# OCR 12 Statistics (Foundation)

1. Describe the correlation in the scatter diagram.
2. The multiple bar chart below represents the amount of expenses claimed by four employees in three months.

How much did David claim in expenses in February?

1. The diagram below shows the maths and physics results of 12 students.

Circle any point on the diagram that may be considered an outlier.

1. The mean of a sample is always equal to the mean of the population.

Is this statement true or false?

1. The time series graph below shows the number of customers at Viv’s Hairdressers over a 12 month period. Describe the trend in the number of customers over this period.
2. Here are the ages of 30 employees.

22 46 58 44 32 64 47 61 53 21 41 33 48 30 27

35 41 33 24 39 53 22 52 63 20 49 46 49 31 47

Complete the following table and identify the modal class.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Age | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50-54 | 55-59 | 60-64 |
| Number of employees |  |  |  |  |  |  |  |  |  |

1. Ian and Alan are car salesmen. Here is a table showing their sales figures for the last four months.

|  |  |
| --- | --- |
|  | **Number of cars sold** |
| **Month** | **Ian** | **Alan** |
| 1 | 8 | 20 |
| 2 | 12 | 16 |
| 3 | 12 | 16 |
| 4 | 16 | 4 |

Calculate the range and mean for the two salesmen and use these values to comment on their sales performance.

1. The data below is a record of the weekly amount of rainfall in a particular town over a six week period. Draw a time series graph to show this information.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Time** | Week 1 | Week 2 | Week 3 | Week 4 | Week 5 | Week 6 |
| **Amount of rainfall (mm)** | 6 | 10 | 17 | 15 | 8 | 14 |

1. Below is a medal table for some countries in the 2016 Olympic Games.

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Gold** | **Silver** | **Bronze** |
| **United States** | 46 | 37 | 38 |
| **GB & N Ireland** | 27 | 23 | 17 |
| **China** | 26 | 18 | 26 |

Complete the composite bar chart to display the data above.

1. The mean weight of six particular adults is 70 kg. The individual weights of five of them are
61 kg, 72 kg, 78 kg, 59 kg and 85 kg. Find the weight of the sixth adult.
2. Lester defines simple random sampling as a sample where some members of the overall population are less likely to be included than others. Is he correct? Explain your answer.
3. The pie chart below represents the responses from 180 students asked their favourite hobby. Matilda states that 50 students said reading. Is she correct? Explain your answer.
4. The table below shows the results of 40 students in a chemistry test.

|  |  |
| --- | --- |
| **Mark** | **Frequency** |
| 2 | 11 |
| 5 | 2 |
| 6 | 12 |
| 8 | 7 |
| 10 | 8 |

Dylan says that one quarter of the students scored less than the mean mark. Is he correct? Show your working.

1. Describe what is wrong with the pictogram below.

**Number of houses built over a three year period**

|  |  |
| --- | --- |
| **Year** | **Number of houses built** |
| 2014 | house.bmphouse.bmphouse.bmphouse.bmp |
| 2015 | house.bmphouse.bmphouse.bmphouse.bmphouse.bmp |
| 2016 | house.bmphouse.bmphouse.bmphouse.bmphouse.bmp |

1. The resting heart rate in beats per minute (bpm) of seven adults is shown below.

65 89 74 95 88 52 83

Lily is asked to calculate the range and median of this data. She calculates the range as

43 bpm and the median as 78 bpm. Explain what Lily has done wrong.

1. A union votes on strike action. 100 people vote and the ratio of Yes : No : Undecided

is 9 : 8 : 3. Complete the table below and use it to construct a pie chart.

|  |  |  |
| --- | --- | --- |
| **Vote** | **Number of people** | **Size of angle** |
| Yes |  |  |
| No |  |  |
| Undecided |  |  |

1. The diagram shows the amount of money spent in a shop plotted against the midday temperature, for 10 days.

A magazine headline states that ‘Cold temperatures make people spend more money’.

Does the diagram support this claim? Give a reason for your decision.

1. Five positive whole numbers have the following properties.
* All the numbers are less than 20.
* The mean of these numbers is 8.
* One of the numbers is even.
* The mode of these numbers is 9.
* Three of the numbers are prime numbers.

What are the five numbers?

1. The time series graph shows the number of new customers at Oscar’s Gym for the first five months of the year.

The target for the first six months of the year is a mean of 28 new customers. What is the minimum number of new customers needed in June to meet this target?

1. A council car park’s daily charges are £2.50 per car Monday to Friday and £1.00 per car Saturday or Sunday. The line chart shows the mean number of cars using the car park on each day of the week.

**Day of the week**

**Number of cars**

The council wishes to raise the car park’s mean income to at least £2000 per week. They propose raising the daily charge on Saturday and Sunday to £2.00 per car. Evaluate the proposal.

