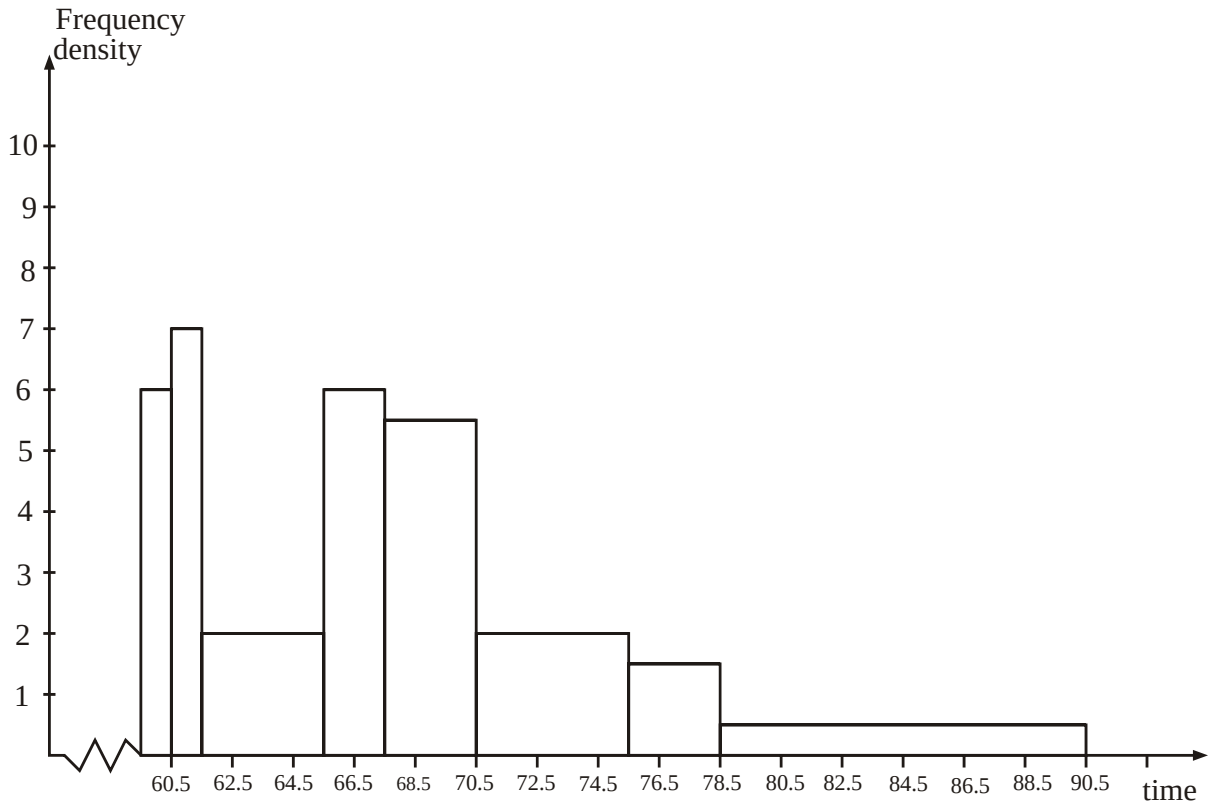
Year 1 Applied Chapter 3 – Exam Questions Representation of Data (60mins)

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



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

(Total 5 marks)

2. A teacher recorded, to the nearest hour, the time spent watching television during a particular week by each child in a random sample. The times were summarised in a grouped frequency table and represented by a histogram.

One of the classes in the grouped frequency distribution was 20–29 and its associated frequency was 9. On the histogram the height of the rectangle representing that class was 3.6 cm and the width was 2 cm.

(a) Give a reason to support the use of a histogram to represent these data.

(1)

(b) Write down the underlying feature associated with each of the bars in a histogram.

(1)

(c) Show that on this histogram each child was represented by 0.8 cm^2.

