# Day 1 Assignment

Create a new R notebook or script file in R-Studio named **StudentID_name_day1.rmd** or **StudentID_name_day1.r**

Insert the following comments at the top of the file. Replace the contents in the brackets with your personal information.

```
# Assignment 1
# <Today's date>
# <Your name>
# <Your student ID>
```

# Task 1 Observation

Do the following exercises and **observe** the output of the commands. Try to predict the solutions before you type in the commands.

**Define**

```
x = c(5,2,1,4)
xx = c(1,10,15,18)
y = rep(1,5)

z = c(TRUE,FALSE,TRUE,TRUE)
w = c("Marie","Betty","Peter")
```

**Execute the following commands and observe the output.**

```
sum(x)
range(x)

length(y)
sum(y)

c(x,y,13)
xx - x
c(x,12) * y

1:6 + 1
1:9 + 1:2

x <= 2
x <= 2 & z

substring(w,2,4)
```

```
paste(substring(w,1,2),substring(w,5,5),sep="..")

cbind(x,xx)
cbind(2,6:1, rep(c(3,1,4),2), seq(1.1,1.6,by=0.1))
```

**Let**

```
a = c(1, 2, 4, 5, 6)
b = c(3, 2, 4, 1, 9)
```

**Answer the following questions**

What is the value of: `cbind(a, b)`?

What is the value of: `rbind(a, b)`?

# TASK 2 Problem Solving

Create the following sequences using R commands.

1. (20, 19, ..., 2, 1)
2. (1, 2, 3, ...,19, 20, 19, 18, ..., 2, 1)
3. Create a vector of the values of $cos\theta$ at $\theta$ = 3, 3.1, 3.2, ... ,6
4. Create the following vectors in R:

$$\sum_{i=1}^{100} \left(i^3 + 4i^2\right) \tag{1}$$

$$\sum_{i=1}^{25} \left(\frac{2^i}{i} + \frac{3^i}{i^2}\right) \tag{2}$$

5. Create a vector of integers from 1 to 1000. Remove all numbers divisible by 5. Then remove all numbers divisible by 7.
6. Generate the following matrix.

```
[,1] [,2] [,3] [,4]

[1,] 1 101 201 301

[2,] 2 102 202 302

[3,] 3 103 203 303

[4,] 4 104 204 304

[5,] 5 105 205 305
```

7. Generate the following matrix.

```
[,1] [,2] [,3] [,4] [,5] [,6] [,7] [,8] [,9] [,10]

[1, ] 5 0 0 0 0 0 0 0 0 0

[2, ] 0 5 0 0 0 0 0 0 0 0

[3, ] 0 0 5 0 0 0 0 0 0 0

[4, ] 0 0 0 5 0 0 0 0 0 0

[5, ] 0 0 0 0 5 0 0 0 0 0

[6, ] 0 0 0 0 0 5 0 0 0 0

[7, ] 0 0 0 0 0 0 5 0 0 0

[8, ] 0 0 0 0 0 0 0 5 0 0

[9, ] 0 0 0 0 0 0 0 0 5 0

[10,] 0 0 0 0 0 0 0 0 0 5
```

8. Plot the following curve. You can assign any values to **α** and ***β***. Let ***θ*** vary from ***-π*** to ***π***.

$$x = (\alpha + \beta\theta)cos\theta \tag{3}$$

$$y = (\alpha + \beta\theta)sin\theta \tag{4}$$

Upload your R notebook or script file to Canvas by the beginning of tomorrow's class.