2.1 Statistical Measures

Question Paper

Course	OCR A Level Maths: Statistics
Section	2. Data Presentation & Interpretation
Topic	2.1 Statistical Measures
Difficulty	Medium

Time allowed: **50**

Score: **/38**

Percentage: **/100**

Question 1

A pharmacy sells face masks in a variety of sizes. Their sales over a week are recorded in the table below:

	Kids		Adults			
Size	Small	Large	S	M	L	XL
Frequency *f*	29	4	8	24	15	4

(i) Write down the mode for this data.

(ii) Explain why, in this case, the mode from part (i) would not be particularly helpful to the shop owner when reordering masks.

(iii) Given that the shop is open every day of the week, calculate the mean number of masks sold per day.

[4 marks]

Question 2

Fran sits three Maths papers and six Science papers during her final A Level exams. She achieves a mean score of 62.7% across the three Maths exam papers, and needs an overall mean score of 78.5% across all nine papers to get into her chosen University. After getting the results of four out of her six Science papers, her mean score in Science is 84.2%.

Given that each of the nine papers is weighted equally when working out the mean scores, calculate the mean score she must achieve on her final two science papers in order to gain a place at University.

[4 marks]

Question 3

Coffee4Life manufactures reusable coffee cups out of coffee plant waste. Coffee cups are tested to see how many times they can be used before they begin to disintegrate. A sample of 15 cups are tested, giving the following results for numbers of uses:

31	36	41	43	47
49	51	56	58	62
62	63	68	69	72

(a) (i) Write down the modal number of times a cup can be used.

(ii) Find the values of the lower quartile, median and upper quartile.

[4 marks]

Question 3

The advertising department at Coffee4Life designs an advert which says;

"If used once a day, $\frac{3}{4}$ of our cups last longer than 9 weeks."

(b) Explain the mistake that the advertising department has made, and state how the advert could be reworded to make it correct.

[2 marks]

Question 4

The lengths (l cm) of nine otters, measured to the nearest centimetre by a wildlife research team, are:

76 77 91 65 63 83 92 61 88

Calculate the standard deviation of the nine recorded lengths.

[3 marks]

Question 5

A machine is set to fill sacks of potatoes to a weight of 50 kg. In a random sample the following weights in kg were recorded:

53.4 46.8 47.2 42.4 43.0 47.4 55.2

(a) Code the weights using the coding $y = 0.5(\text{weight in kg} - 40)$.

[2 marks]

Question 5

(b) (i) Calculate the mean of the coded data values.

(ii) Use your answer to part (i) to show that the mean of the original data is less than 50 kg.

[4 marks]

Question 6

During initial training for the Royal Air Force new recruits must sit an aptitude test. Test scores for the latest round of recruits are shown in the table below:

Score	Frequency f
0 – 154	5
155 – 199	6
200 – 234	12
235 – 260	5

Recruits who score below the 25th percentile are disqualified.

(a) Calculate an estimate for the score recruits must have achieved to avoid disqualification.

[2 marks]

Question 6

Those who score in the top 30% move on to the next stage of training and the rest must re-sit the test.

(b) One of the recruits, Amelia, achieves a score of 231. Estimate whether Amelia will need to re-sit the test or will be moved on to the next stage of training.

[3 marks]

Question 7

A random sample of 50 students were asked how long they spent revising for their Maths exam in the 24 hours before the exam. The results are shown in the table below:

Time t (minutes)	Number of students f
$0 \leq t < 60$	5
$60 \leq t < 120$	6
$120 \leq t < 180$	17
$180 \leq t < 240$	14
$240 \leq t < 300$	8

(a) For this data, use linear interpolation to estimate the median.

[2 marks]

Question 7

Using x to represent the mid-point of each class, $\sum fx = 8340$ and $\sum fx^2 = 1\,636\,200$.

(b) Estimate the mean and the standard deviation of the amount of time students spent revising.

[3 marks]

Question 8

A college needs to standardise the test scores of all students before submitting them to the Exam Board. The scores are standardised by using the coding $y = \frac{x + 53}{200}$, where x represents the raw test score and y represents the standardised score. The college calculates the mean standardised test score to be 0.74. Find the mean of the raw test scores.

[2 marks]

Question 9

Region	Populations totals (in millions) for countries with life expectancy data	Mean Life expectancy at birth
Africa	1264	59.26
America (North, Central and Caribbean)	579	77.28
America (South)	422	73.96
Asia	4423	71.05
Europe	749	76.88
Oceania	38	77.58
Total	7475	

The large data set contains data from 236 different countries around the world. Data on mean life expectancy in different continents for 2010 is summarised above.

According to the World Data Bank the global mean life expectancy at birth in 1960 was just 52.6 years.

Using the data from above, show that the global mean life expectancy at birth in 2010 had risen to 70.3.

[3 marks]