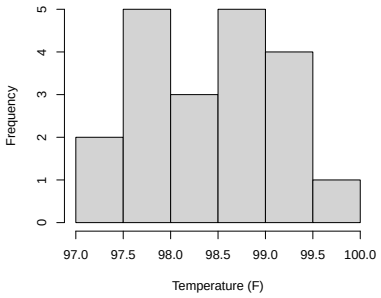
Activity 7: Hypothesis Testing for One Mean
STAT 310, Spring 2023

Exercise 1. A nurse is interested in determining whether the average body temperature of patients at a hospital is different than 98.6 degrees F, the claimed average normal body temperature for adults. She randomly samples $n = 20$ patients at this hospital and obtains a sample mean body temperature $\bar{x} = 98.4$ degrees F with standard deviation $s = 0.68$. A histogram of the temperature data is shown below.



(a) Which of the following is the correct null and alternative hypothesis for a two-sided test?

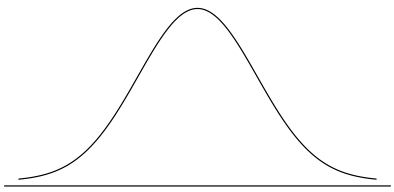
(i) $H_0 : \bar{x} = 98.6$, $H_A : \bar{x} \neq 98.6$

(ii) $H_0 : \mu = 98.6$, $H_A : \mu \neq 98.6$

(b) Are the conditions for the hypothesis test satisfied?

(c) Calculate the test statistic.

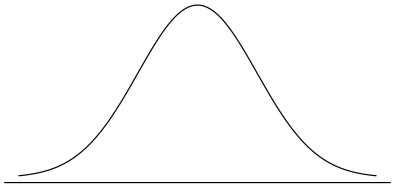
(d) Calculate the p-value and make a decision using $\alpha = 0.05$ significance level.



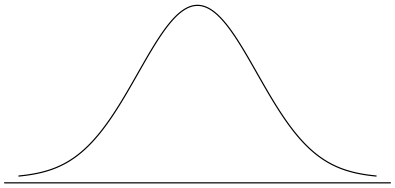
(e) What is the conclusion of the test in the context of the data?

Exercise 2. Find the p-value for the given t-test statistic and sample size. Also determine if the null hypothesis would be rejected at $\alpha = 0.05$. Assume that all the conditions for the hypothesis test are satisfied.

(a) $H_A : \mu < \mu_0$, $n = 25$, $t = -1.2$



(b) $H_A : \mu > \mu_0$, $n = 50$, $t = 1.9$



(c) $H_A : \mu \neq \mu_0$, n=10, $t = 3.5$