MA1S12 (Timoney) Tutorial/exercise sheet 10 [March 31, 2014]

1. The number of alpha particles hitting a certain detector per second is found to obey a Poisson distribution with mean 4. What then is the probability of 3, 4 or 5 alpha particles hitting the detector in a given second?

What is the probability that a number that is either ≤ 2 or ≥ 6 will hit in a given second?

What is the standard deviation in this case?

2. A factory produces bottles of a soft drink that are sold as 2 litre bottles. A good model is that the quantity of liquid in a bottle obeys a normal distribution with mean 2.02 (litres) and standard deviation 0.09. What proportion of the bottles have less than 2 litres in them?

What proportion will have between 2 litres and 2.03 litres?

3. Suppose these are 5 samples

from a normal distribution with mean μ . Use Student's *t*-distribution to give a symmetric 90% confidence interval for μ .

Unlike previous sheets, this one will not be graded. For those who have a tutorial left, you may wish to ask questions at the tutorial about these problems. Richard M. Timoney