

Calculator is okay.

1. Give: 2, 3+k, 4, k, 9, and k-1.  
 a) Find the k when the mean of the data set above is  $\frac{29}{6}$ .

$k = 4$

- b) Find the standard deviation. Show your work.

$\bar{x} = \frac{29}{6}$

$s = \sqrt{\frac{34.8333}{6}} \approx 2.41$

| $x_i$ | $x_i - \bar{x}$    | $(x_i - \bar{x})^2$ |
|-------|--------------------|---------------------|
| 2     | $2 - \frac{29}{6}$ | 8.02778             |
| 4     | $4 - \frac{29}{6}$ | 0.69444             |
| 4     | $4 - \frac{29}{6}$ | 0.69444             |
| 3     | $3 - \frac{29}{6}$ | 3.36111             |
| 7     | $7 - \frac{29}{6}$ | 4.69444             |
| 9     | $9 - \frac{29}{6}$ | 17.36111            |

Sum: 34.8333

2. Four numbers are such that their mean is 13, their median is 14 and their mode is 15. Find the four numbers.

$\frac{sum}{4} = 13$

Two numbers are 15

$\Rightarrow x, 13,$

Median 14

15, 15

$\Rightarrow 9, 13, 15, 15$

3.  $sum = 13 \times 4$   $x$  should be 9

A mathematics test is given to a class of 20 students. One student scores 0, but all the other students score 10.

- (a) Find the mean score for the class.

$\bar{x} = \frac{1 \times 0 + 19 \times 10}{20} = 9.5$  [2]

- (b) Write down the median score.  $\Rightarrow$

$10$  [1]

- (c) Write down the number of students who scored

- (i) above the mean score;

$19$

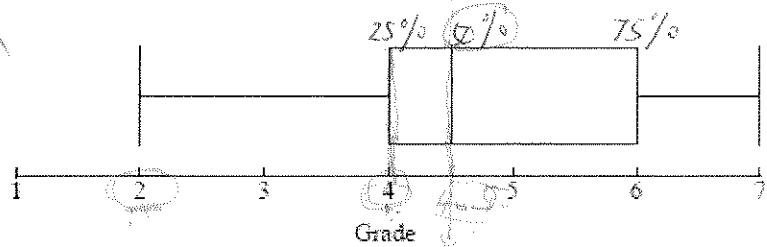
- (ii) below the median score.

$1$

[2]

4.

The box and whisker plot below illustrates the IB grades obtained by 100 students.



IB grades can only take integer values

(a) How many students obtained a grade of more than 4? *50 Students*

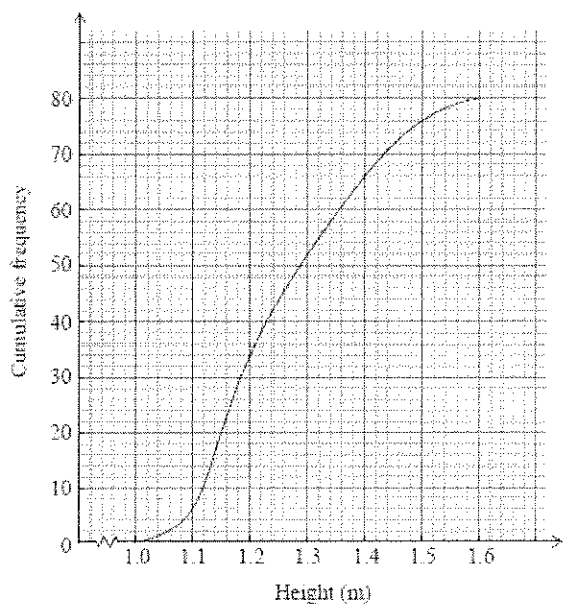
(b) State, with reasons, the maximum possible number and minimum possible number of students who obtained a 4 in the exam.

*At least 26 students obtained a 4.*

*Minimum is 2 and Max is 49*

5.

The heights of all the new boys starting at a school were measured and the following cumulative frequency graph was produced.



