Homework #1

1 Create the following numeric vectors

- (1, 2, 3, . . . , 20)
- (20, 19, . . . , 1)
- (1, 2, 3, . . . , 20, 19, 18, . . . , 1)
- assign (7, 8, 1) to object `tmp`
- (4, 6, 3, 4, 6, 3, . . . , 4, 6, 3) where each element occur 10 times
- (4, 6, 3, 4, 6, 3, . . . , 4) where 4 occurs 11 times, 6 occurs 10 times and 3 occurs 9 times
- create a vector $e^x cos(x)$ for vector $x = 3, 3.1, 3.2, ..., 6$
- $(2, \frac{2^2}{2}, \frac{2^3}{3}, ..., \frac{2^{25}}{25})$
- $\sum_{i=10}^{100}(i^3 + 4i^2)$
- $\sum_{i=1}^{25}(\frac{2^i}{i} + \frac{3^i}{i^2})$

Hints: `seq` and `rep` functions

2 Create the follwing character and factor vectors

- create a random vector of 1000 elements containing `{0,1}`. Set seed to 123.
- based on above vector create a factor vector with levels 0 = 'No', 1 = 'Yes'
- create the following character `(q1s1, q1s2, q1s3, ...., q5s1, q5s2, q5s3)`

Hints: `sample` and `paste` function

3 Declare the following matrices

$$A = \begin{pmatrix} 3 & 1 & -2 \\ -3 & 2 & 1 \\ -2 & 6 & 3 \end{pmatrix},$$

$$B = \begin{pmatrix} 1 & 2 & -2 \\ 0 & 2 & -1 \end{pmatrix},$$

$$C = \begin{pmatrix} 1 & 2 \\ 3 & 4 \end{pmatrix}$$