Introduction to R - ECON 520

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Install R

Exercise 1:

R Installed!

R as a Calculator

Excercise 2:

```
1+2+3+4      ## Addition!
```

```
## [1] 10
```

```
(2/3)+23     ## PEMDAS!
```

```
## [1] 23.66667
```

```
3^4          ## 3 to the power of 4!
```

```
## [1] 81
```

```
4^(1/2)      ## sqrt of 4
```

```
## [1] 2
```

```
sin(0)       ## returns value sin of 0
```

```
## [1] 0
```

```
log(1)       ## natural log 1
```

```
## [1] 0
```

```
log(5)       ## natural log 5
```

```
## [1] 1.609438
```

```
pi           ## returns 3.14.... (unless you assign a new data structure to name pi)
```

```
## [1] 3.141593
```

```
exp(1)       ## returns e^1
```

```
## [1] 2.718282
```

Exercise 3:

```
factorial(3)  ## 3 x 2 x 1 = 6
```

```
## [1] 6
```

```r
choose(3,2)   ## 3! / (2!(3-2)!) = 3
```

```
## [1] 3
```

```r
gamma(1)      ## gamma function should be 1
```

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

Exercise 4:

Using variables, carry out the following computations in R and display the values of each variable:

```r
w = 4; w
```

```
## [1] 4
```

```r
x = 2.4; x
```

```
## [1] 2.4
```

```r
y = w^x - log(x); y
```

```
## [1] 26.98215
```

```r
z = x + y - w; z
```

```
## [1] 25.38215
```

Defining functions

Exercise 5:

Define the following functions in R, and evaluate them at the values given.

(1) $f(x) = x^2 + 2x - 1$ evaluated at $x = 0, 1, 10$

```r
funky1 <- function(x){
  return(x^2 + 2*x -1)
}

dat = matrix(c(0,1,10), nrow = 3, ncol = 1)

apply(dat, 1, funky1)
```

```
## [1]  -1   2 119
```

(2) $f(x) = (2\pi)^{-1} \cdot e^{\frac{-x^2}{2}}$ evaluated at $x = -196, 0, 1.96$

```r
funky2 <- function(x){
  return( ((2*pi)^(-1) * exp((-x^2)/2)) )
}

dat = matrix(c(-1.96, 0, 1.96), nrow = 3, ncol = 1)

apply(dat, 1, funky1)
```

```
## [1] -1.0784 -1.0000  6.7616
```

(3) $f(x) = log(log(x))$ evaluated at $x = 1, e, 4$.

```
funky3 <- function(x){
  return(log(log(x)))
}

dat = matrix(c(1, exp(1), 4), nrow = 3, ncol = 1)

apply(dat, 1, funky1)
```

```
## [1]  2.00000 11.82562 23.00000
```