Mean and Variance

Spec

1 Janet and John wanted to compare their daily journey times to work, so they each kept a record of their journey times for a few weeks.

(i) Janet's daily journey times, x minutes, for a period of 25 days, were summarised by $\Sigma x = 2120$ and $\Sigma x^2 = 180044$. Calculate the mean and standard deviation of Janet's journey times. [3]

(ii) John's journey times had a mean of 79.7 minutes and a standard deviation of 6.22 minutes. Describe briefly, in everyday terms, how Janet and John's journey times compare. [2]

7 At a primary school 20 boys and 25 girls did a test. The boys' scores, b, are summarised by

$$\Sigma b = 466, \quad \Sigma b^2 = 11\,834.$$

The mean of the girls' scores is 21.88 and the standard deviation of the girls' scores is 7.929, correct to 3 decimal places.

NN 02

(i) Find the mean of the boys' scores. [1]

(ii) Find the standard deviation of the boys' scores. [3]

(iii) Find the mean score of all 45 students. [2]

(iv) Find the standard deviation of the scores of all 45 students. [4]

3 A student measured the temperature, t °C, of a liquid to the nearest 0.1 °C on 12 occasions. For each measurement he then calculated $x = t - 60$. The values of x are given in the stem-and-leaf diagram below.

NN 04

Values of x

1	3 6
2	2 4 5
3	1 1 3 5
4	0 1
5	0

Key: 1|3 means 1.3

(i) Calculate the mean of the temperatures. [4]

(ii) Calculate the standard deviation of the temperatures. [3]

1 The times, x seconds, for 80 athletes to run 100 metres were coded using the relation $y = x - 11$. The values of y are summarised by $\Sigma y = 35.2$ and $\Sigma y^2 = 175.08$. Find

Jun 05

(i) the mean and variance of y, [3]

(ii) the mean and variance of x. [2]

Mean + variance (cont)

2 A student carried out a statistics survey in a supermarket. At a checkout she recorded how many items each customer had in their shopping basket. The table below gives her results.

Number of items in the basket	4	5	6	7	8	9
Number of customers with that number of items	2	7	9	11	2	5

Jan 02

(i) Calculate the mean and standard deviation of the number of items the customers had in their shopping baskets. [5]

(ii) At the checkout each customer was given two free items. State the mean and the standard deviation of the total number of items the customers now had. [2]

Coding

6 A class of 20 students takes a test. The score, x, for each student was recorded by the teacher. The results are summarised by

$$\Sigma(x - 10) = 208 \quad \text{and} \quad \Sigma(x - 10)^2 = 2716.$$

Jan 01

(i) Calculate the standard deviation of the 20 scores. [3]

(ii) Show that $\Sigma x^2 = 8876$. [3]

(iii) Two other students took the test later. Their scores were 18 and 16. Find the mean and standard deviation of all 22 scores. [4]

7 In a science experiment, each of 12 students measured the volume of gas, $x\,\text{cm}^3$, in a particular chemical experiment. The results can be summarised by

$$\Sigma(x - 50) = 614, \qquad \Sigma(x - 50)^2 = 32\,826.$$

Nov 03

(i) Find the mean and standard deviation of the volumes of gas measured by the 12 students. [4]

(ii) Find the value of Σx^2. [4]

4 A mathematics student has been asked to calculate some properties of the volumes, $x\,\text{cm}^3$, of a sample of 8 solid objects. To make the calculations easier he decides to subtract $200\,\text{cm}^3$ from each volume. His results can be summarised as

$$\Sigma(x - 200) = 17\,000, \qquad \Sigma(x - 200)^2 = 86\,000\,000.$$

Jan 03

(i) Find the mean volume of the 8 solid objects. [2]

(ii) Find the standard deviation of the volumes of the 8 solid objects. [3]

(iii) Calculate the value of $\Sigma(x - 300)$. [2]