**Data – Interpreting Results (H)**

Intervention Booklet

Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Class: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Useful websites:**

**www.mathswatchvle.com**

*(Video explanations and questions)*

Centre ID: twgash

Username: firstname

Password: lastname

**www.methodmaths.com**

*(Past papers online that get instantly marked)*

Centre ID: wga

Username: firstname

Password: lastname

**www.hegartymaths.com**

*(Online tutorials and quizzes)*

Login: first name and last name are backwards and case sensitive

**www.bbc.co.uk/schools/gcsebitesize/maths**

**Averages from Tables**

**Things to remember:**

* The mode is the one with the highest frequency.
* To calculate the median, find where the middle value is located by using $\frac{n+1}{2}$.
* The mean is given by $\frac{Σfx}{Σf}$, ie. the total frequency x midpoint divided by the total frequency.
* Always look back at the data to check your answer looks realistic.

**Questions:**

**1.** Zach has 10 CDs. The table gives some information about the number of tracks on each CD.

|  |  |  |
| --- | --- | --- |
| **Number of tracks** | **Frequency** |  |
| 11 | 1 |  |
| 12 | 3 |  |
| 13 | 0 |  |
| 14 | 2 |  |
| 15 | 4 |  |

(a) Write down the mode.

...........................................................

 **(1)**

(b) Work out the mean.

...........................................................

 **(3)**

**(Total 4 marks)**

**2.** 30 adults took part in a survey. They were each asked how much money they spent on lottery tickets last week. The table shows the results of the survey.

|  |  |  |
| --- | --- | --- |
| **Money (£)** | **Frequency** |  |
| 0 | 5 |  |
| 2 | 16 |  |
| 4 | 6 |  |
| 20 | 2 |  |
| 30 | 1 |  |

Work out the mean amount of money the 30 adults spent on lottery tickets.

£ ...........................................................

**(Total 3 marks)**

**3.** Josh asked 30 adults how many cups of coffee they each drank yesterday.

 The table shows his results.

|  |  |  |
| --- | --- | --- |
| **Number of cups** | **Frequency** |  |
| 0 | 5 |  |
| 1 | 9 |  |
| 2 | 7 |  |
| 3 | 4 |  |
| 4 | 3 |  |
| 5 | 2 |  |

Work out the mean.

...........................................................

 **(Total 3 marks)**

**4.** Majid carried out a survey of the number of school dinners 32 students had in one week.

 The table shows this information.

|  |  |  |
| --- | --- | --- |
| **Number of school dinners** | **Frequency** |  |
| 0 | 0 |  |
| 1 | 8 |  |
| 2 | 12 |  |
| 3 | 6 |  |
| 4 | 4 |  |
| 5 | 2 |  |

Calculate the mean.

...........................................................

 **(Total 3 marks)**

**5.** Fred did a survey on the areas of pictures in a newspaper.
The table gives information about the areas.

|  |  |
| --- | --- |
| Area (A cm2) | Frequency |
| 0 < *A* ≤ 10 | 38 |
| 10 < *A* ≤ 25 | 36 |
| 25 < *A* ≤ 40 | 30 |
| 40 < *A* ≤ 60 | 46 |

Work out an estimate for the mean area of a picture.

........................................................... cm²

**(Total 4 marks)**

**6.** The table gives some information about the time taken by a group of 100 students to complete an IQ test.

|  |  |  |
| --- | --- | --- |
| **Time (*t* seconds)** | **Frequency** |  |
| 60 < *t* < 70 | 12 |  |
| 70 < *t* < 80 | 22 |  |
| 80 < *t* < 90 | 23 |  |
| 90 < *t* < 100 | 24 |  |
| 100 < *t* < 110 | 19 |  |

(a) Write down the modal class interval.

...........................................................

 **(1)**

(b) Calculate an estimate for the mean time taken by the students.

........................................................... seconds

**(4)**

**(Total 5 marks)**

**7.** The table gives some information about the time taken by a group of 100 students to complete an IQ test.

|  |  |  |
| --- | --- | --- |
| **Time (*t* seconds)** | **Frequency** |  |
| 60 < *t* ≤ 70 | 12 |  |
| 70 < *t* ≤ 80 | 22 |  |
| 80 < *t* ≤ 90 | 23 |  |
| 90 < *t* ≤ 100 | 24 |  |
| 100 < *t* ≤ 110 | 19 |  |

Calculate an estimate for the mean time taken by the students.

