**IB MATH STUDIES EXAM REVIEW: Topic 2**

**Measures of Central Tendency, Measures of Spread, Grouped Data, Histograms, Stem-and-Leaf Plots, Box-and-Whisker Plots, Cumulative Frequency Graphs**

**1.** The table below shows the frequency distribution of the number of dental fillings for a group of 25 children.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Number of fillings | 0 | 1 | 2 | 3 | 4 | 5 |
| Frequency | 4 | 3 | 8 | *q* | 4 | 1 |

(a) Find the value of *q.*

(2)

(b) Use your graphic display calculator to find

(i) the mean number of fillings;

(ii) the median number of fillings;

(iii) the standard deviation of the number of fillings.

(4)

(Total 6 marks)

**2.** 80 matches were played in a football tournament. The following table shows the number of goals scored in all matches.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Number of goals** | 0 | 1 | 2 | 3 | 4 | 5 |
| **Number of matches** | 16 | 22 | 19 | 17 | 1 | 5 |

(a) Find the mean number of goals scored per match.

(2)

(b) Find the median number of goals scored per match.

(2)

A local newspaper claims that the mean number of goals scored per match is two.

(c) Calculate the percentage error in the local newspaper’s claim.

(2)

(Total 6 marks)

**3.** The weights in kg, of 80 adult males, were collected and are summarized in the box and whisker plot shown below.



(a) Write down the median weight of the males.

(1)

(b) Calculate the interquartile range.

(2)

(c) Estimate the number of males who weigh between 61 kg and 66 kg.

(1)

(d) Estimate the mean weight of the lightest 40 males.

(2)

(Total 6 marks)

**4.** 56 students were given a test out of 40 marks. The teacher used the following box and whisker plot to represent the marks of the students.



(a) Write down

(i) the median mark;

(ii) the 75th percentile mark;

(iii) the range of marks.

(4)

(b) Estimate the number of students who achieved a mark greater than 32.

(2)

(Total 6 marks)

**5.** 31 pupils in a class were asked to estimate the number of sweets in a jar.  
The following stem and leaf diagram gives their estimates.

|  |  |
| --- | --- |
| Stem | Leaf |
| 4  5  6  7  8 | 2, 4, 7, 8, 9  1, 1, 2, 3, 8, 9  0, 2, 2, 4, 6, 6, 7, 8, 8  0, 0, 1, 3, 4, 5, 5, 7  1, 2, 2 |

**Key: 4 | 7 represents 47 sweets**

(a) For the pupils’ estimates, write down

(i) the median;

(ii) the lower quartile;

(iii) the upper quartile.

(3)

(b) Draw a box and whisker plot of the pupils’ estimates using the grid below.



(3)

(Total 6 marks)

**6.** The mean of the ten numbers listed below is 6.8.

8, 5, 5, 10, 8, 4, 9, 7, *p*, *q*

(a) Write down an equation in terms of *p* and *q*.

(2)

The mode of these ten numbers is five and *p* is less than *q*.

(b) Write down the value of

(i) *p*;

(ii) *q*.

(2)

(c) Find the median of the ten numbers.

(2)

(Total 6 marks)

**7.** The cumulative frequency graph shows the amount of time in minutes, 200 students spend waiting for their train on a particular morning.



(a) Write down the median waiting time.

(1)

(b) Find the interquartile range for the waiting time.

(2)

The minimum waiting time is zero and the maximum waiting time is 45 minutes.

(c) Draw a box and whisker plot on the grid below to represent this information.



(3)

(Total 6 marks)

**8.** The weights of 90 students in a school were recorded. The information is displayed in the following table.

|  |  |
| --- | --- |
| **Weight (kg)** | **Number of students** |
| 40 ≤ *w* < 50 | 7 |
| 50 ≤ *w* < 60 | 28 |
| 60 ≤ *w* < 70 | 35 |
| 70 ≤ *w* < 80 | 20 |

(a) Write down the mid interval value for the interval 50 ≤ *w* < 60.

(1)

(b) Use your graphic display calculator to find an estimate for

(i) the mean weight;

(ii) the standard deviation.

(3)

(c) Find the weight that is 3 standard deviations below the mean.

(2)

(Total 6 marks)