(1) Fred surveys 20 people. He asks them how many phones they each own. The information he collects is shown in the frequency table below.

Number of Phones	Frequency
0	2
1	13
2	4
3	1

(a) Fred wants to work out the mean number of phones owned by each person.

His calculations are shown below:

$$\frac{(2 \times 0) + (13 \times 1) + (4 \times 2) + (1 \times 3)}{4}$$

Explain what error Fred has made.

(b) Show that the mean number of phones owned by each person is 1.2.

(c) Fred says that the mode 13. Explain why Fred is wrong.

(d) Write down the modal number (mode) of phones owned by each person.

(e) Fred then says that the range is 12. Explain why Fred is wrong (again).

(f) Explain why the range is in fact 3.

(2) The frequency table below shows the number of school days taken off in one week by 30 students in a class at a fictional school.

Number of Days Off	Frequency
0	23
1	5
2	1
3	0
4	1
5	0

Show that the mean number of days taken off is 0.37 to one decimal place.

(3) The table below shows the score each student in a class got in their maths test.

Score out of 8	Frequency
0	1
1	2
2	1
3	0
4	3
5	2
6	1
7	13
8	8
9	3
10	1

Find the mean average score per pupil for the test.

(4) Bob is growing some plants at home. He measures the height of each plant 3 months after he planted them. The frequency table below shows the information he collects

Height of Plant (h) in cm	Frequency
$0 < h \le 6$	4
$6 < h \le 10$	7
$10 < h \le 20$	6

(a) Bob gives the frequency table to his friend Fred. Fred wants to find the exact mean height of the plants. Explain why he can't do this.

(b) Fred tries to find an estimate for the mean height of each plant. His calculations are shown below:

$$\frac{(4 \times 3) + (7 \times 8) + (6 \times 15)}{17}$$

Are Fred's calculations correct?

(c) Find the mean height of the plants.

(d) Fred thinks that the range of heights of the plants is $5cm$. Explain why he could be right.

(5) Sue wants to find out how long her class game for each week. She asks each student how many hours they spend gaming each week on average. The results are shown in the frequency table below.

Number of Hours	Frequency		
$0 \le N < 2$	5		
$2 < N \le 6$	12		
$6 < N \le 10$	10		
$10 < N \le 20$	3		

(a) Find an estimate for the mean number of hours spent gaming by each pupil.

(b) Explain why it's an estimate.

(c) Explain why the median number of hours spent cannot be 0.5.

(d) A new student joins the class. They spend 7 hours a week gaming. Without doing any further calculations, explain what would happen to the mean if Sue includes the new student.

(6) Henry measures the height students cleared in the high jump event in the school sports day. The table below shows information about the heights.

Height (h) in cm	Frequency
$80 \le h < 100$	12
$100 \le h < 120$	3
$120 \le h \le 160$	7

(a) Find an estimate for the mean height jumped.

(b) Find the maximum possible range of heights jumped by the students.

(c)* Explain why the median height jumped could have been $92cm$.

(7) The frequency table below shows the time (t) minutes it took students to complete a challenge on the computer one day in school. Each student's time was recorded and rounded to the nearest second.

Time taken (t)	Frequency
$0 < t \leq 6$	3
$6 < t \leq 10$	9
$10 < t \leq 13$	5
$13 < t \leq 16$	14

(a) Complete the 'statement table' below using the table above. You are not expected to calculate each average before answering.

Statement	True	False	Could be True
One student took 20 minutes to complete the task			
The mean time taken for students to complete the task was 4 minutes			
The median time taken to complete the task was 11 minutes			
The range of times taken was 10 minutes			
The modal time taken was 1 minute and 8 seconds			
The mean must be greater than 9 minutes and 12 seconds			

(b) Explain why the modal time would not be a good average to use for the data.
(c) Explain why the mean time would be a good average to use for the data.

(8) Bettie collects information about the IQ of some people she meets at the bus station. The frequency table shows the information collected. The IQ is recorded as an integer value

IQ (x)	Frequency
$40 \leq x < 50$	6
$50 \leq x < 60$	2
$60 \leq x < 70$	6
$70 \leq x < 80$	7
$80 \leq x < 90$	0

(a)* Estimate the median IQ
(b) Find the least possible range of the IQ's.
(c) Write down the range of values that the mode cannot take.
(d) Find an estimate for the mean IQ of the people.

(9) Gary sets up a test. The test measures the number of times 20 different people a target in one minute. Some information is shown below. Three of the frequency values are missing.

Number of Times the Target is Hit	Frequency
0	13
1	2
2	
3	
4	

(a) Without carrying out any calculations, explain why the mean is higher than the mode.
(b) Without carrying out any calculations explain why the median and mode have the same value.
(c) Calculate the maximum possible mean score achieved by the 20 people.
(d) Work out the least possible range from the dataset.

(10) 32 students were asked how many different social media platforms they use.
The table below shows some information about the findings. Two of the entries in the table were omitted accidently.

Number of Platforms	Frequency
0	11
1	3
2	
3	
4	5
5	3

Given that the mean number of platforms used was exactly 2, complete the table.

(11)* Ahmed is collecting information about the number of questions 30 people answered right out of the 5 questions he asks them.
Given that the distribution is bimodal:
(a) Find the greatest possible mean score for the 30 people.
(b) Find the greatest possible range in the scores.
(c) Show that the median score can be an integer value.

(12)* Bert measures the height of his plants. The table shows information below about the heights

Height (h) in cm	Frequency
$0 < h \leq 10$	6
$10 < h \leq y$	8
$y < h \leq 40$	4
$40 < h \leq 50$	2

Given that the estimate mean height of the plants was 15.6, estimate the median height of the plants.