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REG NO – 20BRS1262

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MATHS STATS LAB – 8

OUTPUTS

Q1

```
> # Check whether two groups have the same  mean
> x<-c(91,87,99,77,88,91)# Using t.test
> y<-c(101,110,103,93,99,102)
> r=t.test(x,y,alternative="less",var.equal=TRUE)
> r

        Two Sample t-test

data:  x and y
t = -3.3806, df = 10, p-value = 0.003498
alternative hypothesis: true difference in means is less than 0
95 percent confidence interval:
     -Inf -5.79825
sample estimates:
mean of x mean of y
 88.83333 101.33333

> r$p.value
[1] 0.003497925
> if(r$p.value<0.05){print("Hypothesis rejected")}else{print("Hypothesis accepted")}
[1] "Hypothesis rejected"
> # if p<0.05 we reject the null hypothesis decided that mean of x and y are not equal
>
```

Q2

```
~/
> #F test
> # Compare two variances of normally distribution groups
> # Determine whether the variances are equal
> x<-rnorm(25,mean=0)
> y<-rnorm(25,mean=1)
> r1=var.test(x,y)
> r1

        F test to compare two variances

data:  x and y
F = 1.6617, num df = 24, denom df = 24, p-value = 0.2207
alternative hypothesis: true ratio of variances is not equal to 1
95 percent confidence interval:
 0.7322482 3.7707995
sample estimates:
ratio of variances
          1.661674

> r1$p.value
[1] 0.2207347
> if(r1$p.value<0.05){print("Hypothesis rejected")}else{print("Hypothesis accepted")}
[1] "Hypothesis accepted"
>
```

Q3

Console | Terminal | Jobs

```
~/
> #Suppose that 10 volunteers have taken an intelligence test;
> #here are the results obtained. The average score of the
> #entire population is 75 in the same test.
> #Is there any significant difference (with a significance level of 95%)
> #between the sample and population means, assuming that the variance of
> #the population is not known.
> #Scores: 65, 78, 88, 55, 48, 95, 66, 57, 79, 81
>
> x=c(65, 78, 88, 55, 48, 95, 66, 57, 79, 81)
> xbar=mean(x)
> sd=sqrt(var(x))
> mu=75
> alpha=0.05
> n=length(x)
> t=abs(xbar-mu)/(sd/sqrt(n-1))
> t
[1] 0.7428466
> ta=qt(1-(alpha/2), n-1)
> if(t<ta){print("Hypothesis accepted")}else{print("Hypothesis rejected")}
[1] "Hypothesis accepted"
>
```

Q4

```
Console  Terminal  Jobs
~/
> #problem 4: Comparing two independent sample means,
> #taken from two populations with unknown variance.
> #The following data shows the heights of individuals
> #of two different countries with unknown population
> #variances. Is there any significant
> #difference b/n the average heights of two groups.
> #x1=c(175,168,168,190,156,181,182,175,174,179)
> #x2=c(185,169,173,173,188,186,175,174,179,180)
>
> # Use t.test
>
> x1=c(175,168,168,190,156,181,182,175,174,179)
> x2=c(185,169,173,173,188,186,175,174,179,180)
> r2=t.test(x1,x2,alternative="less",var.equal=TRUE)
> r2

        Two Sample t-test

data:  x1 and x2
t = -0.94737, df = 18, p-value = 0.178
alternative hypothesis: true difference in means is less than 0
95 percent confidence interval:
     -Inf 2.823332
sample estimates:
mean of x mean of y
    174.8     178.2

> r2$p.value
[1] 0.1779974
> if(r2$p.value<0.05){print("Hypothesis rejected")}else{print("Hypothesis accepted")}
[1] "Hypothesis accepted"
>
```

Q5

```
~/
> #problem 5: Five Measurements of the output of two units
> #have given the following results (in kilograms of material per one hour of operation)
> #.Assume that both samples have been obtained from normal populations,
> #test at 10% significance level if two populations have the same variance.
> #A=c(14.1,10.1,14.7,13.7,14.0)
> # B=c(14.0,14.5,13.7,12.7,14.1)
>
> A=c(14.1,10.1,14.7,13.7,14.0)
> B=c(14.0,14.5,13.7,12.7,14.1)
> R=var.test(A,B,conf.level=0.9)
> R

        F test to compare two variances

data:  A and B
F = 7.3304, num df = 4, denom df = 4, p-value = 0.07954
alternative hypothesis: true ratio of variances is not equal to 1
90 percent confidence interval:
  1.14749 46.82852
sample estimates:
ratio of variances
          7.330435

> R$p.value
[1] 0.07954092
> if(R$p.value<0.05){print("Hypothesis rejected")}else{print("Hypothesis accepted")}
[1] "Hypothesis accepted"
>
```