........................................................... seconds

**(Total 4 marks)**

**Cumulative frequency and box plots**

**Things to remember:**

* Use a running total – adding on to complete the cumulative frequency column;
* Plot at the end of the group;
* Join up with a smooth curve;
* To find the median find the value half way down the cumulative frequency, draw across to the line and then vertically down to find the value – always show these working lines;
* To find the interquartile range find the upper quartile and the lower quartile and subtract them.
* To draw a box plot
* When comparing box plots, use the median and the IQR and keep words consistent with the question.

**Questions:**

**1.** The table shows information about the heights of 40 bushes.

|  |  |  |
| --- | --- | --- |
| **Height (*h* cm)** | **Frequency** | **Cumulative Frequency** |
| 170 ≤ *h* < 175 | 5 |  |
| 175 ≤ *h* < 180 | 18 |  |
| 180 ≤ *h* < 185 | 12 |  |
| 185 ≤ *h* < 190 | 4 |  |
| 190 ≤ *h* < 195 | 1 |  |

(a) Complete the cumulative frequency table above.

**(1)**

(b) On the grid, draw a cumulative frequency graph for your table.



**(2)**

 **(Total 3 marks)**

**2.** The table gives information about the ages of 160 employees of an IT company.

|  |  |  |
| --- | --- | --- |
| **Age** **(*A*)** **in** **years** | **Frequency** | **Cumulative Frequency** |
| 15 < *A* ≤ 25 | 44 |  |
| 25 < *A* ≤ 35 | 56 |  |
| 35 < *A* ≤ 45 | 34 |  |
| 45 < *A* ≤ 55 | 19 |  |
| 55 < *A* ≤ 65 | 7 |  |

(a) Write down the modal class interval.

      ..........................................................

 **(1)**

 (b) Complete the cumulative frequency table.

**(1)**

 (c) On the grid below, draw a cumulative frequency graph for your table.

**(2)**

 

(d) Use your graph to find an estimate for

(i) the median age of the employees,

      .......................................................... years

(i) the interquartile range of the ages of the employees.

      .......................................................... years

**(3)**

Another IT company has 80 employees. The age of the youngest employee is 24 years. The age of the oldest employee is 54 years. The median age is 38 years. The lower quartile age is 30 years. The upper quartile age is 44 years.

(e) On the grid below, draw a box plot to show information about the ages of the employees.

**(2)**



**(Total** **9** **marks)**

**3.** A company tested 100 batteries. The table shows information about the number of hours that the batteries lasted.

|  |  |  |
| --- | --- | --- |
| **Time (*t* hours)** | **Frequency** | **Cumulative Frequency** |
| 50 ≤ *t* < 55 | 12 |  |
| 55 ≤ *t <* 60 | 21 |  |
| 60 ≤ *t* < 65 | 36 |  |
| 65 ≤ *t* < 70 | 23 |  |
| 70 ≤ *t* < 75 | 8 |  |

 (a) Complete the cumulative frequency table for this information.

**(1)**

 (b) On the grid, draw a cumulative frequency graph for your completed table.

**(2)**



(c) Use your completed graph to find an estimate for the median time. You must state the units of your answer.

..........................................................

**(2)**

**(Total 5 marks)**

**4.** The table shows information about the ages of the 240 people at a club.

|  |  |  |
| --- | --- | --- |
| **Age (*t* years)** | **Frequency** | **Cumulative Frequency** |
| 15 ≤ *t* < 20 | 95 |  |
| 20 ≤ *t* < 25 | 90 |  |
| 25 ≤ *t* < 30 | 35 |  |
| 30 ≤ *t* < 35 | 15 |  |
| 35 ≤ *t* < 40 | 5 |  |

(a) Complete the cumulative frequency table.

**(1)**

 (b) On the grid, draw the cumulative frequency graph for your table.



**(2)**

(c) Use your graph to find an estimate for the median age of the people.

.......................................................... years

**(1)**

**(Total 4 marks)**

**5.** An operator took 100 calls at a call centre. The table gives information about the time (*t* seconds) it took the operator to answer each call.

|  |  |  |
| --- | --- | --- |
| **Time (*t* seconds)** | **Frequency** | **Cumulative Frequency** |
| 0 < *t* ≤ 10 | 16 |  |
| 10 < *t* ≤ 20 | 34 |  |
| 20 < *t* ≤ 30 | 32 |  |
| 30 < *t* ≤ 40 | 14 |  |
| 40 < *t* ≤ 50 | 4 |  |

 (a) Complete the cumulative frequency table.

**(1)**

(b) On the grid, draw a cumulative frequency graph for your table.

**(2)**



(c) Use your graph to find an estimate for the number of calls the operator took **more** than 18 seconds to answer.

..........................................................