(b) Estimate the mean and standard deviation of the heights of these 80 boys.

(c) Explain briefly whether or not the normal distribution provides a suitable model for this population.

*No because the normal distribution is symmetric, but these data are not symmetric*

$$\mu = \frac{(1.05 \times 6) + (1.15 \times 28) + (1.25 \times 18) + (1.35 \times 14) + (1.45 \times 10) + (1.55 \times 4)}{80} = 1.26$$

(a) Complete the grouped frequency table for these data.

| Interval   | Frequency |
|------------|-----------|
| [1.0, 1.1] | 6         |
| [1.1, 1.2] | 28        |
| [1.2, 1.3] | 18        |
| [1.3, 1.4] | 14        |
| [1.4, 1.5] | 10        |
| [1.5, 1.6] | 4         |

$\sigma = 0.133$

6.

The marks obtained by a group of students in a class test are shown below.

| Marks | Frequency |
|-------|-----------|
| 5     | 6         |
| 6     | $k$       |
| 7     | 3         |
| 8     | 1         |
| 9     | 2         |
| 10    | 1         |

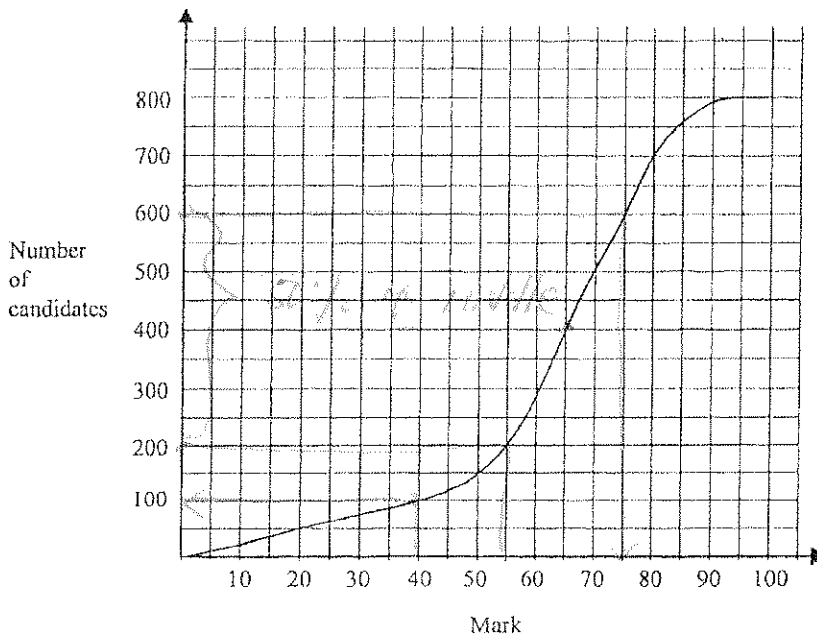
$$\frac{(5 \times 6) + (6k) + (7 \times 3) + (8 \times 1) + (9 \times 2) + (10 \times 1)}{13 + k} = 6.5$$

$$k = 5$$

Given the mean of the marks is 6.5, find the value of  $k$ .

7.

A test marked out of 100 is written by 800 students. The cumulative frequency graph for the marks is given below.



(a) Write down the number of students who scored 40 marks or less on the test. *100*

(b) The middle 50% of test results lie between marks  $a$  and  $b$ , where  $a < b$ . Find  $a$  and  $b$ .

$$a = 55 \quad b = 75$$

8. The 50 students in a class each recorded the number of minutes,  $x$ , spent doing experiments on Monday.

The results are  $\sum_{i=1}^{50} x_i = 5245$ .

a. Find the mean number of minutes the students spend doing experiments on Monday.

$$1a. \frac{5245}{50} = 104.9 \text{ min}$$

b. Two new students joined the class and reported that they spent 42 minutes, and 28 minutes respectively. Calculate the new mean including these two students.

$$1b. \frac{5245 + 42 + 28}{52} = 102.212 \text{ min}$$