(3)

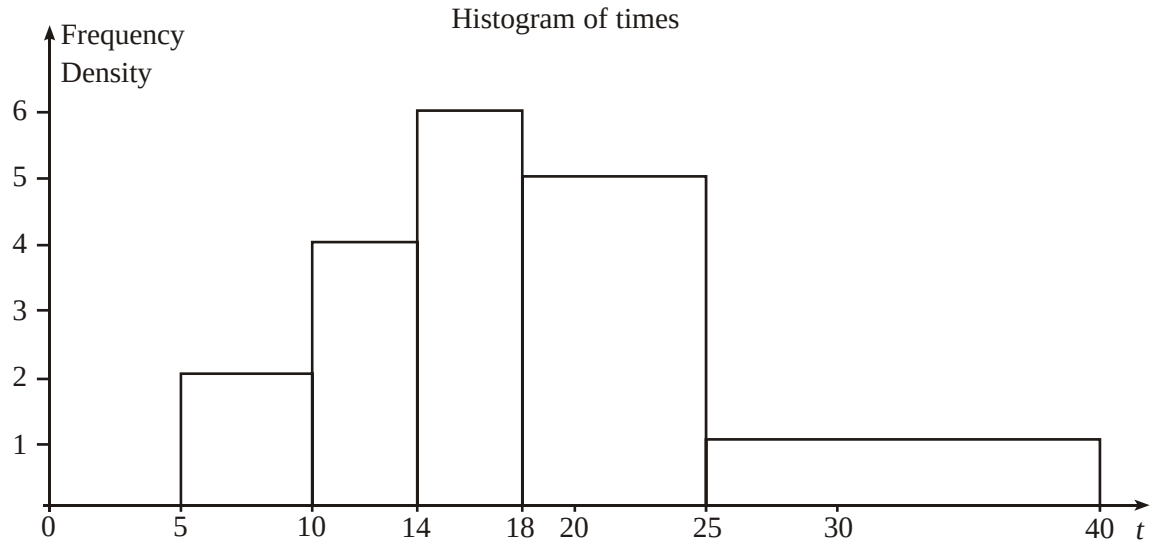
The total area under the histogram was 24 cm^2.

(d) Find the total number of children in the group.

(2)

(Total 7 marks)

3.



The diagram above shows a histogram for the variable *t* which represents the time taken, in minutes, by a group of people to swim 500m.

(a) Complete the frequency table for *t*.

t	5–10	10–14	14–18	18–25	25–40
Frequency	10	16	24		

(2)

(b) Estimate the number of people who took longer than 20 minutes to swim 500m.

(2)

(c) Find an estimate of the mean time taken.

(4)

(d) Find an estimate for the standard deviation of *t*.

(3)

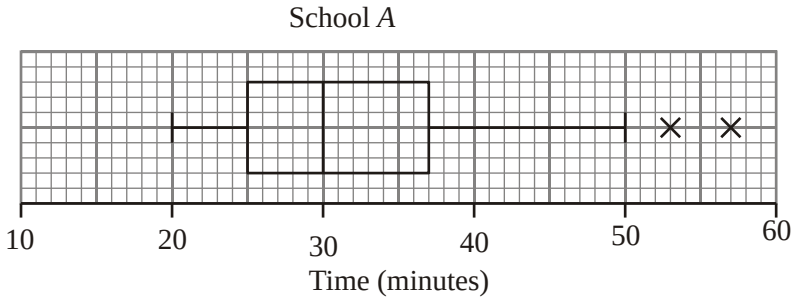
(e) Find the median and quartiles for *t*.

(4)
(Total 15 marks)

4. (a) Describe the main features and uses of a box plot.

(3)

Children from school *A* and *B* took part in a fun run for charity. The times to the nearest minute, taken by the children from school *A* are summarised in the figure below.



(b) (i) Write down the time by which 75% of the children in school *A* had completed the run.

(ii) State the name given to this value.

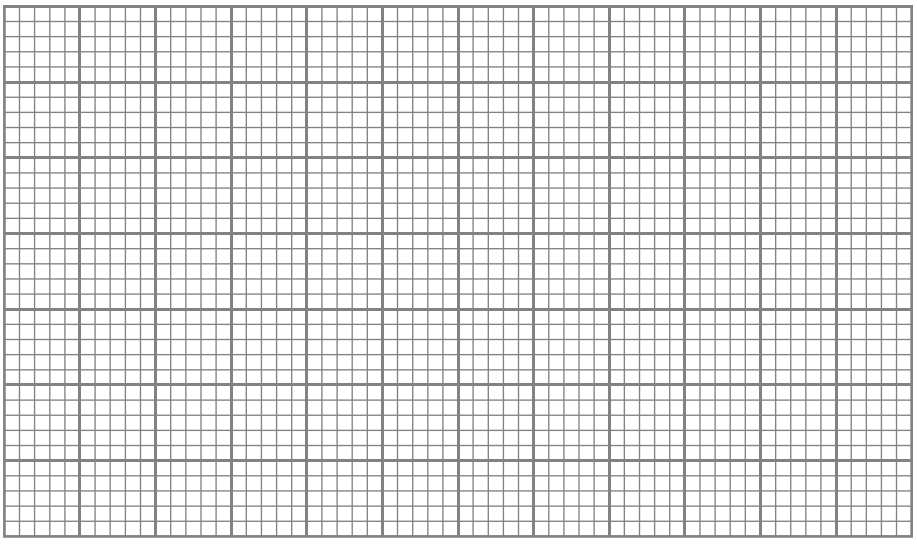
(2)

