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Exam 2

1

1. 0.3780661 = 37.8%
2. 12.91826
3. 0.2230021 = 22.3%

2

1. 8.08824 8.11176
2. The motor needs to be fixed given the following answers
3. H0:mu=8, Ha:mu!=8
4. Test Statistic: 16.66667, pValue: 2
5. We reject the null hypothesis as the pValue is far larger than 0.05
6. 89 spindles needed

3

a) This data suggests that the population mean under these conditions is greater than 100 given the following answers.

i) H0:mu=100, Ha:mu>100

ii) Test Statistic: 0.8162491, pValue: 0.2158

1. We reject the null hypothesis since it is greater than 0.05.

b) 98.24976 104.66691

4

a) The two groups do not show the same mean IQ given the following answers.

i) H0: mu1=mu2, Ha: mu1!=mu2

ii) Test Statistic: 1.6439, pValue: 0.1057

iii) Since the pValue is greater than 0.05, we reject the null hypothesis.

b) 1.081361 9.156113

CODE:

# 1

# Assign xbar and sigma

xbar=8

sigma=3

# a)

# Find probability that value is 6<x<9

pnorm(9,8,3)-pnorm(6,8,3)

# b)

# Generate sample data with significant number of values

sample=rnorm(10000000,8,3)

# Find .95 percentile of sample data

quantile(sample,.95)

# c)

# Create sample data with 20 values

srs=rnorm(20,8,3)

# Calculate Z value

z=((mean(srs)-8)/(sigma/sqrt(20)))

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# 2

# Assign standard values

mu0=8

sigma=0.024

n=16

xbar=8.10

# a)

# Perform T Test for CI=95%

zstar.95=qnorm(.95+(1-.95)/2) #critical value

moe.95=zstar.95\*sigma/sqrt(n) #margin of error

CI.95=c(xbar-moe.95,xbar+moe.95)

CI.95

# b)

# Calculate Test Statistic and pValue

z=(xbar-mu0)/(sigma/sqrt(n))

pvalue=2\*pnorm(z)

pvalue

# c)

# Calculate number of samples needed to fit moe=0.005

zstar.95=qnorm(0.95+(1-0.95)/2)

((zstar.95\*sigma)/0.005)^2

#---------------------------------

# 3

# Create array

data=c(108.6,93.9,94.2,99.9,99.5,94.3,103.1,108.0,102.6,110.7,107.3,95.4)

n=length(data)

# a)

# Assign values for basic computation

xbar=mean(data)

mu0=100

sigma=sd(data)

# Calculate Test Statistic

z=(xbar-mu0)/(sigma/sqrt(n))

# T Test given no CI, testing Alt hypothesis

t.test(data,mu=100,alternative="greater")# verify values

# b)

# T Test given CI=90%

t.test(data,mu=100,conf.level=0.9)

#---------------------------------

# 4

# a)

# Import CSV, check headers, and attach

data4=read.csv("seventhgrade.csv")

names(data4)

attach(data4)

# Gender 1=male 2=female

# Assign IQ values for each group to separate arrays

male=c(IQ[Gender==1])

female=c(IQ[Gender==2])

# T Test given no CI

t.test(female,male)

# b)

# T Test given CI=80%

t.test(female,male,conf.level=0.8)

# Detach dataset

detach(data4)