

13 At a certain factory Christmas tree decorations are packed in boxes of 10.

The quality control manager collects a random sample of 100 boxes of decorations and records the number of decorations in each box which are damaged.

His results are displayed in **Fig. 13.1**.

Number of damaged decorations	0	1	2	3	4	5 or more
Number of boxes	19	35	28	13	5	0

Fig. 13.1

- (a) Calculate
- the mean number of damaged decorations per box,
 - the standard deviation of the number of damaged decorations per box.
- [2]

It is believed that the number of damaged decorations in a box of 10, X , may be modelled by a binomial distribution such that $X \sim B(n, p)$.

- (b) State suitable values for n and p . [1]
- (c) Use the binomial model to complete the copy of **Fig. 13.2** in the Printed Answer Booklet, giving your answers correct to 1 decimal place. [3]

Number of damaged decorations	0	1	2	3	4	5 or more
Observed number of boxes	19	35	28	13	5	0
Expected number of boxes						

Fig. 13.2

- (d) Explain whether the model is a good fit for these data. [1]