Equitable Equations: *Introduction to hypothesis testing*

Instructions

For each of the following problems,

(a) Write null and alternative hypotheses appropriate to this study.

(b) Compute the z-score of the sample mean.

(c) Compute the p-value of the sample mean.

(d) Are the results statistically significant at level $\alpha = .05$?

(e) What conclusions, if any, can be drawn from this study? Answer in ordinary human language.

Problem 1

A laptop manufacturer claims that the mean life of the battery for a certain model of laptop is 6 hours. In a simple random sample of 80 laptops, the mean battery life is 5.9 hours. Assume $\sigma = 1.3$ hours. Is the company's claim reasonable?

Problem 2

A soft drink manufacturer claims that the mean calorie content of one of its sports drinks is 150 calories per bottle. In a simple random sample of 95 bottles, the mean is 158 calories. Is there sufficient evidence to conclude that the mean is actually more than 150 calories/bottle? Assume $\sigma = 5$ calories.

Problem 3

A travel brochure says that the mean duration of eruptions of a the Old Faithful geyser is 3.6 minutes. Use the `faithful` data set to test whether this claim is reasonable or not. Assume a population standard deviation of $\sigma = 1.2$ minutes. p = .0615