

STA 135 HW 3

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6.5

a)

```
#xbar = matrix(c(46.1, 57.3, 50.4), nrow = 1)
#stddev = matrix(c(101.3, 63.0, 71, 63, 80.2, 55.6, 71, 55.6, 97.4), nrow = 3)
(sqrt(1686678.779))/14
```

```
## [1] 92.76586
```

Well, by a matrix calculator, the solution is above. this should be rejecting the null hypothesis.

b)

6.6

a)

```
# sum for treatment 2
t21 = c(3, 1, 2)
t22 = c(3, 6, 3)
t2 = data.frame(t21, t22)
t2m = colMeans(t2)
covt2 = cov(t2)
covt2
```

```
##      t21  t22
## t21  1.0 -1.5
## t22 -1.5  3.0
```

```
# sum for treatment 3
t31 = c(2, 5, 3, 2)
t32 = c(3, 1, 1, 3)
t3 = data.frame(t31, t32)
t3m = colMeans(t3)
```

```

covt3 = cov(t3)

# denominator
n1 = length(t2$t21)
n2 = length(t3$t31)
denom = n1 + n2 - 2

# S pooled
spooled1 = (((n1 - 1)/denom)*(covt2)) + (((n2-1)/denom)*(covt3))
spooled1

```

```

##      t21  t22
## t21  1.6 -1.4
## t22 -1.4  2.0

```

```

cat("S-pooled: ", spooled1[1,1] + spooled1[2,2])

```

```

## S-pooled:  3.6

```

b)

```

# This is the T2 value
tmat = (t2m - t3m)
T2 = (t2m - t3m) * (((1/n1)+(1/n2))*matrix(solve(spooled1), nrow = 2))
tmat

```

```

## t21 t22
##  -1   2

```

```

T2

```

```

##           [,1]      [,2]
## [1,] -0.9408602 -0.6586022
## [2,]  1.3172043  1.5053763

```

```

(T2[1, 1] * tmat[1]) + (T2[1, 2] * tmat[2]) + (T2[2, 1] * tmat[1]) + (T2[2, 2] * tmat[2])

```

```

##      t21
## 1.317204

```

```

p = 2
mult = ((n1+n2 - 2)*p)/(n1 + n2 - p - 1)
T2crit = mult * qf(0.99, p, n1 + n2 - p - 1)
T2crit

```

```

## [1] 45

```

Fail to reject Ho.

c)

```
for(i in c(1:2)) {  
  upper = t2m[i] - t3m[i] + (sqrt(T2crit) * sqrt(((1/n1)+(1/n2))*(spooled1[i,i])))  
  lower = t2m[i] - t3m[i] - (sqrt(T2crit) * sqrt(((1/n1)+(1/n2))*(spooled1[i,i])))  
  cat('i =',i, ':', lower, upper, '\n')  
}
```

```
## i = 1 : -7.480741 5.480741  
## i = 2 : -5.245688 9.245688
```