

### Homework part A.

**3 points [1p: A1] + [2p: A2 or A3]**

A1. (1 point) Graphically represent the mass probability functions of the  $Poisson(\lambda)$  and  $Geometric(p)$  - only the values  $k, k+1, \dots, l$  ( $\lambda, p$ , and  $1 \leq k < l$ ,  $k$  will be given as parameters).

A2. (2 points) Consider the following sample of weights for 45 individuals

```
79 71 89 57 76 64 82 82 67 80 81 65 73 79 79
60 58 83 74 68 78 80 78 81 76 65 70 76 58 82
59 73 72 79 87 63 74 90 69 35 83 76 61 66 71
51 57 81 57 65 81 78 77 81 81 73 75 66 56 62
75 60 74 74 70 71 56 74 63 72 81 54 72 91 92
```

- (a) (0.5 points) Write a function that has to determine the median, the mean, the standard deviation, and the quartiles (the argument of the function is the sample, the function will return a vector containing the required statistics).
- (b) (1 point) Write a function that determine the outliers (if any) using the mean and standard deviation method and removes them from the sample (the function receives the original sample and returns the trimmed sample).
- (c) (0.5 points) Graphically represent the frequency distribution for the trimmed sample using the intervals  $(40, 45]$ ,  $[46, 50]$ ,  $[51, 55]$ ,  $\dots$

A3. (2 points) Consider the following sample of admission grades for a a group of students:

```
9.50 7.50 6.60 7.25 8.50 9.70 7.50 8.25 8.50 8.66 7.50 9.00 8.50 9.33
8.33 9.90 8.75 5.60 6.50 7.75 8.20 8.33 9.50 8.66 6.33 7.25 9.50 9.33
7.50 8.60 5.60 7.25 8.50 9.95 6.66 6.40 7.75 7.66 6.60 9.33 7.80 9.85
7.66 8.66 5.75 8.75 8.33 9.75 8.25 6.33 7.50 8.25 8.66 8.33 6.75 5.33
8.75 7.25 6.60 9.50 7.50 7.85 6.75 5.75 5.66 6.75 7.60 7.33 6.85 5.66
```

- (a) (0.5 points) Write a function that has to determine the median, the mean, the standard deviation, and the quartiles (the argument of the function is the sample, the function will return a vector containing the required statistics).
- (b) (1 point) Write a function that determine the outliers (if any) using 3/2 IQR method and removes them from the sample (the function receives the original sample and returns the trimmed sample).
- (c) (0.5 points) Graphically represent the frequency distribution for the trimmed sample using the intervals  $(40, 45]$ ,  $[46, 50]$ ,  $[51, 55]$ ,  $\dots$

Solutions to these exercises (the corresponding R functions and their calls) will be written in an single R script.