

Histograms

1.

The data shows the mass, in pounds, of 50 adult puffer fish.

- a Draw a histogram for this data.
- b On the same set of axes, draw a frequency polygon.

Mass, m (pounds)	Frequency
$10 \leq m < 15$	4
$15 \leq m < 20$	12
$20 \leq m < 25$	23
$25 \leq m < 30$	8
$30 \leq m < 35$	3

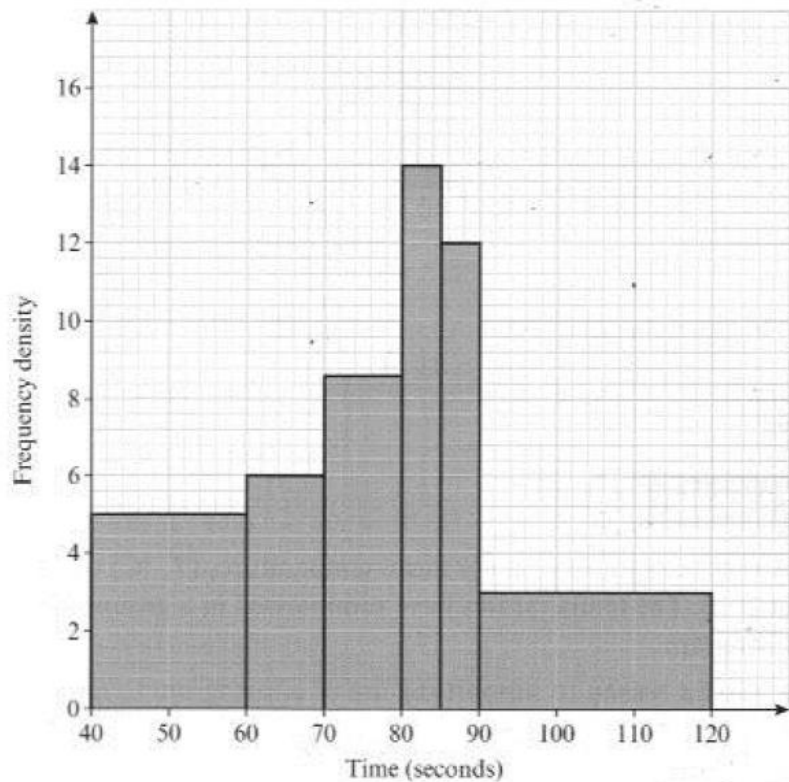
2.

Some students take part in an obstacle race. The time it took each student to complete the race was noted. The results are shown in the histogram.

- a Give a reason to justify the use of a histogram to represent this data.

The number of students who took between 60 and 70 seconds is 90.

- b Find the number of students who took between 40 and 60 seconds.
- c Find the number of students who took 80 seconds or less.
- d Calculate the total number of students who took part in the race.

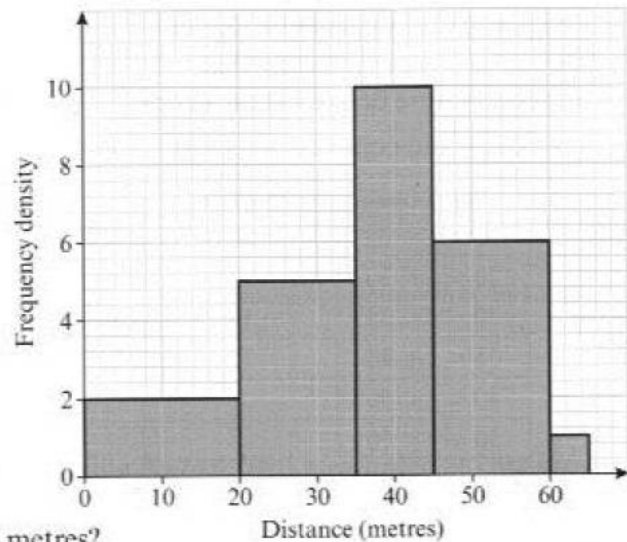


Watch out Frequency density \times class width is always **proportional** to frequency in a histogram, but not necessarily **equal** to frequency.

3.

A Fun Day committee at a local sports centre organised a throwing the cricket ball competition. The distance thrown by every competitor was recorded. The histogram shows the data. The number of competitors who threw less than 20 m was 40.

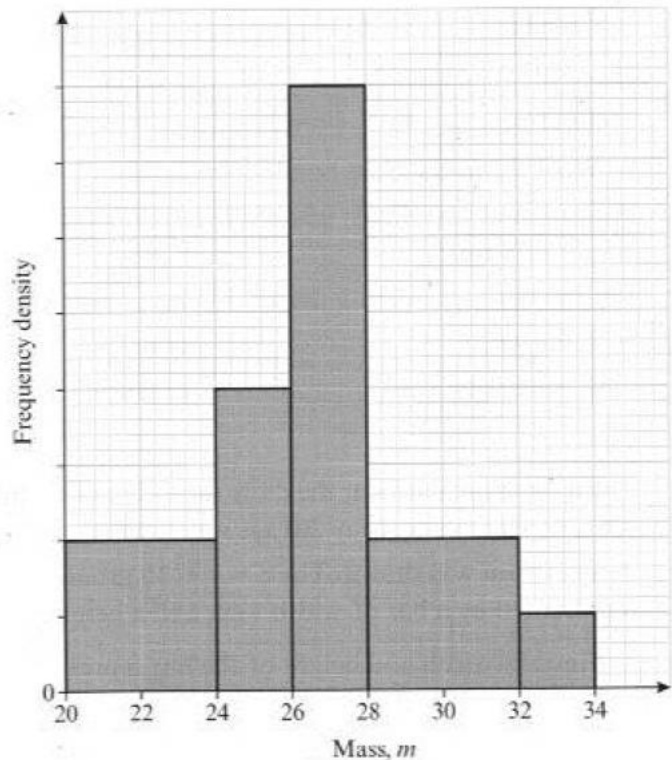
- Why is a histogram a suitable diagram to represent this data?
- How many people entered the competition?
- Estimate how many people threw between 30 and 40 metres.
- How many people threw between 45 and 65 metres?
- Estimate how many people threw less than 25 metres.



