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Problem Set -8

Q.1) An outbreak of salmonella-related illness was attributed to ice produced at certain factory. Scientists measured the level of salmonella in 9 randomly sampled batches ice cream. The levels (in MPN/g) were:0.593,0.142,0.3290,691,0.231,0.793,0.519,0.392,0.418Is there evidence that the mean level of salmonella in ice cream greater than 0.3 MPN/g.

Ans > x = c(0.593, 0.142, 0.329, 0.691, 0.231, 0.793, 0.519, 0.392, 0.418)

> t.test(x, alternative="greater", mu=0.3)

```
        One Sample t-test

data:  x
t = 2.2051, df = 8, p-value = 0.02927
alternative hypothesis: true mean is greater than 0.3
95 percent confidence interval:
 0.3245133       Inf
sample estimates:
mean of x
0.4564444
```

```
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        One Sample t-test

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 0.3245133       Inf
sample estimates:
mean of x
0.4564444
```

Q.2) 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 entire 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.

Ans a = c(65, 78, 88, 55, 48, 95, 66, 57, 79, 81)

```
> t.test (a, mu=75)

        One Sample t-test

data:  a
t = -0.78303, df = 9, p-value = 0.4537
alternative hypothesis: true mean is not equal to 75
95 percent confidence interval:
 60.22187 82.17813
sample estimates:
mean of x
     71.2
```

> qt(0.975, 9)

[1] 2.262157

```
> a = c(65, 78, 88, 55, 48, 95, 66, 57, 79, 81)
> t.test (a, mu=75)

        One Sample t-test

data:  a
t = -0.78303, df = 9, p-value = 0.4537
alternative hypothesis: true mean is not equal to 75
95 percent confidence interval:
 60.22187 82.17813
sample estimates:
mean of x
     71.2

> qt(0.975, 9)
[1] 2.262157
>
```

Q.3) Comparing two independent sample means, taken from two population with unknown variance. The following data shows the heights of the individuals of two different countries with unknown population variances. Is there any significant difference between the average heights of the two groups?

A: 175, 168, 168, 190, 156, 181, 182, 175, 174, 179

B: 185, 169, 173, 173, 188, 186, 175, 174, 179, 180

Ans> a = c(175, 168, 168, 190, 156, 181, 182, 175, 174, 179)

> b = c(185, 169, 173, 173, 188, 186, 175, 174, 179, 180)

> t.test(a,b, var.equal=TRUE, paired=FALSE)

Two Sample t-test

data: a and b

t = -0.94737, df = 18, p-value = 0.356

alternative hypothesis: true difference in means is not equal to 0

95 percent confidence interval:

-10.93994   4.13994

sample estimates:

mean of x mean of y

174.8   178.2

> qt(0.975, 18)

[1] 2.100922

```
> a = c(175, 168, 168, 190, 156, 181, 182, 175, 174, 179)
> b = c(185, 169, 173, 173, 188, 186, 175, 174, 179, 180)
> t.test(a,b, var.equal=TRUE, paired=FALSE)

        Two Sample t-test

data:  a and b
t = -0.94737, df = 18, p-value = 0.356
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -10.93994   4.13994
sample estimates:
mean of x mean of y
    174.8     178.2

> qt(0.975, 18)
[1] 2.100922
> 
```