### Answers

1. No correlation
2. £40
3. False
4. The trend is that the number of customers is decreasing.
5. The modal class is 45-49.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Age** | 20-24 | 25-29 | 30-34 | 35-39 | 40-44 | 45-49 | 50 -54 | 55-59 | 60-64 |
| **Number of employees** | 5 | 1 | 5 | 2 | 3 | 7 | 3 | 1 | 3 |

1. **Ian** Range  cars Mean  cars

**Alan** Range  cars Mean  cars

Alan has a higher mean over the four month period so on average he has sold more cars each month. Ian has a lower range so he is more consistent than Alan.

1. 65 kg as the six weights must add up to 420 kg (706). The other weights add up to 355 kg so the difference is kg.
2. Lester is not correct as he is describing sampling bias. Simple random sampling is when each member of the population has an equally likely chance of being chosen for the sample.
3. Matilda is not correct. If 50 students said reading, then the sector angle would be 100°, but the sector angle is less than 90° so less than 50 students said reading. The actual number of students who said reading was 40.
4. Mean .

13 students out of 40 scored less than the mean mark , so he is incorrect.

1. The pictogram does not have a key. The pictures of the houses are different sizes, which may be misleading.
2. Lily is not correct as the range bpm and the median bpm. She has calculated the mean rather than the median.

|  |  |  |
| --- | --- | --- |
| **Vote** | **Number of people** | **Size of angle** |
| Yes | 45 | 162° |
| No | 40 | 144° |
| Undecided | 15 | 54° |

1. No, there may be other factors involved e.g. day of the week, whether it rains, etc. The sample is only for 10 days and may not represent a longer period of time.
2. 2, 7, 9, 9 and 13 or 2, 3, 9, 9 and 17
3. January  60, February  30, March , April , May , June .







1. At the current daily charges, the car park’s mean income is £1810 per week. Doubling the weekend daily charge would increase the mean income to £2020 per week. However, the mean income may not be met if the increased charge deters existing customers.

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| **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |  | **Assessment Objective** | **Qu.** | **Topic** | **R** | **A** | **G** |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| AO1 | 1 | Describe correlation |  |  |  |  | AO1 | 1 | Describe correlation |  |  |  |
| AO1 | 2 | Interpret a multiple bar chart |  |  |  |  | AO1 | 2 | Interpret a multiple bar chart |  |  |  |
| AO1 | 3 | Recognise outliers on a scatter diagram |  |  |  |  | AO1 | 3 | Recognise outliers on a scatter diagram |  |  |  |
| AO1 | 4 | Understand the difference between population and sample |  |  |  |  | AO1 | 4 | Understand the difference between population and sample |  |  |  |
| AO1 | 5 | Identify trends from a time series graph |  |  |  |  | AO1 | 5 | Identify trends from a time series graph |  |  |  |
| AO1 | 6 | Complete a frequency table and identify the modal class of grouped data |  |  |  |  | AO1 | 6 | Complete a frequency table and identify the modal class of grouped data |  |  |  |
| AO1 | 7 | Calculate the range and mean and make simple comparisons |  |  |  |  | AO1 | 7 | Calculate the range and mean and make simple comparisons |  |  |  |
| AO1 | 8 | Construct a time series graph |  |  |  |  | AO1 | 8 | Construct a time series graph |  |  |  |
| AO1 | 9 | Construct a composite bar chart |  |  |  |  | AO1 | 9 | Construct a composite bar chart |  |  |  |
| AO1 | 10 | Calculate the mean of ungrouped data |  |  |  |  | AO1 | 10 | Calculate the mean of ungrouped data |  |  |  |
| AO2 | 11 | Understand what is meant by simple random sampling and bias in sampling |  |  |  |  | AO2 | 11 | Understand what is meant by simple random sampling and bias in sampling |  |  |  |
| AO2 | 12 | Interpret a pie chart |  |  |  |  | AO2 | 12 | Interpret a pie chart |  |  |  |
| AO2 | 13 | Calculate and interpret the mean |  |  |  |  | AO2 | 13 | Calculate and interpret the mean |  |  |  |
| AO2 | 14 | Recognise and explain graphical misrepresentation |  |  |  |  | AO2 | 14 | Recognise and explain graphical misrepresentation |  |  |  |
| AO2 | 15 | Understand and explain how to calculate the range and median of ungrouped data |  |  |  |  | AO2 | 15 | Understand and explain how to calculate the range and median of ungrouped data |  |  |  |
| AO3 | 16 | Solve a problem using pie charts |  |  |  |  | AO3 | 16 | Solve a problem using pie charts |  |  |  |
| AO3 | 17 | Interpret results and know the difference between population and sample |  |  |  |  | AO3 | 17 | Interpret results and know the difference between population and sample |  |  |  |
| AO3 | 18 | Evaluate properties of numbers including mean and mode |  |  |  |  | AO3 | 18 | Evaluate properties of numbers including mean and mode |  |  |  |
| AO3 | 19 | Interpret and use graphical data to solve a problem |  |  |  |  | AO3 | 19 | Interpret and use graphical data to solve a problem |  |  |  |
| AO3 | 20 | Evaluate data from a line chart and consider assumptions |  |  |  |  | AO3 | 20 | Evaluate data from a line chart and consider assumptions |  |  |  |