**Higher Applications of Mathematics**

**Numerical and Graphical Representations – Questions similar to those found in AQA Core Maths.**

1. A maths exam has two papers. The two tables below show the percentage mark for 15 students for Paper 1 of the exam.

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student | A | B | C | D | E | F | G | H | I | J | K | L | M | N | O |
| % Mark | 92 | 80 | 67 | 96 | 72 | 59 | 91 | 82 | 51 | 71 | 49 | 74 | 70 | 83 | 64 |

1. Give 2 words to describe what type of data this is.

Numerical and Discrete

1. The table below shows information about the percentage marks for the same 15 students on Paper 2

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
|  | Lowest Value | Lower Quartile | Median | Upper quartile | Highest value |
| Paper 1 | 49 | 64 | 72 | 83 | 96 |
| Paper 2 | 45 | 70 | 73 | 85 | 92 |

 Complete this table to show the information for Paper 2

1. Draw two box plots to display this information.



1. Compare the performances of the students in both the papers.

The average score for each paper is very close, but there is a greater spread of results for Paper 1

1. Consumers of electricity have to decide which payment plan, or tariff to follow each year.

Tariffs usually consist of a charge per kilowatt hour (kWh) of electricity used and an annual standing charge.

The table below shows three tariffs that are offered to consumers.

|  |  |  |
| --- | --- | --- |
|  | Charge per kWh | Annual standing charge |
| Tariff A | 15p | £20 |
| Tariff B | 13p | £50 |
| Tariff C | 11p | £100 |

1. Show that using 800kWh in on month of tariff B would cost £154.

50 + (800 x 0.13) = £154

1. Draw 3 line graphs on the same axis to compare the 3 tariffs up to 3000kWh.

Coordinates for

Tariff A – (0,20) (500,95) (1000, 170) (1500, 245) (2000, 320) (2500,395) (3000, 470)

Tariff B – (0,50) (500, 115) (1000, 180) (1500, 245) (2000, 310) (2500, 375) (3000, 440)

Tariff C – (0,100) (500, 155) (1000, 210) (1500,265) (2000, 320) (2500, 375) (3000, 430)

1. 24 Students in Year 9 each at national tests in Mathematics and English.

The back to back stem and leaf diagram shows their results.

Key 5 | 1 | 9 represents marks of 15 in Mathematics and 19 in English.



1. The national average mark for the Mathematics test was 33.

Work out the percentage of these students who scored more than the national average in Mathematics.

10/24 = 42%

1. The national average mark for English was 27.

How do these results compare with the national average? Show working to support your answer.

Mean = 29.917

The average of the class was slightly higher than the national average.

1. The daily mean cloud cover for Leeming May-October 1987 is shown in the table below

|  |  |
| --- | --- |
| Daily Mean Cloud Cover | Frequency |
| 1 | 1 |
| 2 | 4 |
| 3 | 6 |
| 4 | 20 |
| 5 | 30 |
| 6 | 46 |
| 7 | 47 |
| 8 | 30 |

1. What is the mode?

7

1. What is the median?

6

1. What is the mean?

6

1. A dice is rolled 20 times, giving the following result,

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

Record this data in a frequency table.

1. The daily mean cloud cover for May 2015 from Leuchars is shown below

|  |  |
| --- | --- |
| Daily mean cloud cover | Frequency |
| 1 | 0 |
| 2 | 1 |
| 3 | 2 |
| 4 | $$c$$ |
| 5 | 3 |
| 6 | 6 |
| 7 | 5 |
| 8 | 4 |

The mean cloud cover is found to be $\frac{166}{31}$. Find the value of $c$.

10

1. The daily mean air temperature for Perth in May 1987 is shown below

|  |  |
| --- | --- |
| Daily mean air temperature (degrees, c) | Frequency |
| $$10\leq c<13$$ | 4 |
| $$13\leq c<16$$ | 18 |
| $$16\leq c<19$$ | 7 |
| $$19\leq c<21$$ | 1 |
| $$21\leq c<24$$ | 1 |

1. Find an estimate for the mean of this data
2. Find the standard deviation for this data