1. During an expedition to Antarctica a research team collect 22 oriented rock cores to be used to determine the paleo-magnetic field. Among the 22 samples there are 7 of utmost importance: 3 from an exciting new basaltic outcrop and 4 from another area with no prior samples. During the flight back to Puntas Arenas the PI samples too much Chilean wine and proceeds to trip over the box with the rock samples with the result that 8 of the rock cores fall out and break.
   a) What are the chances of total disaster (i.e., all 7 important samples are destroyed)?
   b) What are the chances that the 7 samples are intact?
   c) What are the chances that at least 2 samples from each of the two exciting areas have been ruined?

2. A sample of 55 specimens of a particular fossil gives a mean length of 51.8 mm with a standard deviation of 4.4 mm. Find the 99% confidence intervals for the mean length.

3. The data depths.d contains the bathymetric depths in meters for an ocean basin.
   a) Find the mean depth and the standard deviation, and the 95% confidence interval on the mean depth.
   b) What is the probability that a random depth measurement will be shallower than -4000m?
   c) Determine the median and median absolute deviation (MAD; use routine mad.m on web).
   d) Given the criteria for outliers ($|z_i| > 3$) using the median and MAD, find the cutoff values in meters. How many measurements are considered outliers?