(a) Show that the standard deviation of 1, 1, 1, 2 and 5 is equal to $\sqrt{3}$.

1

(b) **Write down** the standard deviation of 101, 101, 101, 102 and 105.

A driving examiner looks at her diary for the next 30 days.

2

She writes down the number of driving tests booked for each day as shown below.

Number of tests booked	0	1	2	3	4	5	6
Frequency	1	1	3	2	9	10	4

(a) Find the median for this data.

(b) Find the probability that **more than** 4 tests are booked for one day.

The marks of a group of students in their October test are listed below.

  41   56   68   59   43   37   70   58   61   47   75   66

3

Calculate:

 (i)   the median;
 (ii)   the semi-interquartile range.

The teacher arranges extra homework classes for the students before the next test in December.

In this test, the median is 67 and the semi-interquartile range is 7.

Make **two** appropriate comments comparing the marks in the October and December tests.

4

Sandi takes the bus to work each day.

Over a two week period, she records the number of minutes the bus is late each day. The results are shown below.

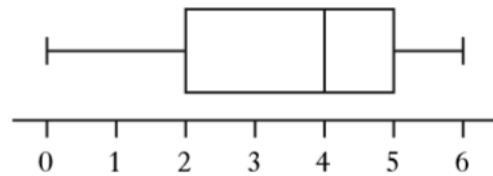$$5 \quad 6 \quad 15 \quad 0 \quad 6 \quad 11 \quad 2 \quad 9 \quad 8 \quad 7$$

(a) From the above data, find:

    (i) the median;

    (ii) the lower quartile;

    (iii) the upper quartile.

(b) Construct a boxplot for the data.

Sandi decides to take the train over the next two week period and records the number of minutes the train is late each day.

The boxplot, drawn below, was constructed for the new data.

(c) Compare the two boxplots and comment.

5

The pupils in a primary class record their shoe sizes as shown below.

8	7	6	5	6
5	7	11	7	7
7	8	7	9	6
8	6	5	9	7

(a) Construct a frequency table from the above data and add a cumulative frequency column.

(b) For this data, find:

    (i) the median;

    (ii) the lower quartile;

    (iii) the upper quartile.

(c) Construct a boxplot for this data.

A teacher recorded the marks, out of ten, of a group of pupils for a spelling test.

Mark	Frequency
5	2
6	5
7	6
8	11
9	9
10	2

(*a*) Copy the frequency table and add a cumulative frequency column.

(*b*) For this data, find:

    (i)   the median;

    (ii) the lower quartile;

    (iii) the upper quartile.

(*c*) Draw a boxplot to illustrate this data.

One weekend, the attendances at five Premier League football matches were recorded.

    8 900   12 700   59 200   10 300   9 700

The median attendance is 10 300.

(*a*) Calculate the mean attendance.

(*b*) Which of the two "averages" – the mean or the median – is more representative of the data?

    You must explain your answer.

8 In a survey, the number of books carried by each girl in a group of students was recorded.

The results are shown in the frequency table below.

Number of books	Frequency
0	1
1	2
2	3
3	5
4	5
5	6
6	2
7	1

(a) Copy this frequency table and add a cumulative frequency column.

(b) For this data, find:
  (i) the median;
  (ii) the lower quartile;
  (iii) the upper quartile.

(c) Calculate the semi-interquartile range.

(d) In the same survey, the number of books carried by each boy was also recorded.

The semi-interquartile range was 0·75.

Make an appropriate comment comparing the distribution of data for the girls and the boys.

A rugby team scored the following points in a series of matches.

$$13 \quad 7 \quad 0 \quad 9 \quad 7 \quad 8 \quad 5$$

(a)   For this sample, calculate:

  (i)   the mean;

  (ii)   the standard deviation.

  Show clearly all your working.

The following season, the team appoints a new coach.

A similar series of matches produces a mean of 27 and a standard deviation of 3·25.

(b)   Make two valid comparisons about the performance of the team under the new coach.

9

(a)   During his lunch hour, Luke records the number of birds that visit his bird-table.

The numbers recorded last week were:

$$28 \quad 32 \quad 14 \quad 19 \quad 18 \quad 26 \quad 31.$$

Find the mean and standard deviation for this data.

(b)   Over the same period, Luke's friend, Erin also recorded the number of birds visiting her bird-table.

Erin's recordings have a mean of 25 and a standard deviation of 5.

Make **two** valid comparisons between the friends' recordings.

10

A machine is used to put drawing pins into boxes.

A sample of 8 boxes is taken and the number of drawing pins in each is counted.

The results are shown below:

$$102 \quad 102 \quad 101 \quad 98 \quad 99 \quad 101 \quad 103 \quad 102$$

(a)   Calculate the mean and standard deviation of this sample.

(b)   A sample of 8 boxes is taken from another machine.