**(2)**

**(Total 5 marks)**

**6.** 200 students took a test. The cumulative frequency graph gives information about their marks.



The lowest mark scored in the test was 10.
The highest mark scored in the test was 60.

Use this information and the cumulative frequency graph to draw a box plot showing information about the students’ marks.



**(Total 3 marks)**

**7.** On Friday, Peter went to the airport.
He recorded the number of minutes that each plane was delayed.
He used his results to work out the information in this table.

|  |
| --- |
| **Minutes** |
| Shortest delay | 0 |
| Lower quartile | 2 |
| Median | 8 |
| Upper quartile | 18 |
| Longest delay | 41 |

(a) On the grid, draw a box plot to show the information in the table.



**(2)**

Peter also went to the airport on Saturday.
He recorded the number of minutes that each plane was delayed.

 The box plot below was drawn using this information.

 

(b) Make two comparisons between the distributions of plane delays on Friday and on Saturday.

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………………………......................................................................................................

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 **(2)**

**(Total 4 marks)**

**Histograms**

**Things to remember:**

* Frequency = Frequency Density x Class Width;
* The y-axis will always be labelled “frequency density”;
* The x-axis will have a continuous scale.

**Questions:**

**1.** One Monday, Victoria measured the time, in seconds, that individual birds spent on her bird table. She used this information to complete the frequency table.

|  |  |
| --- | --- |
| Time (*t* seconds) | Frequency |
| 0 < *t* ≤ 10 | 8 |
| 10 < *t* ≤ 20 | 16 |
| 20 < *t* ≤ 25 | 15 |
| 25 < *t* ≤ 30 | 12 |
| 30 < *t* ≤ 50 | 6 |

(a) Use the table to complete the histogram.



**(3)**

On Tuesday she conducted a similar survey and drew the following histogram from her results.



 (b) Use the histogram for Tuesday to complete the table.

|  |  |
| --- | --- |
| Time (*t* seconds) | Frequency |
| 0 < *t* ≤ 10 | 10 |
| 10 < *t* ≤ 20 |  |
| 20 < *t* ≤ 25 |  |
| 25 < *t* ≤ 30 |  |
| 30 < *t* ≤ 50 |  |

**(2)**

**(Total 5 marks)**

**2.** This histogram gives information about the books sold in a bookshop one Saturday.



(a) Use the histogram to complete the table.

|  |  |
| --- | --- |
| **Price** **(*P*)** **in** **pounds** **(£)** | **Frequency** |
| 0 < *P* ≤ 5 |  |
| 5 < *P* ≤ 10 |  |
| 10 < *P* ≤ 20 |  |
| 20 < *P* ≤ 40 |  |

**(2)**

The frequency table below gives information about the books sold in a second bookshop on the same Saturday.

|  |  |
| --- | --- |
| **Price** **(*P*)** **in** **pounds** **(£)** | **Frequency** |
| 0 < *P* ≤ 5 | 80 |
| 5 < *P* ≤ 10 | 20 |
| 10 < *P* ≤ 20 | 24 |
| 20 < *P* ≤ 40 | 96 |

(b) On the grid below, draw a histogram to represent the information about the books sold in the second bookshop.



**(3)**

**(Total** **5** **marks)**

**3.** The incomplete table and histogram give some information about the distances walked by some students in a school in one year.



 (a) Use the information in the histogram to complete the frequency table.

|  |  |
| --- | --- |
| **Distance (d) in km** | **Frequency** |
| 0 < *d* ≤300 | 210 |
| 300 < *d* ≤ 400 | 350 |
| 400 < *d* ≤ 500 |  |
| 500 < *d* ≤ 1000 |  |

**(2)**

(b) Use the information in the table to complete the histogram.

**(1)**

**(Total 3 marks)**

**4.** The incomplete histogram and table show information about the weights of some containers.

|  |  |
| --- | --- |
| **Weight (*w*) in kg** | **Frequency** |
| 0 < *w* ≤ 1000 | 16 |
| 1000 < *w* ≤ 2000 |  |
| 2000 < *w* ≤ 4000 |  |
| 4000 < *w* ≤ 6000 | 16 |
| 6000 < *w* ≤ 8000 |  |
| 8000 < *w* ≤ 12000 | 8 |

(a) Use the information in the histogram to complete the table.

**(2)**

 (b) Use the information in the table to complete the histogram.



