

```

> # 3)
> (Name <- "Joseph Blubaugh")
[1] "Joseph Blubaugh"
>
> # 4)
> Sys.time()
[1] "2016-08-31 18:13:31 CDT"
>
> #5)
> help.start()
If nothing happens, you should open
'http://127.0.0.1:31395/doc/html/index.html' yourself
> x <- rnorm(50)
> y <- rnorm(x)
>
> plot(x,y)
>
> # 7)
> ls()
[1] "dummy"  "filepath" "fm"      "fm1"     "lrf"     "mm"
[7] "Name"    "oldpar"   "th"      "w"       "x"       "y"
[13] "z"
>
> rm(x, y)
>
> x <- 1:20
>
> w <- 1 + sqrt(x)/2
>
> dummy <- data.frame(x = x, y = x + rnorm(x) * w)
>
> fm <- lm(y ~ x, data = dummy)
> summary(fm)

```

Call:

```
lm(formula = y ~ x, data = dummy)
```

Residuals:

Min	1Q	Median	3Q	Max
-5.6147	-1.3348	0.3304	1.0768	6.1564

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-0.4959	1.2620	-0.393	0.699
x	1.2082	0.1053	11.469	1.04e-09 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.717 on 18 degrees of freedom

Multiple R-squared: 0.8796, Adjusted R-squared: 0.8729
F-statistic: 131.5 on 1 and 18 DF, p-value: 1.042e-09

```
>  
> fm1 <- lm(y ~ x, data = dummy, weight = 1 / w^2)  
> summary(fm1)
```

Call:
lm(formula = y ~ x, data = dummy, weights = 1/w^2)

Weighted Residuals:

Min	1Q	Median	3Q	Max
-2.27486	-0.37598	0.04307	0.43759	2.03209

Coefficients:

	Estimate	Std. Error	t value	Pr(> t)
(Intercept)	-0.08422	0.89356	-0.094	0.926
x	1.17051	0.09111	12.847	1.67e-10 ***

Signif. codes: 0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.9874 on 18 degrees of freedom
Multiple R-squared: 0.9017, Adjusted R-squared: 0.8962
F-statistic: 165 on 1 and 18 DF, p-value: 1.671e-10

```
>  
> attach(dummy)  
The following object is masked _by_ .GlobalEnv:
```

x

```
>  
> lrf <- lowess(x, y)  
>  
> plot(x, y)  
>  
> lines(x, lrf$y)  
>  
> abline(0, 1, lty = 3)  
>  
> abline(coef(fm))  
>  
> abline(coef(fm1), col = "red")  
>  
> # 8)  
> detach()  
>  
> plot(fitted(fm), resid(fm), xlab = "Fitted Values", ylab = "Residuals", main = "Residuals vs Fitted")  
>
```

```

> # 10)
> qqnorm(resid(fm), main = "Residuals Rankit Plot")
>
> # 11)
> rm(fm, fm1, lrf, x, dummy)
>
> # 12)
> filepath <- system.file("data", "morley.tab" , package="datasets")
> filepath
[1] "C:/PROGRA~1/R/R-33~1.1/library/datasets/data/morley.tab"
>
> mm <- read.table(filepath)
> mm$Expt <- factor(mm$Expt)
> mm$Run <- factor(mm$Run)
>
> attach(mm)
>
> plot(Expt, Speed, main = "Speed of Light Data", xlab = "Experiment No.")
>
> # 14)
> fm <- aov(Speed ~ Run + Expt, data = mm)
> summary(fm)
          Df Sum Sq Mean Sq F value Pr(>F)
Run        19 113344    5965   1.105 0.36321
Expt         4  94514    23629   4.378 0.00307 **
Residuals   76 410166    5397
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1
> fm0 <- update(fm, . ~ . - Run)
> anova(fm0, fm)
Analysis of Variance Table

Model 1: Speed ~ Expt
Model 2: Speed ~ Run + Expt
  Res.Df  RSS Df Sum of Sq   F Pr(>F)
1     95 523510
2     76 410166 19  113344 1.1053 0.3632
>
> detach()
> rm(fm, fm0)
>
> x <- seq(-pi, pi, len = 50)
> y <- x
> f <- outer(x, y, function(x, y) cos(y) / (1 + x^2))
> oldpar <- par(no.readonly = TRUE)
> par(pty = "s")
> contour(x, y, f)
> contour(x, y, f, nlevels = 15, add = TRUE)
>

```

```

> # 15)
> fa <- (f - t(f)) / 2
> contour(x, y, fa, nlevels = 15)
>
> # 16)
> par(oldpar)
> image(x, y, f)
> image(x, y, fa)
>
> # 17)
> objects(); rm(x,y,f,fa)
[1] "f"      "fa"      "filepath" "mm"      "Name"    "oldpar"
[7] "th"     "w"       "x"        "y"       "z"
> th <- seq(-pi, pi, len = 100)
> z <- exp(1i * th)
> par(pty = "s")
> plot(z, type = "l")
>
> # 18)
> w <- rnorm(100) + rnorm(100) * 1i
> w <- ifelse(Mod(w) > 1, 1 / w, w)
>
> plot(w, xlim = c(-1, 1), ylim = c(-1, 1), pch = "+", xlab = "x", ylab = "y")
> lines(z)
>
> # 19)
> w <- sqrt(runif(100)) * exp(2 * pi * runif(100) * 1i)
> plot(w, xlim = c(-1, 1), ylim = c(-1, 1), pch = "+", xlab = "x", ylab = "y")
> lines(z)
>

```