

STATS 3N03/3J04
ASSIGNMENT #4 – Part A – SOLUTIONS
2006-11-13

Question 1 [10]

Figure 8-4

```
> xgr <- seq(-4,4,length=50)
> plot(xgr, dnorm(xgr), type = "l", lty = 1, xlab = "x", ylab = "f(x)")
> lines(xgr,dt(xgr,10),lty=2)
> lines(xgr,dt(xgr,1),lty=3)
> legend(1.8,.38,c("infinite df","10 df","1 df"),lty=1:3)
> title("t density")
```

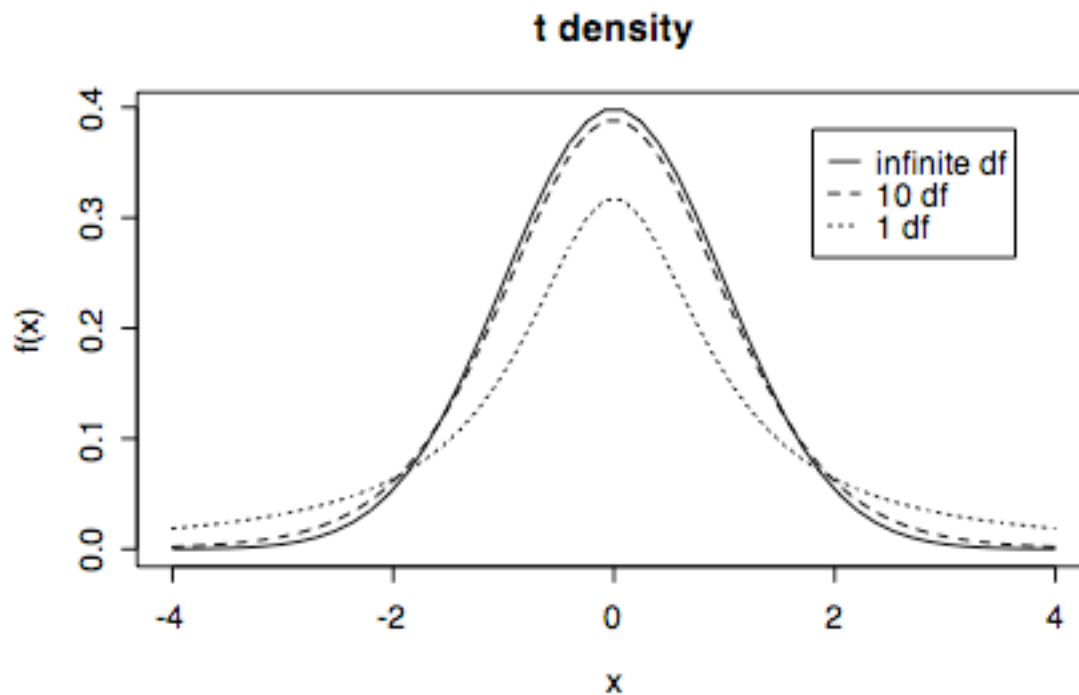


Figure 8-8

```
> xgr <- seq(0,30,length=50)
> plot(xgr, dchisq(xgr, 2), type = "l", lty = 1, xlab = "x", ylab = "f(x)")
> lines(xgr,dchisq(xgr,5),lty=2)
> lines(xgr,dchisq(xgr,10),lty=3)
> legend(15,.4,c("2 df","5 df","10 df"),lty=1:3)
> title("Chi-square density")
```

