

8 Rosella is carrying out an investigation into the age at which adults retire from work in the city where she lives. She collects a sample of size 50, ensuring this comprises of 25 randomly selected retired men and 25 randomly selected retired women.

(a) State the name of the sampling method she uses. [1]

Fig. 8.1 shows the data she obtains in a frequency table and Fig. 8.2 shows these data displayed in a histogram.

Age in years at retirement	45 –	50 –	55 –	60 –	65 –	70 –	75 – 80
Frequency density	0.4	1.8	2.4	2.2	1.8	1.2	0.2

Fig. 8.1

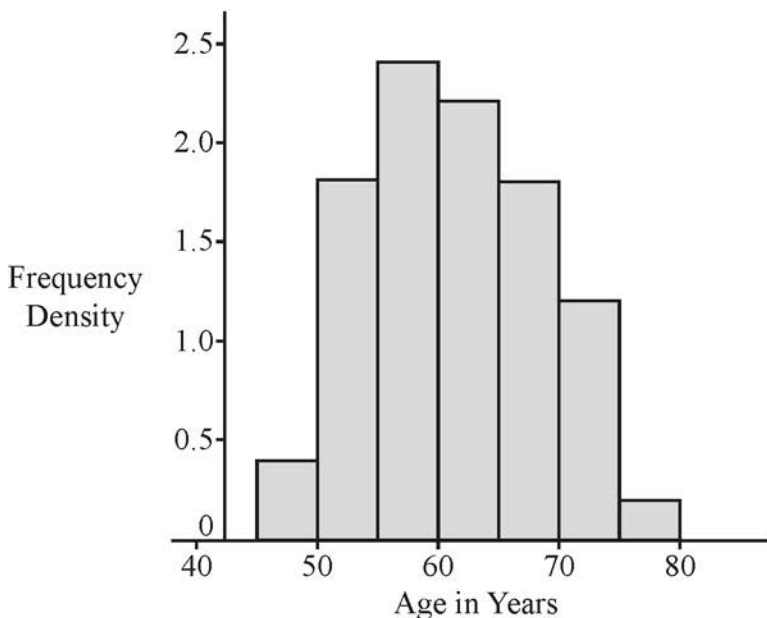


Fig. 8.2

(b) How many people in the sample are aged between 50 and 55? [1]

Rosella obtains a list of the names of all 4960 people who have retired in the city during the previous month.

(c) Describe how Rosella could collect a sample of size 200 from her list using

- systematic sampling such that every item on the list could be selected,
- simple random sampling.

[4]

Rosella collects two simple random samples, one of size 200 and one of size 500, from her list. The histograms in Fig. 8.3 show the data from the sample of size 200 on the left and the data from the sample of 500 on the right.

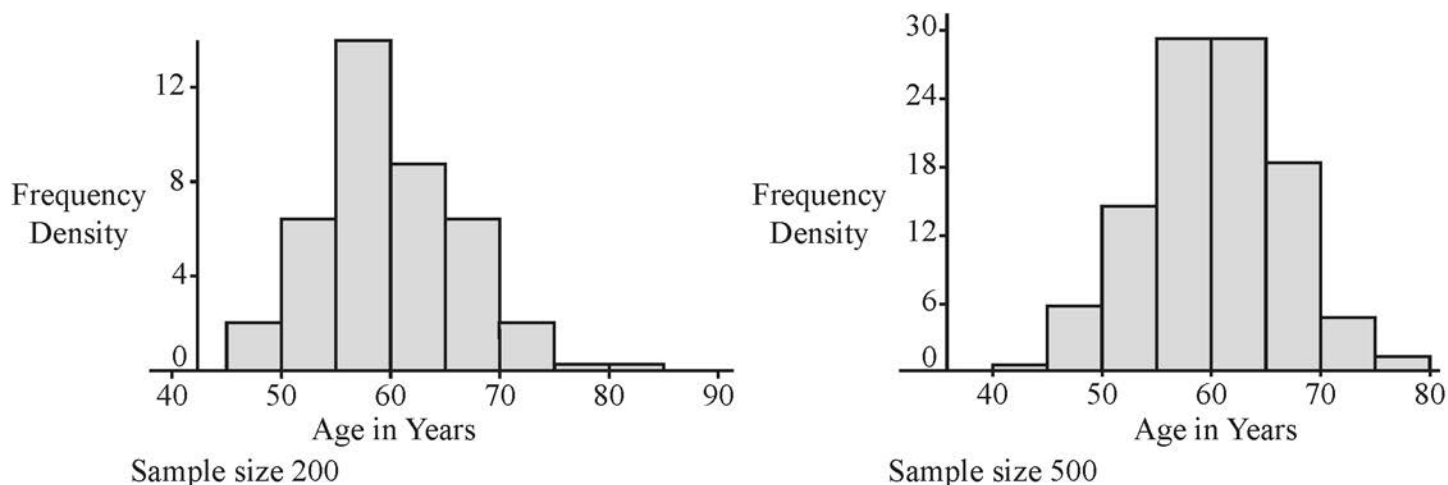


Fig. 8.3

- (d) With reference to the histograms shown in Fig. 8.2 and Fig. 8.3, explain why it appears reasonable to model the age of retirement in this city using the Normal distribution. [1]

Summary statistics for the sample of 500 are shown in Fig. 8.4.

Statistics	
n	500
Mean	60.0515
σ	6.5717
s	6.5783
Σx	30025.7601
Σx^2	1824686.322
Min	36.0793
Q1	55.2573
Median	59.9202
Q3	64.4239
Max	81.742

Fig. 8.4

- (e) Use an appropriate Normal model based on the information in Fig. 8.4 to estimate the number of people aged over 65 who retired in the city in the previous month. [4]
- (f) Identify a limitation in using this model to predict the number of people aged over 65 retiring in the **following** month. [1]