5) Photoresist is a light-sensitive material applied to semiconductor wafers so that the circuit pattern can be imaged on to the wafer. After application, the coated wafers are baked to remove the solvent in the photoresist mixture and to harden the resist. Here are measurements of photoresist thickness (in kÅ) for eight wafers baked at two different temperatures. Assume that all of the 16 runs were made in random order. Note: a wafer cannot be baked twice.

| 95 ºC | 100 ºC |
|---|---|
| 11.176 | 5.623 |
| 7.089 | 6.748 |
| 8.097 | 7.461 |
| 11.739 | 7.015 |
| 11.291 | 8.133 |
| 10.759 | 7.418 |
| 6.467 | 3.772 |
| 8.315 | 8.963 |

(a) Is there evidence to support the claim that the higher baking temperature results in wafers with a lower mean photoresist thickness? Use $\alpha = 0.05$ and justify your answer.
(b) Find a 95% confidence interval on the difference in means. Provide a practical interpretation of this interval.

```
#5)(a)
#let u1  the mean of thickness at 95 degree and u2 the mean of thickness at 100 degree
# Ho:u1 = u2 Ha = u1 > u2
lower_temp <- c(11.176,7.089,8.097,11.739,11.291,10.759,6.467,8.315)
higher_temp <- c(5.623,6.748,7.461,7.015,8.133,7.418,3.772,8.963)

t_test = t.test(lower_temp, higher_temp, alternative = "greater", paired = FALSE, var.equal
       = TRUE,conf.level = 0.95)

t_test
```

```
##
##  Two Sample t-test
##
## data:  lower_temp and higher_temp
## t = 2.6549, df = 14, p-value = 0.009424
## alternative hypothesis: true difference in means is greater than 0
## 95 percent confidence interval:
##  0.8330468       Inf
## sample estimates:
## mean of x mean of y
##  9.366625  6.891625
```

```
#From the table above we know that since p-value = 0.009424 which is much smaller
#than 0.05, we reject Ho. There is an significant evidence that higher baking
#temperature result in wafers with a lower mean photoresist thickness.

#(b)
t_test$conf.int
```

```
## [1] 0.8330468       Inf
## attr(,"conf.level")
## [1] 0.95
```

```
#I got the confidence (0.8330468,Inf)
#
```

This means, since the 95% CI doesn't include 0, It suggests an significant difference; the actual values of the interval provide a range for the difference in mean thickness.