

4. Chen is studying the mean total cloud cover, in oktas, for Leuchars in 1987. The daily mean total cloud cover for all 195 days is summarised in the table below.

Daily mean total cloud cover (oktas)	0	1	2	3	4	5	6	7	8
Frequency (number of days)	1	2	5	6	13	28	50	59	31

One of the 195 days is selected at random.

(a) Find the probability that it has a daily mean total cloud cover of 7 or greater. (1)

Chen is investigating whether the daily mean total cloud cover can be modelled using a binomial distribution.

He uses the random variable X to denote the daily mean total cloud cover and believes $X \sim B(8, 0.78)$

(b) Using Chen’s model, find, (2)

- (i) $P(X \geq 7)$ to 2 decimal places,
- (ii) the expected number of days in a sample of 195 days with a daily mean total cloud cover of 7, to 1 decimal place. (2)

(c) Explain whether or not your answers to part (b) supports the use of Chen’s model (1)

There were 31 days that had a daily mean total cloud cover of 8. For these 31 days the daily mean total cloud cover for the **following** day is shown in the table below.

Daily mean total cloud cover (oktas)	0	1	2	3	4	5	6	7	8
Frequency (number of days)	0	0	0	1	2	2	6	9	11

(d) Find the proportion of these days when the daily mean total cloud cover was 7 or greater. (1)

(e) Comment on Chen’s model in light of your answer to part (d). (2)