# Exercise Sheet 1 – Plotting Data and Basic Statistical Measures

1. For the babyboom dataset included in the lecture notes

   (a) Using Figure 1.1 in the notes identify the data type of the three variables in the dataset.

   (b) Plot a histogram of the time of birth of all the babies.

   (c) Calculate the mean, median, SIQR, MAD and sample standard deviation of the birth weight of all the babies.

   (d) Construct box plots of time of birth for both boys and girls and compare the two distributions.

2. The following dataset is from a study of the age at which infants learn to crawl, and whether crawling age is related to the temperature during the month in which babies first try to crawl. The measured variables are month of the birth, average age in weeks that this group learned to crawl and average monthly temperature six months after birth month. Plot a scatter plot of Temperature versus Avg. Crawling Age and comment.

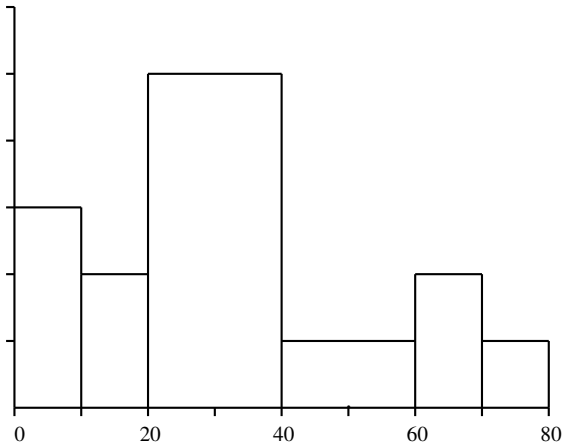
| Birth Month | Avg. Crawling Age | Temperature (°F) |
|---|---|---|
| January | 29.84 | 66 |
| February | 30.52 | 73 |
| March | 29.70 | 72 |
| April | 31.84 | 63 |
| May | 28.58 | 52 |
| June | 31.44 | 39 |
| July | 33.64 | 33 |
| August | 32.82 | 30 |
| September | 33.83 | 33 |
| October | 33.35 | 37 |
| November | 33.38 | 48 |
| December | 32.32 | 57 |

3. According to the 1976 Canadian census, the average number of children in francophone families was 1.85, while the average number in anglophone families was 1.95. N. Keyfitz (in Applied Mathematical Demography) made the following table:

| Avg. # Children in: | French | English |
|---|---|---|
| Quebec | 1.80 | 1.64 |
| Other Provinces | 2.14 | 1.97 |

In other words, the average number of children in francophone families in Quebec is higher than the average number of children in anglophone families in Quebec; and the average number of children in francophone families in the rest of Canada is higher than the average number of children in anglophone families in the rest of Canada. Does this contradict what we just said, that the average number of children in francophone families in the whole country is **lower** than the average number of children in anglophone families? Why or why not? Think about which set of individuals goes into making up each average.

4. The histogram below represents the distribution of family incomes in a hypothetical town with 20,000 people.




   (a) The vertical axis uses the density scale, but the numbers and units have been left off. Fill these in. What would the numbers and units be if the data were given in percentages?

   (b) What percent of the families earned between £10,000 and £20,000?

   (c) Is the average income under £30,000, over £30,000, or equal to £30,000? Explain your reasoning, and say what assumptions you need to make.

**Exam Paper Questions** Nearly all exam paper questions ask you to 'Plot the data and comment'. The table below lists past exam paper *question numbers* that involve *both* plotting the data and calculating summary measures of the data (useful for revision).

| | Human Sciences | Psychology | | |
|---|---|---|---|---|
| Year | TT | MT | HT | TT |
| 2001 | 2 | - | 4 | 2 |
| 2000 | 2 | 2 | 7 | 2 |
| 1999 | 2 | 3 | 1 | 2 |
| 1998 | 1 | - | 1 | 1 |
| 1997 | 1 | - | 1 | 1 |