4.

A farmer found the masses of a random sample of lambs. The masses were summarised in a grouped frequency table and represented by a histogram. The frequency for the class $28 \leq m < 32$ was 32.

- Show that 25 small squares on the histogram represents 8 lambs.
- Find the frequency of the $24 \leq m < 26$ class.
- How many lambs did the farmer weigh in total?
- Estimate the number of lambs that had masses between 25 and 29 kg.



5.

The histogram in Figure 1 shows the time taken, to the nearest minute, for 140 runners to complete a fun run.

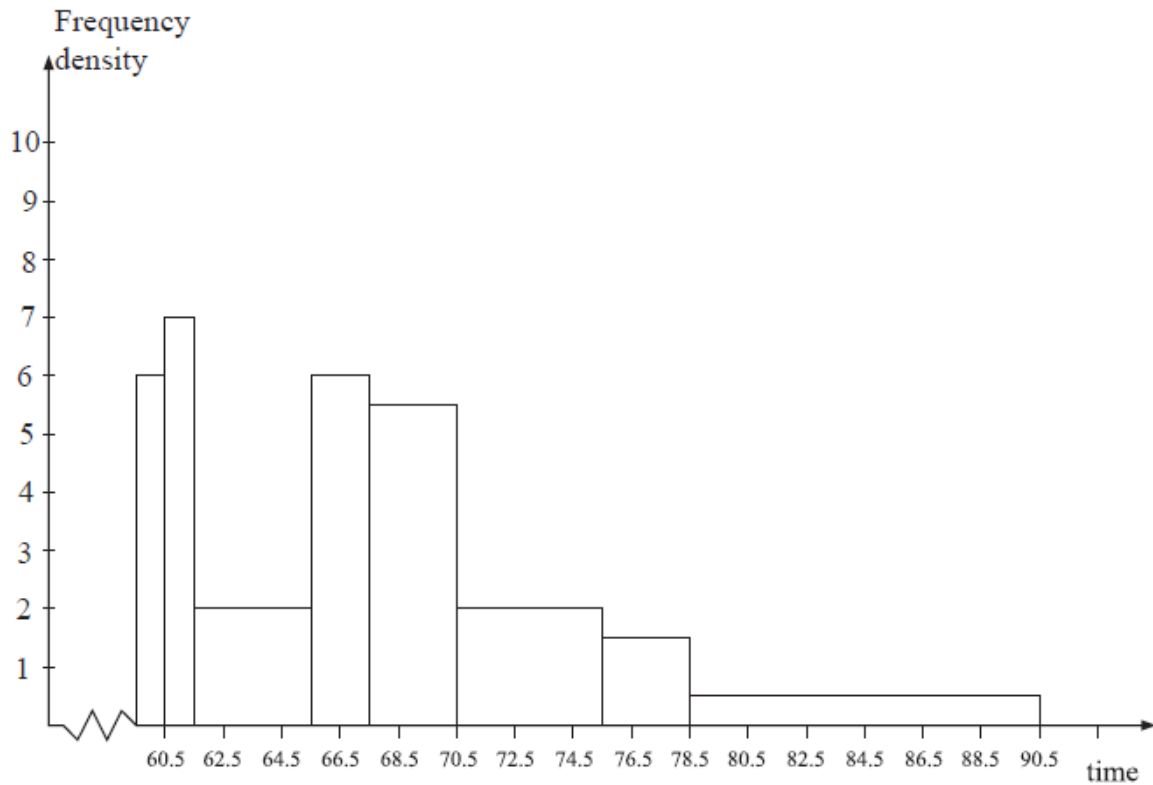


Figure 1

Use the histogram to calculate the number of runners who took between 78.5 and 90.5 minutes to complete the fun run.

(5)

6.

The variable y was measured to the nearest whole number. 60 observations were taken and are recorded in the table below.

y	10–12	13–14	15–17	18–25
Frequency	6	24	18	12

a Write down the class boundaries for the 13–14 class.

(1 mark)

A histogram was drawn and the bar representing the 13–14 class had a width of 4 cm and a height of 6 cm.

For the bar representing the 15–17 class, find:

b i the width

(1 mark)

ii the height.

(2 marks)

Problem-solving

Remember that area is proportional to frequency.

7.

A teacher selects a random sample of 56 students and records, to the nearest hour, the time spent watching television in a particular week.

Hours	1–10	11–20	21–25	26–30	31–40	41–59
Frequency	6	15	11	13	8	3
Mid-point	5.5	15.5		28		50

(a) Find the mid-points of the 21–25 hour and 31–40 hour groups. **(2)**

A histogram was drawn to represent these data. The 11–20 group was represented by a bar of width 4 cm and height 6 cm.

(b) Find the width and height of the 26–30 group. **(3)**

(c) Estimate the mean and standard deviation of the time spent watching television by these students. **(5)**

(d) Use linear interpolation to estimate the median length of time spent watching television by these students. **(2)**
