Question 7

Do not write in this margin

In an article in the Daily Mail (5th November 1994) the following advice was given to those planning to purchase tickets for the National Lottery: *"Sometimes, week after week, a certain number may resolutely refuse to put in an appearance. It becomes 'overdue' and you could reason that therefore it is bound to turn up soon."* Say whether you believe there is any useful advice in the implied suggestion that a lottery gambler should bet on numbers that have not recently been drawn. [2]

Question 8

What probability distribution could reasonably be used to model the total number of faulty components in a sample of 100, where the probability that a component is faulty is 0.04? [1]

Binomial distribution
B(100, 0.04).

Question 9

Why is the function

$$f(x) = \tfrac{1}{2}x, -1 \leq x \leq 1$$

not a valid probability density function?

Because $\sum f(x)\delta x = \int f(x)dx = \int_{-1}^{1} \frac{x}{2}\,dx$ [1] $= \left[\frac{x^2}{4}\right]_{-1}^{1}$

$= 0$

But the sum of a probability density function is 1.