(c) Explain what you understand by the two crosses (✕) on the figure above.

(2)

For school *B* the least time taken by any of the children was 25 minutes and the longest time was 55 minutes. The three quartiles were 30, 37 and 50 respectively.

(d) Draw a box plot to represent the data from school *B*.



(4)

(e) Compare and contrast these two box plots.

(4)
(Total 15 marks)

5. A travel agent sells holidays from his shop. The price, in £, of 15 holidays sold on a particular day are shown below.

299	1050	2315	999	485
350	169	1015	650	830
99	2100	689	550	475

For these data, find

(a) the mean and the standard deviation,

(3)

(b) the median and the inter-quartile range.

(4)

An outlier is an observation that falls either more than 1.5 × (inter-quartile range) above the upper quartile or more than 1.5 × (inter-quartile range) below the lower quartile.

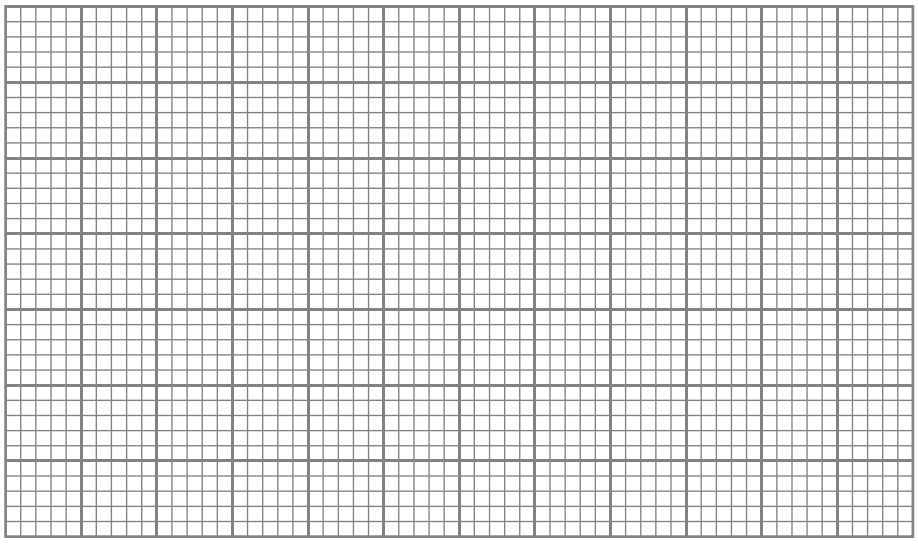
(c) Determine if any of the prices are outliers.

(3)

The travel agent also sells holidays from a website on the Internet. On the same day, he recorded the price, £x, of each of 20 holidays sold on the website. The cheapest holiday sold was £98, the most expensive was £2400 and the quartiles of these data were £305, £1379 and £1805. There were no outliers.

(d) On graph paper, and using the same scale, draw box plots for the holidays sold in the shop and the holidays sold on the website.

(4)



(e) Compare and contrast sales from the shop and sales from the website.

(2)
(Total 16 marks)

6. The table gives information about the ages of 160 employees of an IT company.

Age (A) in years	Frequency
$15 < A \leq 25$	44
$25 < A \leq 35$	56
$35 < A \leq 45$	34
$45 < A \leq 55$	19
$55 < A \leq 65$	7

(a) Complete the cumulative frequency table.

Age (A) in years	Cumulative Frequency
$15 < A \leq 25$	
$15 < A \leq 35$	
$15 < A \leq 45$	
$15 < A \leq 55$	
$15 < A \leq 65$	

(1)

(b) On the grid below, draw a cumulative frequency graph for your table.

