Sheet 10: Hypothesis testing

NOTE: All results should be rounded to two decimal places unless otherwise stated. If a number or result has fewer decimal places, it is okay to keep fewer. For probabilities, give two decimal places when expressed in percentage (e.g., 12.34%) and four decimal places when expressed as numbers (e.g., 0.1234).

Exercise 1
[D, Section 8.2, Exercise 18]
Provide detailed arguments for b-d. In particular, in b, specify the test statistic and calculate the p-value. In c and d, do NOT use any black box formulas; instead, properly derive the solutions as we have done in the lecture. Solve e WITHOUT "when $\mu = 76$". (Think about why the question is trivial/nonsense if we keep "when $\mu = 76$".)

Exercise 2
[D, Section 8.2, Exercise 24]
Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, the p-value, and conclude. Before solving the exercise, read "Large-sample tests" starting on page 331.

Exercise 3
Read the example on pages 16 and 17 of "6-Hypothesis-Testing.pdf"

Exercise 4
[D, Section 8.3, Exercise 34a]
Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, the p-value, and conclude.

Exercise 5
[D, Section 8.1, Exercise 13]
Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, the p-value, and conclude. Ignore "With ... test statistic" in b.

Exercise 6
[D, p. 358, Exercise 57] Solve this exercise with sample size 50 **replaced by 15** (everything else remains unchanged). Also, assume the data is normally distributed. Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, the p-value, and conclude.

Exercise 7
[D, p. 358, Exercise 76]

Exercise 8
[D, Section 14.1, Exercise 2]
Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, and calculate the p-value or use p-value considerations to conclude.

Exercise 9
[D, Section 14.1, Exercise 8]
Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, and calculate the p-value or use p-value considerations to conclude.

Exercise 10
[D, Section 14.3, Exercise 25]
Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, and calculate the p-value or use p-value considerations to conclude.

Exercise 11
[D, Section 14.3, Exercise 30]
Carry out the hypothesis test at significance level $\alpha = 0.01$. Provide detailed arguments. In particular, specify H_0 and H_a, the test statistic, and calculate the p-value or use p-value considerations to conclude.