

1 MAT013 - Practice Sheet

1.1 Chapter 3

1.1.1 Attempt to do the following in SAS and/or R.

1. Download the data sets [weight.xls](#) and [height.xls](#):
 1. Create a SAS data set containing the bmi of the observations.
 2. Output the data set to csv.
2. For the concatenated data set (of JJJ and MMM):
 1. For individuals over the age of 25, calculate the yearly average savings (for each year after their 25th birthday)
 2. Output a frequency table showing the mean yearly average by sex.
 3. Obtain the mean yearly average savings by sex and age groups:
 - Group A [0,18]
 - Group B [19,65]
 - Group C [66,]
 4. Find the mean, max and min for the variable “random number” and output this to a SAS data set.
3. Create (separate) data sets containing the following:
 1. The first 200 odd numbers;
 2. The square root of the first 1000 integers;
 3. The square root of the first 10000 integers, selecting only those that are integers
 4. The first 20 prime numbers (this is slightly harder)
4. Download the file [coordinates.csv](#).
 1. Obtain coefficients for a line fitted to the coordinates (x, y) of this data set.
 2. For each of the observations create a new variable giving the following:
 1. The product xy ;
 2. The ration x/y ;
 3. The exponent x^y ;
 4. The sum $x + y$;
 5. The difference $x - y$;
 6. The absolute value of x ;
 7. The square root of x ;

8. The log to the base 10 $\log_{10}(x)$;
9. The natural log $\ln(x)$.
3. Obtain the following for the above data set (including the newly created variables):
 1. minimum
 2. maximum
 3. total
 4. mean
 5. median
5. The probability that an $M/M/k$ queue is empty is given by the following formulae:

$$\pi_0 = \frac{1}{\sum_{i=0}^{k-1} \frac{(\lambda/\mu)^i}{i!} + \frac{(\lambda/\mu)^k}{k!(1-\lambda/(k\mu))}}$$

Obtain π_0 for $\lambda \in \{.1, .5, .7, .9\}$, $k = 3$ and $\mu = 1$.

6. Download the data set [marks.csv](#)
 1. Create a data set that shows the percentage increase or decrease of marks for each student from one month to the next.
 2. Obtain a table showing the mean of these percentage changes categorized by gender.
7. Download the data set [numbers.csv](#) and create the following variables:
 1. $y1 = x1 \times x2 \times \dots \times x36$
 2. $y2 = (1 + z1/1) \times (1 + z2/2) \times \dots \times (1 + z36/36)$
 3. $y3 = x1 - x2 + x3 - \dots - x36$