Hypothesis Test for Population Proportion

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Example 1:

A certain automobile manufacturer claims that at least 80% of its cars meet the tough new standards of the Environmental Protection Agency (EPA). Let p denote the proportion of the cars that meet the new EPA standards. The EPA tests a random sample of 400 cars from this manufacturer. Suppose that 308 of the 400 cars in our sample meet the new EPA standards. Perform an appropriate test at a 10% significance level.

Step 0: Check if the test is appropriate

Step 1: State the hypotheses

H_0: vs. H_1:

Other options: H_0: vs. H_1:

H_0: vs. H_1:

Step 2: Compute the test statistic

Step 3: Compute the p-value

Step 4: State the conclusion

p-value $\leq \alpha$: Reject H_0

p-value $> \alpha$: Fail to reject H_0

Since p-value =

Example 2:

Alex wants to test whether a coin is fair or not. Suppose he observes 477 heads in 900 tosses.

a) Perform the appropriate test using a 5% level of significance.

b) If the coin is actually loaded, did we make a mistake? If yes, what type of error did we make?