MSIT 431: PROBABILITY AND STATISTICAL METHODS

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Ques 1. Textbook Exercise 6.19

Solution 1. Mean=13.2

Standard deviation = 6.5

For 95 % confidence interval, Z=1.96

$M=(Z^* \sigma)/(n)^{1/2}$

Margin of error$= (1.96*6.5)/(31)^{1/2}$

=2.29

Confidence Interval=(10.91,15.49)

Ques 2. Textbook Exercise 6.33

Solution 2. For 95 % confidence interval, Z=1.96

Standard deviation = 6.5

Margin of error=1.5

$N=(z^* \sigma /m)^2$

N=72.10

Ques 3. Textbook Exercise 6.54

Solution 3. (a) We want to know if the percent of students who owned a phone has increased.

$H_{0=}$ Percent of students who owned a phone is 96%

$H_{A=}$ Percent of students who owned a phone has increased from 96%.

H_A is one sided alternative

(b) We want to know if the percent of students who attend early morning session will have higher mean score than the class.

$H_{0=}$ Mean score of sample is 75

$H_{A=}$ Mean score of sample is greater than 75

H_A is one sided alternative

(b) We want to know whether students found the change in newspaper as an improvement.

$H_{0=}$ New format is same as old

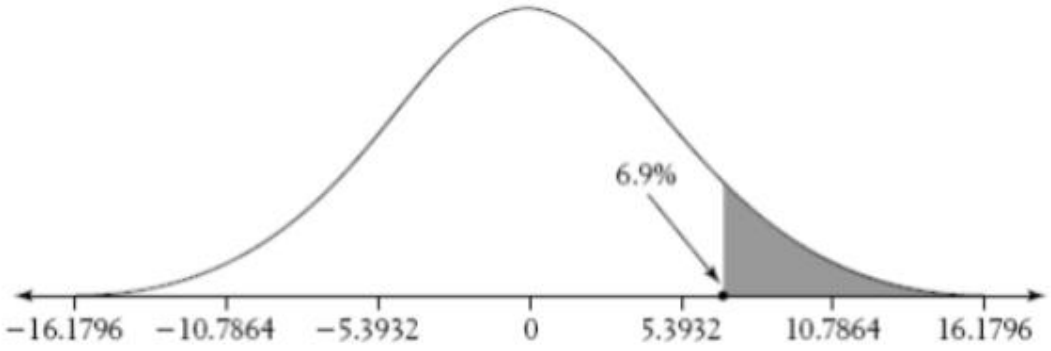
$H_{A=}$ New format is worse or better than old.

H_A is two- sided alternative

Ques 4. Textbook Exercise 6.137

Solution 4.

a)



(b)$z=(x-u)/ (\sigma /(n)^{1/2})$

$Z=(6.9-0)/(55/(104)^{1/2})$

Z=1.28

So P Value= P(Z>1.279)

=0.1003

(c) 10.03> 5% hence it is not significant. Also since 10.03 is a large percentage, hypotheses H_a does not give strong evidence that the mean compensation of all CEOs went up.

