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Section 1A

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HW #7

8.2) 1) sample

2) population

8.14) a) sample = $\frac{145 \text{ SUV}}{500 \text{ cars}} = 0.29 \times 100 = 29\%$.

H_0 $p = 0.33$

H_a $p < 0.33$

b) The test statistic z is -1.9022

8.24)

1) Sampling is Random

2) $0.3 * 2100 = 630$; thus there are at least 10 subjects on both success & failure since 630 & $(2100 - 630)$ are both greater than or equal to 10

3) The population size in silicon valley is 8 million people which is 10 times the sample size,

4) The observations are independent

8.28) $\frac{450}{500} \times 100 = 0.9$ or 90%, $0.88 \times 500 = 440$

$$z = \frac{\hat{p} - p_0}{SE} = \frac{\text{observed} - \text{null}}{SE} = \frac{0.9 - 0.88}{\sqrt{\frac{0.88(1-0.88)}{500}}} = \frac{.02}{0.0145} = 1.37$$

p value null hypothesis $= 0.88$

p value alternative hypothesis $\neq 0.88$

Since the wording is changed, this means that the alternative hypothesis can be greater than or less than the null hypothesis, meaning it should be graph A

8.34)

a) It can represent a p value of a one tailed alternative hypothesis since its shaded to the left of the vertical line, this is a left tailed one-sided alternative hypothesis.

b) It can represent a p value of a one sided alternative hypothesis since the area is shaded to the right of the vertical line, this is a right tailed one-sided hypothesis

8.36)

a) 1) Label Null & Alternate hypothesis

$H_0 = 0.5$

$H_a > 0.5$

2) Check conditions

Random sampling, more than 10 success & fails, Observations are independent & $1000.5 \quad 1000.5$

Sample size is at least 10 times smaller than population.

3) calculate z

$\frac{1241}{2001} = 0.62$

$$\frac{\text{observed} - \text{null}}{\sqrt{\frac{(1-\text{null})\text{null}}{n}}} = \frac{0.62 - 0.5}{\sqrt{\frac{0.5(0.5)}{2001}}} = 10.73 = z$$

p score based off z-table is less than 0.0002

Since p score < 0.05, we reject the null hypothesis that half the people favor the death penalty

b) Since we reject the null hypothesis since p score < 0.05, we reject the null hypothesis & thus, a ban on death penalty wouldn't pass as the alternative hypothesis suggests more than 50% of the population support the death penalty.

8.38)

a) $h_0 = 0.5$

$h_a \neq 0.5$

$$z\text{-score} = \frac{\text{obs} - \text{null}}{\text{std E}} = \frac{0.62 - 0.5}{\sqrt{\frac{0.5(0.5)}{100}}} = 2.4$$

P- score based on z table is 0.0164

Since .0164 or p-score < 0.05, we reject null hypothesis

b) Correct interpretation is ii

8.44) $H_0 = 0.5$

$H_a \neq 0.5$

A is the p-value corresponding to 16 heads while B is the p-value corresponding 18 heads as a higher p-value closer to 1 is one that is closer to the null hypothesis. Since 16 heads is closer to the null hypothesis of 15 heads, B is the p-value corresponding to 16 heads.

8.50) $H_0 = 0.5$

$H_a = 0.8$

The sample size isn't sufficently large for both success & fails.

$5 * 0.5 \leq 10$ & $5 * 0.5 \leq 10$ for both fails & success

8.56) No, we can only say that we don't reject the null hypothesis.

Also, the hypothesis test only assesses whether we can reject a null hypothesis

8.62) The larger sample size will decrease std error & thus increase z-statistic, which in turn decreases the P- value.

Thus, to get a smaller p-size, you need a larger sample size

8.68) $\frac{55}{230} = 0.239$ => Counseling $\frac{42}{174} = 0.241$ => probation

$\hat{p} = \frac{55+42}{404} = 0.24$

$H_0 = \hat{p}_1 = \hat{p}_2$

$H_a => \hat{p}_1 < \hat{p}_2$

$$\frac{\hat{p}_1 - \hat{p}_2}{\sqrt{\bar{p}(1-\bar{p})\left(\frac{1}{n_1}+\frac{1}{n_2}\right)}} = \frac{0.239 - 0.241}{\sqrt{0.24(0.76)\left(\frac{1}{230}+\frac{1}{174}\right)}} = -0.046$$

Based off z-table, p-value is 0.4840

Which is greater than 0.05 meaning we cannot conclude that counseling lowered the arrest rate.

8.72)

a) Two proportion z-test.
Men leaving Milwaukee with carts is population 1 &
women leaving Milwaukee with carts is population 2

b) A one proportion z-test is appropriate with graduates from Oregon University School of Law are considered as the population.

8.86) It is not appropriate to do a 2proportion z-test since we don't know the sample size. As of currently, we only have the population. The data represents the population