

# Answers: Introduction to hypothesis testing

Ellie Trace

## Summary

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

*These are the answers to [Questions: Introduction to hypothesis testing](#).*

**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  $\mu$ . Here,  $H_0 : \mu = 350$  and  $H_1 : \mu < 350$ , 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  $\mu_a, \mu_b$  to be the average wait time in the two different branches. Here,  $H_0 : \mu_a = \mu_b$  and  $H_1 : \mu_a \neq \mu_b$ , and you would need a two-tailed test.
- 1.4. Set  $\mu_x$  to be the average time of the express trains, and  $\mu_r$  to be the average time of the regular trains. Here,  $H_0 : \mu_r = \mu_x$  and  $H_1 : \mu_x > \mu_r$ , and you would need a lower one-tailed test.

## Q2

- 2.1.  $\alpha = 0.15$
- 2.2.  $\alpha = 0.01$
- 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.

[This work is licensed under CC BY-NC-SA 4.0.](#)