Ques 5. Textbook Exercise 6.141

Solution 5. For 95% confidence interval, Z=1.96

Margin of error=$(1.96*5)*(15)^{1/2}$

Margin of error=2.53

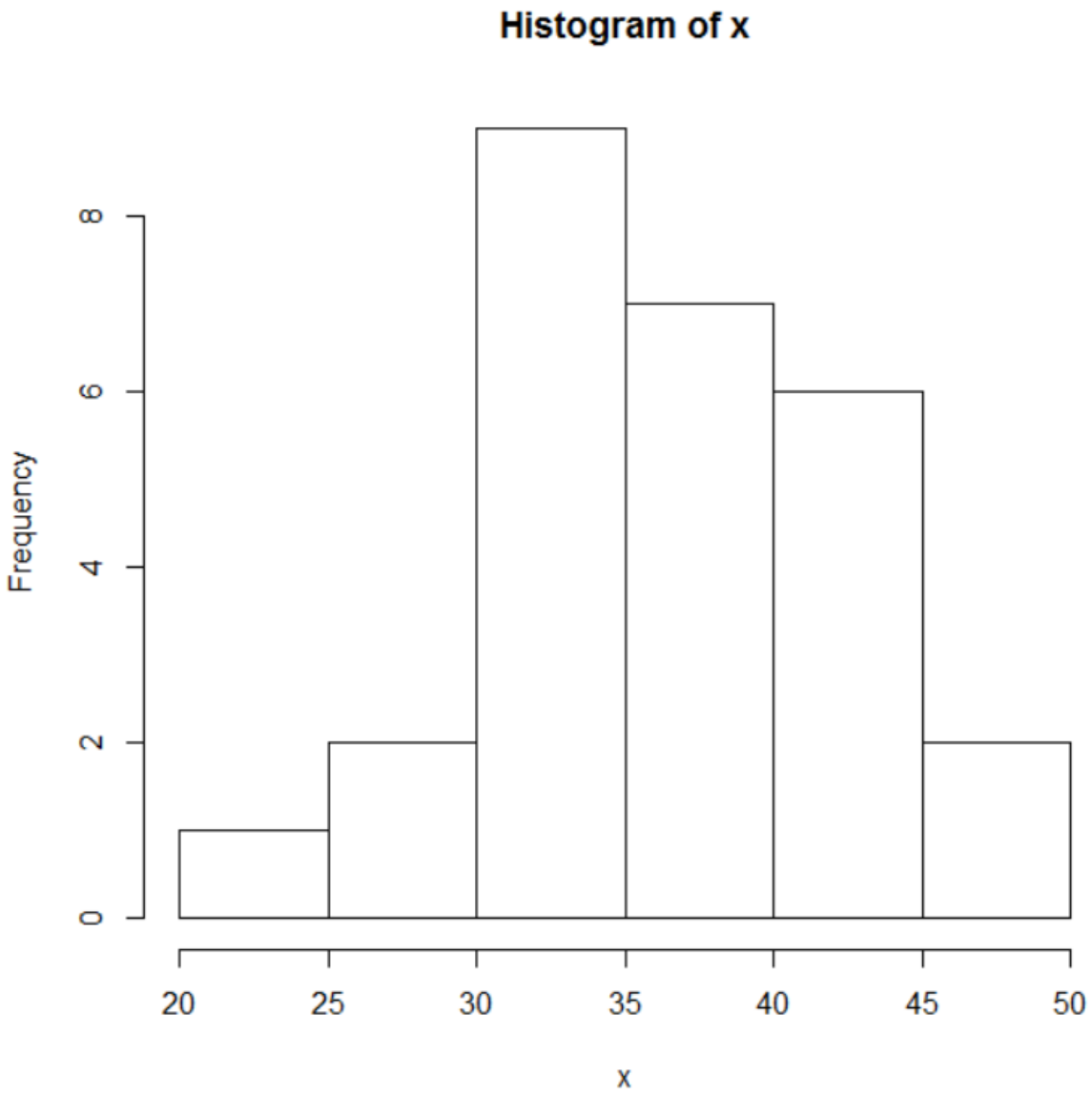
So the confidence interval is (17.47,22.53)

(b) If we repeat the process 100 times, =20 is included in the confidence interval the following times Count 94 times.

Ques 6. Textbook Exercise 7.27

Solution 6.

(a)



Since the plot is normally distributed, we can use t method to compute 95% confidence interval.

(b) Mean from R is =36.157

Sd=6.58

Margin of error = $(Z^* \boldsymbol{\sigma})/(n)^{1/2}$

=2.48

(c) Confidence Interval =36.157+-2.48

(33.677,38.63)

(d) These data cannot be used to assess the claim as confidence interval can only apply to mean not median.

Ques 7. Textbook Exercise 7.40

Solution (a) Difference between other garage and Jocko's estimate : 160 250 0 100 -50 -55 150 220 125 240

mean=114

sd=114.4018

(b) z=(114-0)/(114.4018/3.16)

=3.14

Since Ha is a one-sided alternative, so P-value=P(Z>3.1512) =0.0008

First, 0.08%<5%, so the result is significant. Second, 0.08% is very small, this means there is strong evidence in favor of Ha, which is strong evidence that the estimates they receive from Jocko's Garage is unreasonably high.

(c) For 95% confidence interval, z=1.96

Margin of error ,m=z* σ $(n)^{1/2}$

$=1.96*114.4018/(10)^{1/2}$

=70.95

So, the confidence interval is 114 ± 70.95

(d) Since the confidence interval is 43.05~184.95, the insurance company should seek repayment between 73090~214910. I think 114000 is a pretty reasonable number for them to seek.