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Section 1C

8.2

Measurements are made on a sample, and generalization are made to a population

8.14

H0: p=0.33; 33% of cars sold are SUVs;

Ha: p<0.33; fewer than 33% of cars sold are SUVs

For the sample: 145/500 = 0.29

Z=-1.9022

8.28

A, since a change in proportion should be reflected as variations on both sides of the graph.

8.34

In figure A, the shaded area could be a p-value because it includes tail areas only. This is a left-tailed one-sided alternative hypothesis

It represents p-value for a one-sided Ha

In figure B, the shaded area could be a p-value because it includes tail areas only. This is a right-tailed one-sided alternative hypothesis

It represents p-value for a one-sided Ha

8.36

Step1:

H0: p=0.5

Ha: p>0.5

Step 2:

We use a one-proportion z-test and random sample with independent measurement.

We have a large sample size: n\*p0≈1001 >10, n\*(1-p0)≈1000 >10

The population needs to be greater than 10 times the sample size: satisfied

significance level=0.05

Step 3:

Sample proportion **p** = 0.62

SE = √(p0\*(1-p0)/n) = 0.0111

z-score = (0.62-0.5)/0.0111=10.736

Based on the z-table, the p-value is less than 0.0002, which is less than 0.05

Since p < 0.05, we can reject H0 that

8.38

Step1:

H0: p=0.5; Ha: p≠0.5, where p is the population proportion of plane crashes due in part to pilot error.

Step2: We adopt a one proportion z-test

np=0.5\*100=50>10; n(1-p)=0.5\*100=50>10; so we have large samples.

population size is 10 times greater than sample size, so we have a large population

Step3:

SE=√(0.5\*0.5/100)=0.05

Z=(0.62-0.5)/0.05=2.4, p-value=0.0082\*2=0.0164<0.05

Step4:

Therefore, we can reject H0 and choose ii

8.44

H0: p=0.5 and Ha: p≠0.5

A is the p-value corresponding to 16 heads while B corresponds to 18 heads. A p-value closer to 1 means H0 is more likely to be valid, which is represented by greater tail area as represented in A. In this case p=0.5 yields 15 heads, which is closer to 16.

8.50

The sample size is 5, and np=n(1-p)=2.5 which is smaller than 10

Since we don’t have a large enough sample size, her approach is invalid.

8.56

We cannot “accept” null hypothesis because we are never 100% sure that the null hypothesis is true. We don’t know whether H0 is true or not. We can just find evidence to reject it.

8.62

A larger sample size will decrease standard error, thus increasing the corresponding z value. As z-value increases, p decreases. To get a small p-value, you need a larger sample size.

8.68

55/230=0.239

42/174=0.241

Since 0.239<0.241, it is necessary to do a hypothesis test.

p=(55+42)/404=0.24

H0: p1=p2

Ha: p1<p2

SE=√(p\*(1-p)(1/n1+1/n2))=0.043

Z=(estimate-null value)/SE = (0.241-0.239)/0.043=-0.0483

Based on the z table, p-value is 1-0.5199≈0.48 for the two sides altogether, which is much greater than 0.05. So we fail to reject Ha and cannot conclude that counseling lowered the arrest rate.

8.72

1. Two-proportion z-test

One population is all men going to the supermarket; the other population is all women going to the supermarket

B.One proportion z-test

The population is all people taking the Oregon bar exam

8.86

It would not be appropriate to do such a test, because the data were the entire population of employed men and women. These are not samples, so inference is not reasonable.