This sample has a mean of 103 and a standard deviation of 2·1.
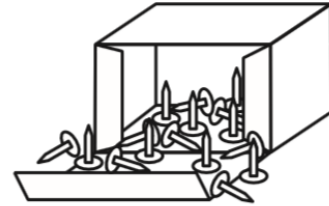
Write down two valid comparisons between the samples.

11

12

A sample of six boxes contains the following numbers of pins per box.

43   39   41   40   39   44

(a) For the above data, calculate:

(i) the mean;

(ii) the standard deviation.

The company which produces the pins claims that "the mean number of pins per box is 40 ± 2 and the standard deviation is less than 3".

(b) Does the data in part (a) support the claim made by the company?

Give reasons for your answer.

13

The heights, in centimetres, of seven netball players are given below.

173   176   168   166   170   180   171

For this sample, calculate:

(a) the mean;

(b) the standard deviation.

Show clearly all your working.

14

The results for a group of students who sat tests in mathematics and physics are shown below.

Mathematics (%)	10	18	26	32	49
Physics (%)	25	35	30	40	41

(a) Calculate the standard deviation for the mathematics test.

(b) The standard deviation for physics was 6·8.
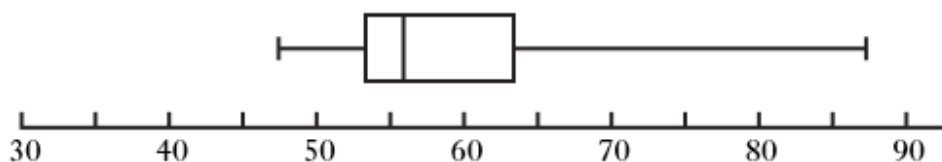Make an appropriate comment on the distribution of marks in the two tests.

This back-to-back stem and leaf diagram shows the results for a class in a recent mathematics examination.

15

Girls		Boys
1	3	
9	4	7 9
8 7 4 3 2 2	5	2 3 4 4 6 6 7 9
9 4	6	3
9 6 3	7	4 8
8 1	8	7

n = 15   n = 14

Key
3 | 7   represents 73%
   8 | 7   represents 87%

(a) A boxplot is drawn to represent one set of data.

Does the boxplot above represent the girls' data or the boys' data?
Give a reason for your answer.

(b) For the **other** set of data, find:
   (i) the median;
   (ii) the lower quartile;
   (iii) the upper quartile.

(c) Use the answers found in part (b) to construct a second boxplot.

(d) Make an appropriate comment about the distribution of data in the two sets.

Before training, athletes were tested on how many sit-ups they could do in one minute.
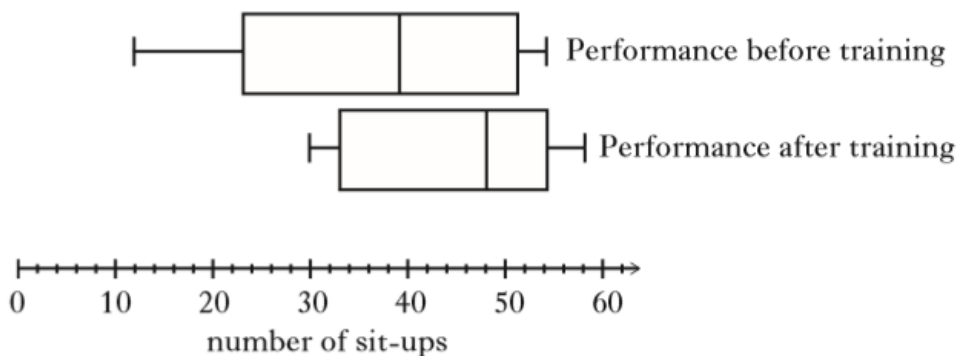
The following information was obtained:

lower quartile (Q_1)	23
median (Q_2)	39
upper quartile (Q_3)	51

(a) Calculate the semi-interquartile range.

After training, the athletes were tested again.

Both sets of data are displayed as boxplots.

(b) Make **two** valid statements to compare the performances before and after training.

Tom looked at the cost of 10 different flights to New York.

He calculated that the mean cost was £360 and the standard deviation was £74.

A tax of £12 is then added to each flight

Write down the new mean and standard deviation.

17

A ten-pin bowling team recorded the following six scores in a match.

18

| 134 | 102 | 127 | 98 | 104 | 131 |

(*a*) For this sample calculate:

    (i) the mean;

    (ii) the standard deviation.

Show clearly all your working.

In their second match their six scores have a mean of 116 and a standard deviation of 12·2.

(*b*) Consider the 5 statements written below.

    1   The total of the scores is the same in both matches.

    2   The total of the scores is greater in the first match.

    3   The total of the scores is greater in the second match.

    4   In the first match the scores are more spread out.

    5   In the second match the scores are more spread out.

Which of these statements is/are true?