Edexcel Collecting and interpreting data

Topic assessment

1. George records the time he spends per day surfing the internet for the first three weeks of May. The times, given to the nearest minute, are as follows:

0	26	13	5	18	12	35
24	61	16	10	26	15	0
0	73	21	17	16	42	32

(i) Illustrate the data using a sorted stem and leaf diagram with eight stems. Comment briefly on the shape of the distribution. [3]

(ii) Find the mode, median and mean, commenting on their relative usefulness as measures of central tendency for this data set. [5]

(iii) Calculate the standard deviation and hence find any outliers that are more than 2 standard deviations from the mean. [4]

(iv) George's Dad claims that he is spending too much time on the internet. He tells George to reduce his usage so that the mean daily time for May is 20% less than the current mean.
What is the maximum total time George can spend surfing the internet for the remaining 10 days of May? [3]

2. Over a period of time, a teacher recorded the number of time, x, each of the 20 students in the mathematics class was absent. The distribution was as follows.

Number of times absent, x	0	1	2	3	4	5	6	7	8	9	10	11 or more
Number of students, f	4	6	3	2	0	2	0	1	1	0	1	0

$$\sum f = 20, \quad \sum fx = 53, \quad \sum fx^2 = 299$$

(i) Illustrate the data using a suitable diagram. [2]

(ii) State the mode and find the median for the data set. [2]

(iii) Calculate the mean and the standard deviation of the data set. [3]

During this period of time, there were 30 mathematics lessons. The teacher needs to analyse the distribution of the number of times each student was *present* during the 30-lesson session.

(iv) Without creating a new frequency distribution, deduce values for the mean and standard deviation of the numbers of times students were present.
Describe the shape of the new distribution. [3]

There are 12 boys and 8 girls in the class. The mean of the numbers of times boys were *absent* was 3, and the standard deviation was also 3.

(v) Show that the mean of the numbers of times girls were absent is 2.125. [2]

(vi) Find the standard deviation of the numbers of times girls were absent. [3]

3. Asha keeps hens so that she has a regular supply of fresh eggs. During March, the numbers of eggs she collected on each day were as follows.

4	5	8	4	6	5	6	7	7	10	11	18	12	9	5	6
5	6	4	5	5	6	7	8	8	13	10	11	14	9	10	

(i) Find the median number of eggs collected. [1]

(ii) Find the upper quartile, lower quartile and interquartile range. [3]

(iii) Draw a box and whisker plot for the data. [3]

(iv) Using your answers to part (ii), identify any outliers that are more than 1.5 times the interquartile range below the lower quartile or above the upper quartile. [3]

(v) Calculate the mean number of eggs laid per day. [2]

4. A motoring magazine carried out a survey of the value of petrol-driven cars that were five years old. In the survey, the value of each car was expressed as a percentage of its value when new. The results of the survey are summarised in the following table.

Percentage of original value (x)	Number of cars
$15 \le x < 20$	4
$20 \le x < 25$	12
$25 \le x < 30$	18
$30 \le x < 35$	13
$35 \le x < 40$	6
$40 \le x < 45$	5
$45 \le x < 55$	2

(i) Draw a histogram on graph paper to illustrate the data. [4]

(ii) Calculate an estimate of the median of the data. [2]

(iii) Calculate estimates of the mean and standard deviation of the data, giving your answers correct to 2 decimal places. Hence identify any outliers that are more than two standard deviations from the mean. [7]

A similar survey of 60 diesel driven cars produced a mean of 34.3% and a standard deviation of 11.7%.

(iv) Use these statistics to compare the values of petrol and diesel cars five years after they were purchased as new. [2]

Total 57 marks