are required here.) [3]

(ii) Use the data to suggest an estimate for the parameter θ of the triangular model. *(No elaborate techniques are required here: you can follow the approach of Solution 2.22(b) in the course text.)* [1]

(iii) Use your model to determine the proportion of waiting times that would exceed 80 milliseconds, and compare this with the estimate of this proportion obtained from the sample. [3]

(d) *This part of the question is posed in terms of electrical components, but describes a quality procedure with many common applications.*

Electrical fuses are supplied in boxes of 20, and purchasers may choose to buy the standard item or a 'high-quality' version. In fact, there is no discernible difference between individual items: all this means is that the expected number of defectives in a box of 20 fuses labelled 'high quality' is less than the expected number of defectives in a box of 20 items labelled 'standard'.

Suppose that the number of defectives in a 'standard' box is binomial $X_1 \sim B(20, 0.08)$, while the number of defectives in a 'quality' box is binomial $X_2 \sim B(20, 0.01)$.

(i) Calculate the probability that a standard box contains no defectives, and the probability that a high quality box contains no defectives. [2]

(ii) Complete Table 1 below

$P(X = x)$	0	1	2	3	4	$P(X > 4)$
$B(20, 0.08)$						
$B(20, 0.01)$						

Table 1 The probability distributions of X_1 and X_2 [4]

(iii) One measure of comparison between the two types of box is the probability that a randomly selected high quality box contains fewer defectives than a randomly selected standard box. This probability may be written $P(X_2 < X_1)$ and is not at all straightforward to calculate, though on the basis of the description above you might suppose that it is moderately high.

Instead, use the command `brand()` in SSC to simulate a vector `v1` of 1000 observations on the random variable X_1 and another vector `v2` of 1000 observations on X_2; find `v1-v2`; and hence estimate the probability $P(X_2 < X_1)$. [5]