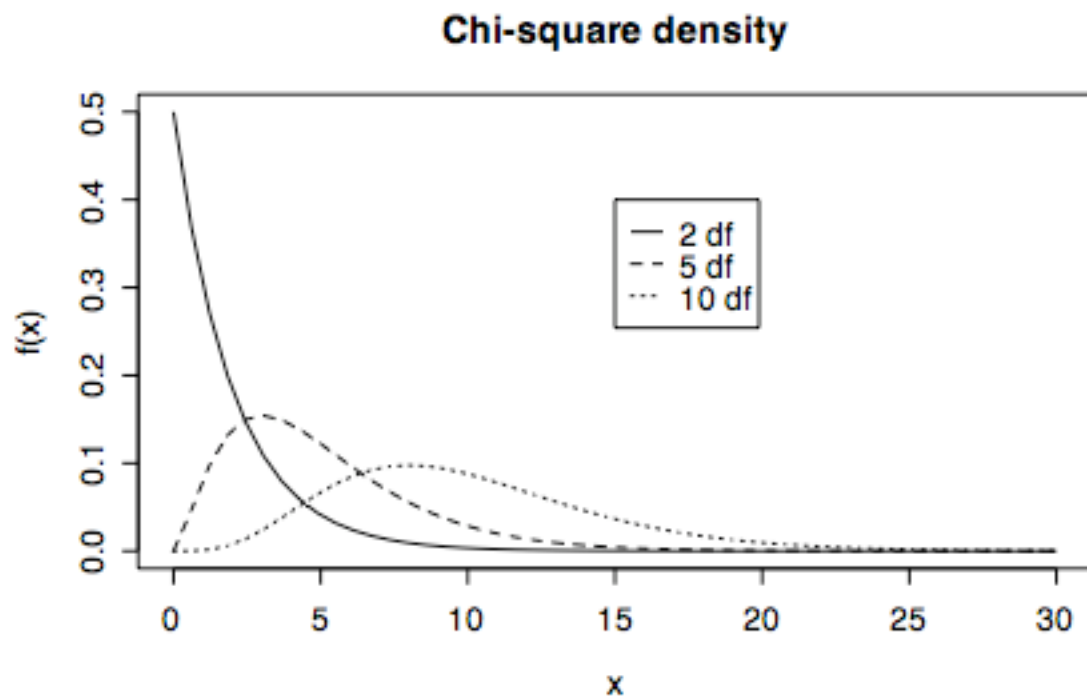
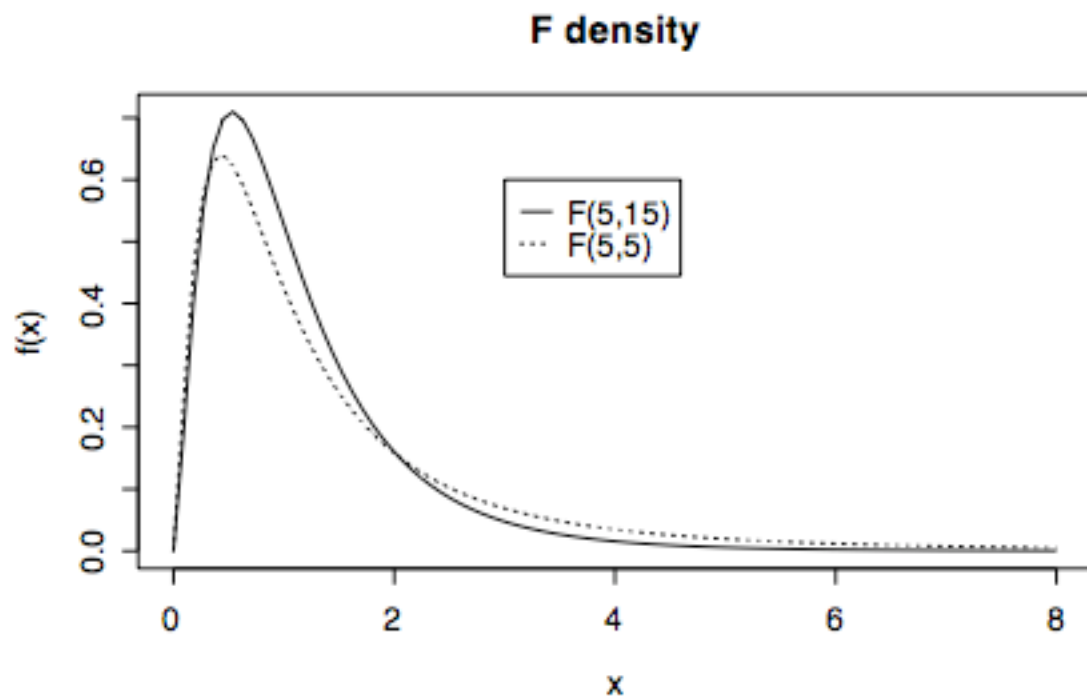


Figure 10-4

```
> xgr <- seq(0,8,length=90)
> plot(xgr, df(xgr,5,15), type = "l", lty = 1, xlab = "x", ylab = "f(x)")
> lines(xgr,df(xgr,5,5),lty=3)
> legend(3,.6,c("F(5,15)","F(5,5)"),lty=c(1,3))
> title("F density")
```



Question 2 [10]

When $n = 4$, the coverage is much less than 95%, closer to 88%. Even with $n = 100$ the coverage is a bit less than 95%. It would be safe to say that $n = 200$ is enough. I wrote a function so I wouldn't have to keep re-entering the code to try more examples.

```
> expconf
function (n, mu, nint = 1000)
{
  expdata <- matrix(rexp(nint * n, 1/mu), ncol = n)
  xbar <- apply(expdata, 1, mean)
  sx <- apply(expdata, 1, sd)
  llim <- xbar - qt(0.975, n - 1) * sx/sqrt(n)
  ulim <- xbar + qt(0.975, n - 1) * sx/sqrt(n)
  mean(mu > llim & mu < ulim)
}
> expconf(4, 10)
[1] 0.886
> expconf(4, 10)
[1] 0.882
> expconf(20, 10)
[1] 0.915
> expconf(20, 10)
[1] 0.912
> expconf(40, 10)
[1] 0.92
> expconf(40, 10)
[1] 0.929
> expconf(100, 10)
[1] 0.938
> expconf(100, 10)
[1] 0.942
> expconf(200, 10)
[1] 0.952
> expconf(200, 10)
[1] 0.945
```