

MATH1001 Homework Solution

Chapter 1

1.2.7

- (a) (I) This should be an **observational** study; (II) it should be **single blind**: The people who measure the brains should be blinded to the sexual orientations of the men.
- (b) (I) This should be an **experiment**, with people randomly assigned to one of two groups: high (more than 1 liter per day) vs low water intake; (II) it should be **single blind**: The people who measure the weights of the subjects should be blinded to the group assignments.

1.3.2

- (a) The sample is **nonrandom** and likely nonrepresentative of the general population because it consists of volunteers from nightclubs. (i) The social anxiety level of people who attend nightclubs is likely lower than the social anxiety level of the general public. (ii) A better sampling strategy would be to recruit subjects from across the population.
- (b) **Bias** arises from the data being collected **only on rainy days**. (i) Water pollution readings in the stream might be lower when rain water is mixed in with regular stream water. (ii) A better method would be to sample during all types of weather.
- (c) Recording observations only when random coordinates are within a tree canopy will induce **bias**. (i) Trees with **large canopies are more likely to be included** in the sample than are other trees, but canopy size is probably related to tree radius, resulting in a sample average that is too large. (ii) A better sampling method would be to measure whichever tree trunk is closest to randomly choose coordinates, but even this produces bias in favor of large trees. In order to avoid the bias, number all of the trees within a region and drawn random numbers to select trees to measure. Geographical regions could be used as strata within a stratified sampling plan of this type.