Question 6

An article in the *Ayrshire Leader* (4 November 1993) said: 'Local police are particularly pleased with decreases in the numbers of robberies, break-ins and car related crimes. In fact robberies in the area are down by a staggering 100 per cent.' What would a 100% reduction actually mean? [1]

Question 7

In a clinical trial of 663 patients, interest centred on whether or not they developed liver abnormalities. You may assume that the development or otherwise of liver abnormalities is independent from patient to patient and occurs with equal probability for each.

(a) What distribution would you use to model the total number of patients who developed liver abnormalities? B(663, 192/663)

(b) In the event, 192 patients did suffer from liver problems. Estimate any unknown parameters in your model. [2]

$p = \frac{192}{663}$

Question 8

Why is the function

$$\tfrac{1}{5}(4-x), \quad x = 1, 2, 3, 4, 5$$

not a valid probability mass function? [1]

$\frac{1}{5}(4-1)+\frac{1}{5}(4-2)+\frac{1}{5}(4-3)+\frac{1}{5}(4-4)+\frac{1}{5}(4-5)$

$= \frac{3}{5}+\frac{2}{5}+\frac{1}{5}\left(\frac{-1}{5}\right) = 1.$

negative probability impossible.