

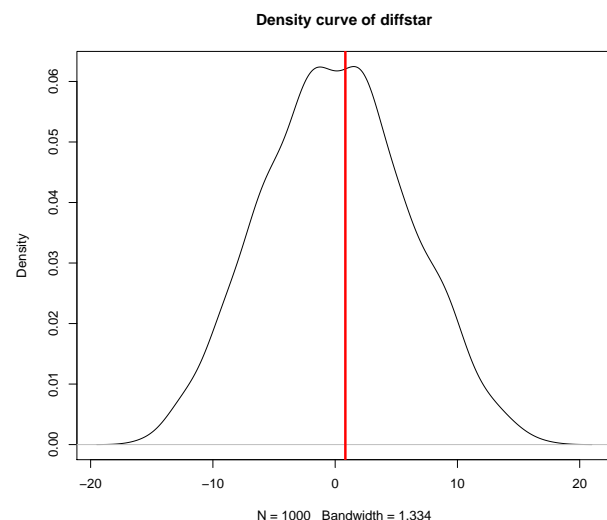
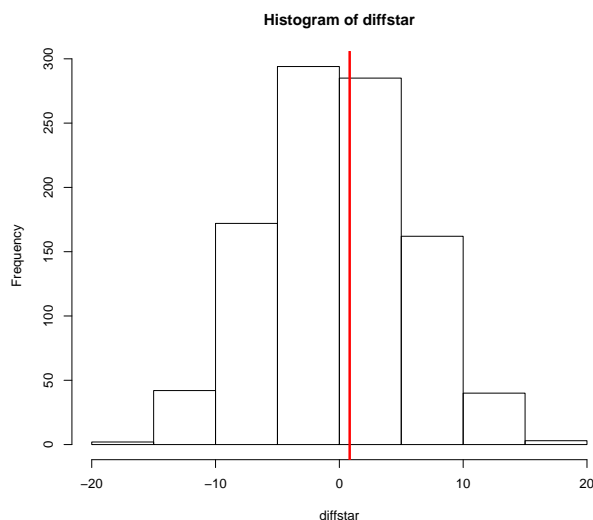
STAT 217: Two Sample Permutation Tests 10-14

1. Suppose 24 first graders need to be given physical health examinations. Two school nurses conduct the exams. Each first grader is given a “health score” from 0 to 100. The director of the school is worried that the health scores given by Nurse 1 are generally greater than the health scores given by Nurse 2. Each nurse is randomly assigned 12 first graders. Help them compare the health scores given by Nurse 1 to the health scores given by Nurse 2.

```
require(mosaic)
diffobs <- diffmean(scores~nurse, data=scores)
diffobs

## diffmean
## 0.8333333
```

```
require(mosaic)
B <- 1000
diffstar <- matrix(NA, nrow=B)
for(b in 1:B){
  diffstar[b] <- diffmean(scores~shuffle(nurse), data=scores)
}
par(mfrow=c(1,2))
hist(diffstar)
abline(v=diffobs, col="red", lwd=3)
plot(density(diffstar), main="Density curve of diffstar")
abline(v=diffobs, col="red", lwd=3)
```



- (a) Explain what diffobs is.

- (b) Below the first five rows of the `diffstar` matrix is shown. Explain how each value in this matrix is generated.

```
##           [,1]
## [1,]  -3.000000
## [2,]   2.166667
## [3,]   5.000000
## [4,]   6.333333
## [5,]   5.000000
## [6,] -12.833333
```

- (c) What is the purpose of the `shuffle` function?
- (d) What is the purpose of the `for` loop?
- (e) What does the “Histogram of `diffstar`” represent?
- (f) How will you find the p-value? Explain in detail.
- (g) Find another group who is also finished and has a worksheet titled “One Way Anovas Permutation Test”. Explain the steps of your permutation test to them, and have them explain the steps of their permutation test to you.