AP Statistics

2019-03-22 9.2 Assignment

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Pg. 562-565 41,43,45,47,49,51,53,55,57-60

Question 41

H[0]: p = 0.37

H[a]: p > 0.37

p̂ = 83/200 = 0.415

stddev[p̂] = sqrt(0.37(1-0.37)/200) = 0.0342

z = (0.415-0.37)/0.0342 = 1.32

P = P(z>1.32) = 0.0934

P > alpha as 0.0934 > 0.05. Therefore, there is not sufficient proof to reject the null hypothesis (and agree with the principal's claim).

Question 43

Part A

Type I: The null hypothesis is proven false when it is in fact true. This would cause for the satisfaction to seem to have been higher when in fact it remained the same. This would cause less improvements to be made when they are still needed.

Type II: This would show that the satisfaction did not rise when, in fact, it had risen. This would cause resources to be redirected away from the new solution when the new solution did work.

Part B

This means that there is a (1-P = 0.25) 0.25 probability that the null hypothesis will be rejected, given that the null hypothesis () is false and the alternative true.

Part C

Increase the sample size

Increase the significance level

Question 45

Part A

Firstborn only as only firstborn children were used for the sample.

Part B

H[0]: p = 0.50

H[a]: p ≠ 0.50

p̂ = 13173/25468 = 0.5172

stddev[p̂] = 0.003133

z = (0.5172-0.5)/0.003133 = 5.49

P = P(z > 5.49) = 0.0001

This P is less than the significance level (assuming 0.01) so we can reject the null hypothesis.

Question 47

The alternative hypothesis should compare against 0.75 as the null hypothesis does.

For the normalcy check, 558 should be multiplied by both p and (1-p), not against p̂, and both products compared to ten.

The fact that the sample was less than 10% of the population size should be stated.

The z-score calculation is backwards, it should be 0.797-0.75 (p̂ - p) on top. Additionally, the full sample size of 558 students should be used in calculating the z-score. The true z-score is 2.59

Therefore P = P(Z > 2.59) = 0.0048.

Question 49

H[0]: p = 0.6

H[a]: p ≠ 0.6

p̂ = 86/125 = 0.688

stddev[p̂] = sqrt(.6*.4/125) = 0.04382

z = (p̂ - p)/stddev[p̂] = 2.01

P = P(z > 2.01 ∪ z < -2.01) = 0.0444

P < alpha, therefore, we can disprove the null hypothesis and conclude that the DMV's claim is incorrect.

Question 51

Part A

z[0.025] = 1.96

ME = 1.96 * sqrt(0.688*(1-0.688)/125) = 1.96*0.04144 = 0.081

0.607 < p < 0.769

Part B

We are 95% confident that the true proportion of all teens who passed their driving test on their first attempt is between 0.607 and 0.769.

Question 53

No. The interval contains the value p = 0.20, indicating that 0.20 is a potential true population proportion.

Question 55

Part A

Proportion of all US teens aged 13-17 that thinks young people should wait until marriage for sex.

Part B

np = n(1-p) = 219.5, normal.

Random stated.

Independent, more than 4390 teenagers in the US.

Part C

There is a 0.011 probability that the sample proportion would be obtained while the null hypothesis (H[0]: p = 0.5) is true

Part D

Yes - the P value of 0.011 is much less than the confidence level of 0.05

Question 57: **C**

Question 58: **C**

Question 59: **D**

Question 60: **B**