(2)

(c) Use your graph to find an estimate for

(i) the median age of the employees,

..... years

(ii) the interquartile range of the ages of the employees.

..... years

(3)

Another IT company has 80 employees.

The age of the youngest employee is 24 years.
The age of the oldest employee is 54 years.

The median age is 38 years.
The lower quartile age is 30 years.
The upper quartile age is 44 years.

(d) On the grid, draw a box plot to show information about the ages of the employees.

(2)
(Total 8 marks)

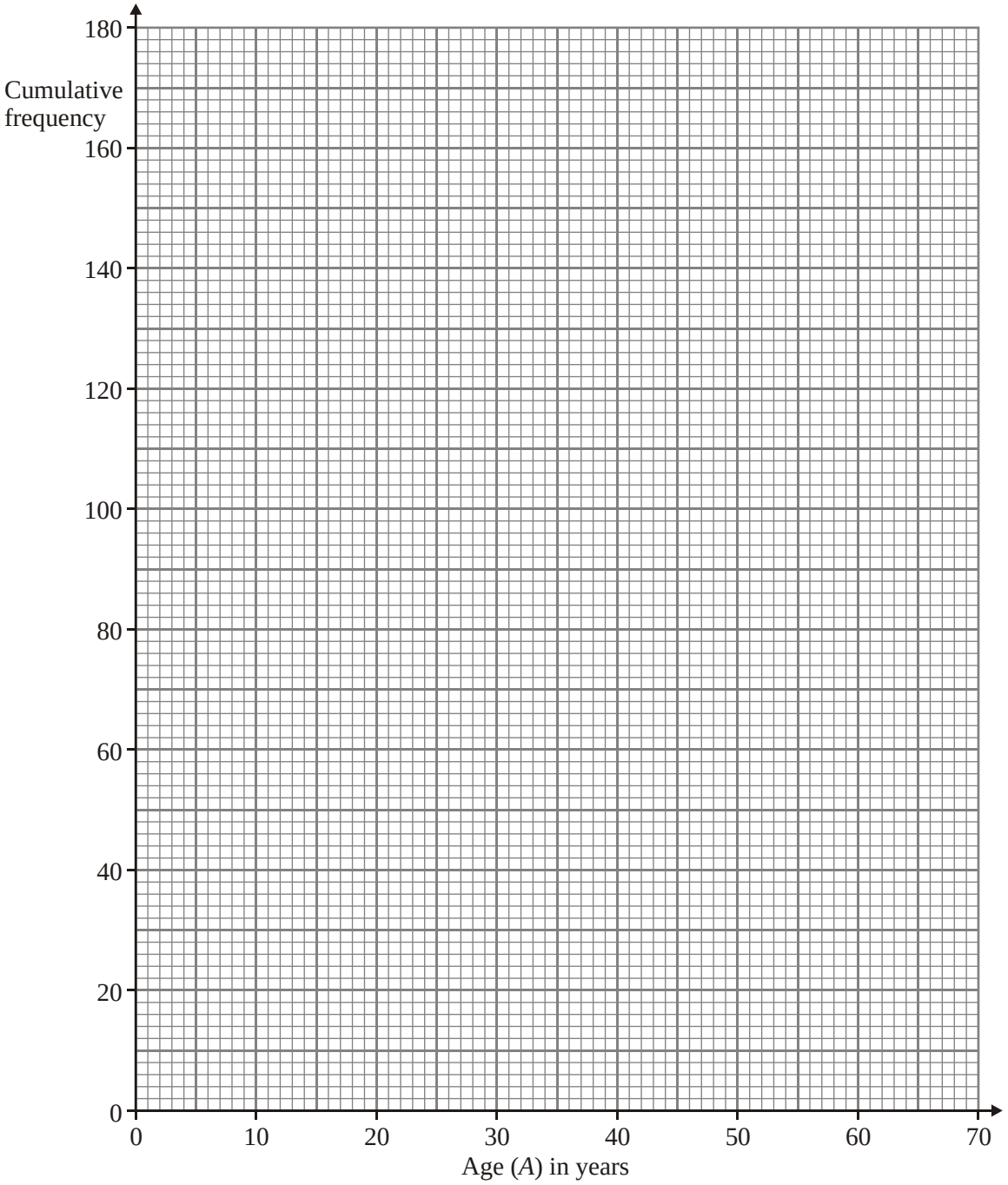


Diagram for part (d).