**Activity 1**

(i) The intervals between successive events in a Poisson process are exponentially distributed. Using Minitab, find the mean and standard deviation of the intervals between earthquakes in California. Are these values consistent with the data being observations from an exponential distribution? Give a reason for

your answer. [3]

(ii) Using Minitab, obtain a histogram with the following properties:

❼ the ticks on the horizontal axis are at the cutpoints

❼ the bins have width 500 days

❼ the first bin starts at 0 days and the last bin finishes at

7500 days.

Include a copy of your histogram in your answer. Is the shape of the histogram consistent with the data being observations from an exponential distribution? Give a reason for your answer. [4]

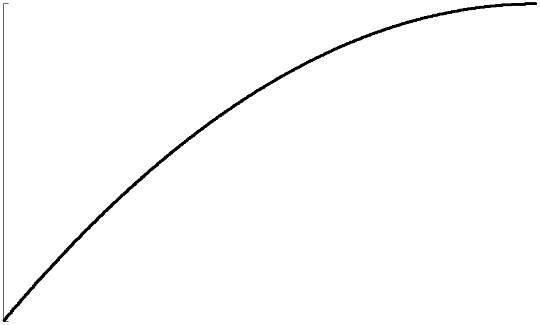
(iii) The data are listed in the order in which they arose. Using Minitab, produce an appropriate graph to investigate whether, for the period of observation, the data are consistent with the rate at which earthquakes occur in California remaining constant. Include a copy of your graph in your answer. Explain why your graph suggests that the average rate at which earthquakes occurred in California was not constant over the period. How did the average

rate change over time? [6] (c) A certain form of ‘triangular’ distribution has c.d.f.

F (x) = 1 − (1 − x)2, 0 < x < 1,

which is plotted in Figure 1. (It is called a triangular distribution because its p.d.f. is a line which, together with the axes, forms a triangle.)

1



F(x)

0

0 1

x

Figure 1 The c.d.f. F (x)

(i) Calculate the value of the upper quartile for this distribution. [3] (ii) On a copy of, or very rough sketch based on, Figure 1, show the

values of α and its corresponding quantile qα for the upper quartile

that you calculated in part (c)(i).

**Activity 2:**

B) The Minitab file body-temperature.mwx contains values of the normal body temperature, measured orally, of n = 130 people. The model for normal human body temperature used in part (a) of this question was obtained partly by consideration of these data. The data can be used to check whether or not it is appropriate to assume that normal human body temperature can be modelled by a normal distribution.

Suggest a suitable graph to investigate specifically whether or not a normal distribution might be a good model for the normal body temperature of people, measured orally. Using the Mean Rank (Herd-Johnson) method in Minitab (see Activity 7 of Computer Book B), produce this graph. Include a copy of your graph in your answer. On the basis of this graph, do you think that a normal

distribution is a plausible model for these data? Explain your answer. [5]

(C) Suppose that the mean weight of a particular type of ripe tomato is

155 g, and the variance of the weight of this type of ripe tomato is

576 g2. A random sample of n = 36 such ripe tomatoes is obtained.

(i) What is the approximate distribution of the sample mean weight of

the random sample of 36 ripe tomatoes? [2] (ii) Use Minitab to find the probability that the sample mean weight of

the sample of 36 ripe tomatoes lies between 150 g and 157.5 g. To

show that you used Minitab, write down the results of any intermediate calculations that you make in Minitab to the same

number of decimal places as given by Minitab.