**(2)**

**(Total 4 marks)**

**5.** The incomplete histogram and table give some information about the distances some teachers travel to school.



(a) Use the information in the histogram to complete the frequency table.

|  |  |
| --- | --- |
| **Distance (*d*km)** | **Frequency** |
| 0 < *d* ≤ 5 | 15 |
| 5 < *d* ≤ 10 | 20 |
| 10 < *d* ≤ 20 |  |
| 20 < *d* ≤ 40 |  |
| 40 < *d* ≤ 60 | 10 |

**(2)**

 (b) Use the information in the table to complete the histogram.

**(1)**

**(Total 3 marks)**

**6.** The table gives information about the heights, in centimetres, of some 15 year old students.

|  |  |  |  |
| --- | --- | --- | --- |
| Height (*h* cm) | 145 < *h* ≤ 155 | 155 < *h* ≤ 175 | 175 < *h* ≤ 190 |
| Frequency | 10 | 80 | 24 |

Use the table to draw a histogram.



**(Total 3 marks)**

**7.** A teacher asked some year 10 students how long they spent doing homework each night.
The histogram was drawn from this information.



 Use the histogram to complete the table.

|  |  |
| --- | --- |
| Time (*t* minutes) | Frequency |
| 10 ≤ *t* < 15 | 10 |
| 15 ≤ *t* < 30 |  |
| 30 ≤ *t* < 40 |  |
| 40 ≤ *t* < 50 |  |
| 50 ≤ *t* < 70 |  |

**(Total 2 marks)**

**Moving Averages**

**Things to remember:**

* For an x-point moving average, calculate the mean of the first x values.
* Then move the group along by one value, and find the mean of those x values.
* Repeat until the end.

**Questions:**

**1.** The table shows the number of computer games sold in a supermarket each month from January to June.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Jan  | Feb  | Mar  | Apr  | May  | Jun  |
| 147  | 161  | 238  | 135  | 167  | 250  |

Work out the three month moving averages for this information.

............ ............ ........... ............

(Total 2 marks)

**2.** The table shows the number of digital cameras Bytes sold each month in the first six months of 2005.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Month | January | February | March | April | May | June |
| Number of digitalcameras sold | 30 | 19 | 20 | 15 | 27 | 39 |

 The first 3-month moving average for this data is 23

Work out the **second** 3-month moving average for this data.

.....................................

(Total 2 marks)

**3.** The table shows the number of orders received each month by a small company.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Month | Jan | Feb | Mar | Apr | May | Jun | Jul | Aug |
| Number oforders received | 23 | 31 | 15 | 11 | 19 | 16 | 20 | 13 |

 Work out the first two 4-month moving averages for this data.

..................... and .....................

(Total 3 marks)

**4.** A shop sells DVD players.

 The table shows the number of DVD players sold in every three-month period from January 2003 to June 2004.

|  |  |  |
| --- | --- | --- |
| **Year** | **Months** | **Number of DVDplayers sold** |
| **2003** | Jan – Mar | 58 |
|  | Apr – Jun | 64 |
|  | Jul – Sep | 86 |
|  | Oct – Dec | 104 |
| **2004** | Jan – Mar | 65 |
|  | Apr – Jun | 70 |

(a) Calculate the set of four-point moving averages for this data.

.................................................................................................................

(2)

(b) What do your moving averages in part (a) tell you about the trend in the sale of DVD players?

..............................................................................................................................

(1)

(Total 3 marks)

**5.** Paul and Carol open a new shop in the High Street.
The table shows the monthly takings in each of the first four months.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Month | Jan | Feb | March | April |
| Monthly takings (£) | 9375 | 8907 | 9255 | 9420 |

 Work out the 3-point moving averages for this information.

.................. ..................

(Total 2 marks)

**6.** The owner of a music shop recorded the number of CDs sold every 3 months.

 The table shows his records from January 2004 to June 2005.

|  |  |  |
| --- | --- | --- |
| **Year** | **Months** | **Number of CDs** |
| 2004 | Jan – Mar | 270 |
|  | Apr – Jun | 324 |
|  | Jul – Sept | 300 |
|  | Oct – Dec | 258 |
| 2005 | Jan – Mar | 309 |
|  | Apr – Jun | 335 |

 (a) Calculate the complete set of four-point moving averages for this information.

............. .............. ............

(2)

(b) What trend do these moving averages suggest?

..............................................................................................................................

(1)

(Total 3 marks)

**7.** The table shows some information about student absences.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Term | Autumn 2003 | Spring 2004 | Summer 2004 | Autumn 2004 | Spring 2005 | Summer 2005 |
| Number of absences | 408 | 543 | 351 | 435 | 582 | 372 |

 Work out the three-point moving averages for this information. The first two have been done for you.

434, 443, …………, ………….

(Total 2 marks)