3. Set $μ\_{a},μ\_{b}$ to be the average wait time in the two different branches. Here, $H\_{0}:μ\_{a}=μ\_{b}$ and $H\_{1}:μ\_{a}\ne μ\_{b}$, and you would need a two-tailed test.

1.4. Set $μ\_{x}$ to be the average time of the express trains, and $μ\_{r}$ to be the average time of the regular trains. Here, $H\_{0}:μ\_{r}=μ\_{x}$ and $H\_{1}:μ\_{x}>μ\_{r}$, and you would need a lower one-tailed test.

## Q2

2.1. $α=0.15$

2.2. $α=0.01$

2.3. A paired t-test.

## Q3

3.1. I reject $H\_{0}$ as the test statistic of $3.12$ is greater than the critical value of $2.58$. Therefore there is significant evidence to suggest the average daily sales of Boole Bars differ from 150.

3.2. I reject $H\_{0}$ as the test statistic of $2.01$ is greater than the critical value of $1.645$. Therefore there is significant evidence to suggest the proportion of customers who buy Lagrangian Lollipops exceeds $40\%$.

3.3. I do not reject $H\_{0}$ as the test statistic of $2.102$ is between the critical values of $2.306$ and $−2.306$. Therefore there is no significant evidence to suggest there is a difference in sweetness scores between the two recipes.

## Version history and licensing

v1.0: initial version created 12/24 by Ellie Trace as part of a University of St Andrews VIP project.

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