R Exercise

Seminar 3

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Make sure to clear memory before starting

```
> rm(list=ls())          # It will  clean up memory!
```

Task 1: Review

Create A = [$3^3 4^5$, $3^6 4^4$, $3^9 4^3$, $3^{12} 4^2$, $3^{15} 4^1$]

Solve B = $\sum_{i=10}^{100} (i^3 + 4i^2)$

- Write down R code lines for A and B

Task 2: Data Frame

Step 0: Create the following data frame, Sales:

ID	Name	Price	QTY	Discount
P001	Book	3.99	6	10%
P002	Pencil	0.99	9	0%
P003	Eraser	1.99	12	30%
P004	Clips	0.99	4	50%

Step1: Add a row for a new product

- ID: P005, Name: Glue, Price: 1.99, QTY: 3, Discount: 5%

Step 2: Add a column "Final_Price" after discounts. What are the final prices?

Step 3: List the names of products whose final prices are less than the averaged final price of all products. What are they?

Q: Write down your R code for the Steps 1 to 3

Task 3: Functions

- Write a function 'FN1' such that if 'Vec' is the vector $(x_1, x_2, x_3,\ldots,x_n)$, then 'FN1' returns the vector $(x_1^1, x_2^2, x_3^3,\ldots, x_n^n)$

  Hint: Use the seq() and length() functions

```
> Vec <- 1:3
> FN1(Vec)
[1]  1  4 27
```

- Write a function 'FN2' which takes 2 arguments *p* and *d*, where *p* is the original price of a product (e.g., $2.99) and *d* is a discount rate (e.g., 10%). The function should return the final price after the discount rate (*d*) is applied to the original price (*p*):

```
> FN2(2.99, 10)
[1] 2.691
```

Extra Credit Points

1. Create a vector, M (1 point)

$$M = \sum_{i=1}^{20} \sum_{k=1}^{5} \frac{i^4}{(3+k)}$$

- Write down your R code for M
- What is the value of M?

2. Write a function 'FN3' which takes 2 arguments x and n, where x is a single number and n is a strictly positive integer. The function should return the values of

$$\frac{x}{1} + \frac{x^2}{2} + \frac{x^3}{3} + \ \ldots + \frac{x^n}{n}$$

(1 point)

```
> FN3(1,3)
[1] 1.833333
```