

# MAT5007 – Applied Statistical Methods

## Embedded Lab – *R* Statistical Software

FALL SEMESTER –  
20222023L25+L26  
SLOT

### E-RECORD

**Experiment No.: 5**

Submitted By

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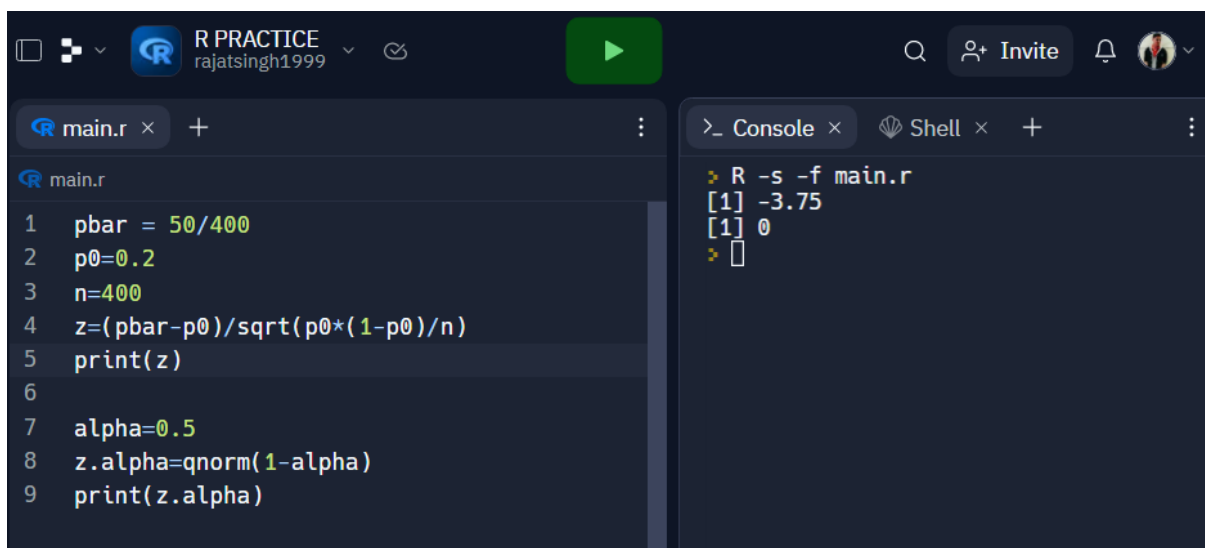
MCA-I Year  
SITE



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**Note: The codes are done in “repl it” environment because I was facing errors in Rstudio due to my laptop data being corrupted. Thank You for the considerations.**

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.



The screenshot shows an R REPL environment with a dark theme. The top bar displays 'R PRACTICE' and the username 'rajatsingh1999'. The left pane shows the script 'main.r' with the following code:

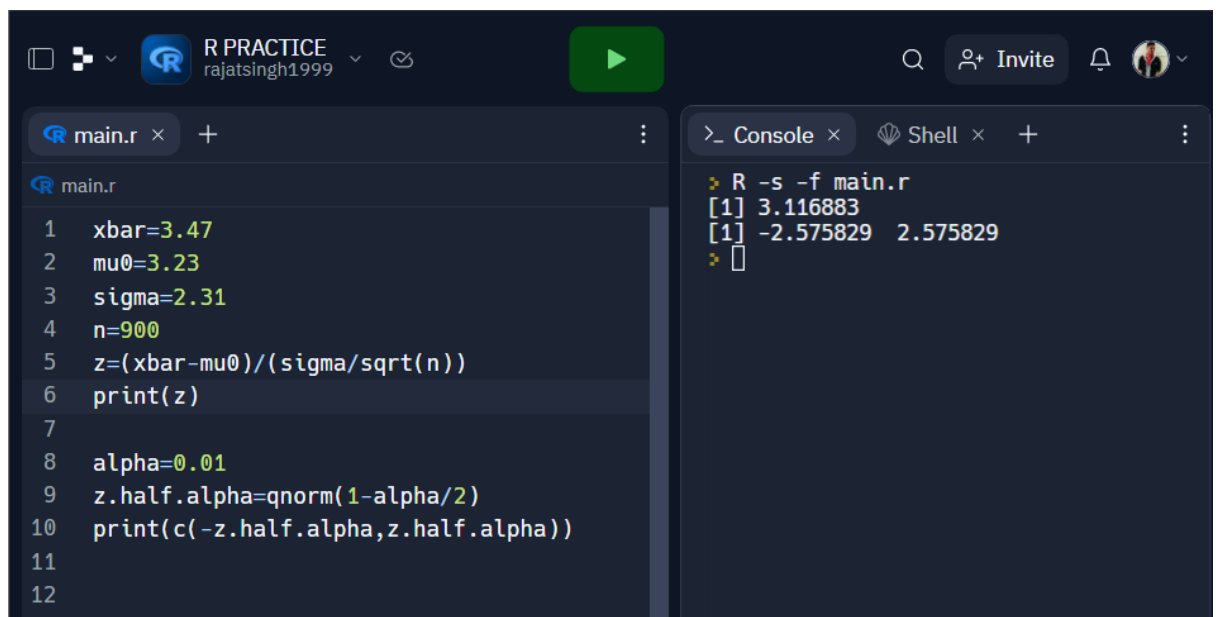
```
1 pbar = 50/400
2 p0=0.2
3 n=400
4 z=(pbar-p0)/sqrt(p0*(1-p0)/n)
5 print(z)
6
7 alpha=0.5
8 z.alpha=qnorm(1-alpha)
9 print(z.alpha)
```

The right pane shows the console output for the command 'R -s -f main.r':

```
> R -s -f main.r
[1] -3.75
[1] 0
>
```

The test statistic -3.75 is not greater than the critical value of 1.644854. Hence, at 0.05 significance level, we fail to reject the null hypothesis that 20% of the manufactured product is of top quality.

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.



```
main.r x +
main.r
1 xbar=3.47
2 mu0=3.23
3 sigma=2.31
4 n=900
5 z=(xbar-mu0)/(sigma/sqrt(n))
6 print(z)
7
8 alpha=0.01
9 z.half.alpha=qnorm(1-alpha/2)
10 print(c(-z.half.alpha,z.half.alpha))
11
12
```

```
> R -s -f main.r
[1] 3.116883
[1] -2.575829 2.575829
>
```

The test statistic 3.116883 does not lie between the critical values -2.575829 and 2.575829. Hence, at 0.01 significance level, we succeed in rejecting the null hypothesis that it cannot be reasonably regarded as a simple sample from a population with mean 3.23 cm and SD 2.31 cm