

## 6.7 Maximum likelihood estimates

(a) See the solution for Exercise 2.8.

(b) Suppose the data are the  $N$  integers  $M_i$ , drawn from the same Poisson distribution. The likelihood is proportional to simple terms in  $\mu$ :

$$\mathcal{L} \propto e^{-N\mu} \mu^{\sum_i M_i}.$$

Differentiating finds the maximum, and the estimator is just the average

$$\hat{\mu} = \frac{1}{N} \sum_i M_i.$$

This may seem obvious, but it is not particularly apparent from the form of the Poisson. Try working backwards to find the distribution of a sum of Poisson variables. Use Fourier techniques.