MAT5007 – Applied Statistical Methods

Embedded Lab – R Statistical Software

FALL SEMESTER – 2022~2023 L25+L26 SLOT

E-RECORD

Assignment No.: 5

Submitted By

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MCA– I Year

SITE

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Date: 25/12/2022

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Experiment 1:

Experience has shown that 20% of a manufactured product is of top quality. In one day's production of 400 articles, only 50 are of top quality. Write down the R programming code to test whether the production of the day chosen is a representative sample at 95% confidence level.

```
> p = 50 / 400
> p0 = 0.2
> q0 = 1 - p0
> n = 400
> z = (p - p0) / sqrt((p0 * q0) / n)
> z
> zalpha = qnorm(p=.05/2, lower.tail=FALSE)
> zalpha
> abs(z) < abs(zalpha)
```

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```
> p = 50 / 400
>
> p0 = 0.2
>
> q0 = 1 - p0
>
> n = 400
>
> z = (p - p0) / sqrt((p0 * q0) / n)
>
> z
[1] -3.75
>
> zalpha = qnorm(p=.05/2, lower.tail=FALSE)
>
> zalpha
[1] 1.959964
>
> abs(z) < abs(zalpha)
[1] FALSE
```

Interpretation: Here since the |z| > |zalpha| we reject the null hypothesis (production of the day chosen is a representative sample) and accept the alternative hypothesis i.e. production of the day chosen is not a representative sample at 95% confidence level.

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Experiment 2:

A sample of 900 items is found to have a mean of 3.47 cm. Write down the R programming code to test whether it can be reasonably regarded as a simple sample from a population with mean 3.23 cm and SD 2.31 cm at 99% level of confidence.

```
> n = 900
> sd = 2.31
> xbar = 3.47
> mu = 3.23
> z = (xbar - mu) / (sd / sqrt(n))
> z
> zalpha = qnorm(p=.01/2, lower.tail=FALSE)
> zalpha
> abs(z) < abs(zalpha)
```

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```
> n = 900
>
> sd = 2.31
>
> xbar = 3.47
>
> mu = 3.23
>
> z = (xbar - mu) / (sd / sqrt(n))
>
> z
[1] 3.116883
>
> zalpha = qnorm(p=.01/2, lower.tail=FALSE)
>
> zalpha
[1] 2.575829
>
> abs(z) < abs(zalpha)
[1] FALSE
```

Interpretation: Here since the |z| > |zalpha| we reject the null hypothesis (sample is from the given population) and accept the alternative hypothesis i.e. sample is not from the given population at 99% confidence level.

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