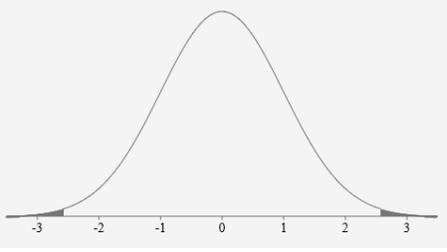


1. In your work for a national health organization, you are asked to monitor the amount of sodium in a certain brand of cereal. You find that a random sample of 82 cereal servings has a mean sodium content of 233 milligrams. Assume the population standard deviation is 10 milligrams. At $\alpha = 0.01$, can you conclude that the mean sodium content per serving of cereal is different from 230 milligrams?

<p>(a) (DESIGN) State your Hypotheses in words and parameters.</p> <p>Ho: The mean sodium content per serving of cereal is not different from 230 milligram</p> <p>Ha: The mean sodium content per serving of cereal is different from 230 milligrams</p> <p>Ho: $\mu = 230$</p> <p>Ha: $\mu \neq 230$</p>	<p>(d)</p>  <p>Reject Ho if $Z < - 2.578$ or $Z > 2.578$</p> <p>(e) (DATA) Conduct the test and circle your decision</p> <p>$Z = (232-230)/(10/\text{sqrt}(82)) = 1.81$</p> <p>This is not in the rejection region</p> <p>Fail to Reject Ho</p> <p>(f) (CONCLUSION) State your overall conclusion in language that is clear, relates to the original problem and is consistent with your decision.</p> <p>Insufficient data to conclude that mean cereal sodium is over 230 mg.</p>
<p>(b) (DESIGN) State Significance Level of the test and explain what Type I error is in context.</p> <p>$\alpha=.05$, which represents the maximum design probability of Type I error, which would be claiming the mean sodium content per serving of cereal is different from 230 milligrams, when in fact the mean is 230 milligrams.</p>	
<p>(c) (DESIGN) Determine the statistical model (test statistic)</p> <p>Test of mean vs. Hypothesized Value, population standard deviation unknown.</p> $Z = \frac{\bar{X} - \mu_0}{\sigma / \sqrt{n}}$ <p>This is a two-tail test, so α will need to be split into 2 parts.</p>	

2. A tourist agency in Florida claims the mean daily cost of meals and lodging for a family of four traveling in Florida is no more than \$284. You work for a consumer protection advocate and want to test this claim. In a random sample of 50 families of four traveling in Florida, the mean daily cost of meals and lodging is \$292. Assume the population standard deviation is \$25. At $\alpha = 0.05$, do you have enough evidence to reject the agency's claim?

(a) (DESIGN) State your Hypothesis

Ho: The mean daily cost of meals and lodging for a family of four traveling in Florida is no more than \$284

Ha: The mean daily cost of meals and lodging for a family of four traveling in Florida is more than \$284

$$\text{Ho: } \mu \leq 284$$

$$\text{Ha: } \mu > 284$$

(b) (DESIGN) State Significance Level of the test and explain what Type II error would be.

$$\alpha = 0.05$$

Type II Error:

Failing to claim the mean cost of lodging and meals is over \$284, when it in fact the mean cost is not over \$284

(d) (DESIGN) Determine the statistical model (test statistic)

Test of mean vs. Hypothesized Value, population standard deviation unknown.

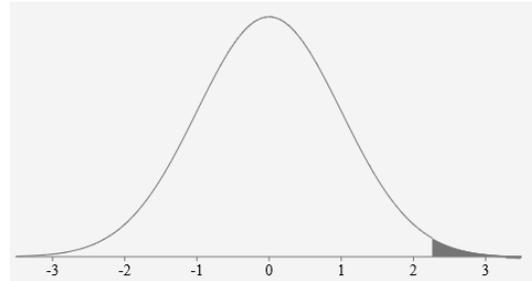
$$Z = \frac{\bar{X} - \mu_0}{\sigma / \sqrt{n}}$$

This is a one-tail test, so α will be only in the upper tail.

(d) (DESIGN) Determine decision rule (p-value method)

Reject Ho if p-value < 0.05 (α)

(e) (DATA) Conduct the test, graph and shade the test statistic find the p-value and **circle** your decision.



$$Z = (292 - 284) / (25 / \sqrt{50}) = 2.26$$

$$\text{p-value} = P(Z > 2.26) = 0.0119 < \alpha$$

Reject Ho

(f) (CONCLUSION) State your overall conclusion in language that is clear, relates to the original problem and is consistent with your decision.

The mean daily cost of meals and lodging for a family of four traveling in Florida is more than \$284