

```
# Operations on vectors
```

```
c(3,5)  
y <- c(3,5)  
a <- c(y,7)  
b <- c(2:4)  
c <- a-b
```

```
# Matrices (note: dataframes behave similarly in most cases, but not all)
```

```
mat1 <- cbind(a,b,c)  
mat2 <- rbind(a,b,c)
```

```
mat1[1,3]  
mat1[1,]  
mat1[,1]
```

```
# T-tests on randomly generated data
```

```
set.seed(50)
```

```
unicorn <- rnorm(40,10,5)  
dragon <- rnorm(40,15,5)
```

```
hist(unicorn)  
hist(dragon)
```

```
mean(unicorn)  
sd(unicorn)
```

```
t.test(unicorn)  
t.test(unicorn,mu=15)  
t.test(x=unicorn,y=dragon,var.equal=T)  
t.test(x=dragon,y=unicorn,var.equal=T)
```

```
result <- t.test(unicorn,dragon,var.equal=T)  
result$p.value
```

```
# Doing simple analyses with real data
```

```
setwd("~/Desktop/")  
dat <- read.csv("Session5_data.csv")  
head(dat)
```

```
dim(dat)  
table(dat$Employed,useNA="ifany")
```

```
dat$TooFast  
mean(dat$TooFast)  
mean(na.omit(dat$TooFast))
```

```
datUnemployed <- subset(dat,Employed==0)  
datFullTime <- subset(dat,Employed==2)
```

```
TFUnemployed <- na.omit(datUnemployed$TooFast)  
TFFullTime <- na.omit(datFullTime$TooFast)
```

```
mean(TFUnemployed)  
mean(TFFullTime)
```

```
t.test(TFUnemployed,TFFullTime,var.equal=T)
```

```
# Basics of linear models
```

```
lm1 <- lm(SciOpport ~ IndIncome,data=dat)  
summary(lm1)
```

```
lm2 <- lm(SciOpport ~ IndIncome + CollegeSci,data=dat)  
summary(lm2)
```

```
dat$IndThousands <- dat$IndIncome/1000
```

```
lm3 <- lm(SciOpport ~ IndThousands + CollegeSci,data=dat)  
summary(lm3)
```

```
lm4 <- lm(SciOpport ~ IndThousands + CollegeSci + Sex,data=dat)  
summary(lm4)
```

```
lm5 <- lm(SciOpport ~ IndThousands + CollegeSci*Sex,data=dat)  
summary(lm5)
```