

# Grouped data

Tuesday, 19 February 2019 6:38 pm

★ By the end of the lesson I would hope that you have the knowledge and understanding for the following points:

- Know what it means to group data
- Know why we might wish to group data
- Know what a frequency table is
- Know what a Histogram is, both
  - Frequency Histogram
  - Percentage Frequency Histogram
- Know the difference between a Histogram and a Bar Chart
- Know what the term "Interval" means
  - Know how to read intervals
  - Know how to construct intervals
- Know how to construct a histogram
- Know how to read and interpret information which is shown in a histogram

## RECAP:

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Some times the data we are dealing with has a very large spread.

This spread might also contain a LOT of data items.

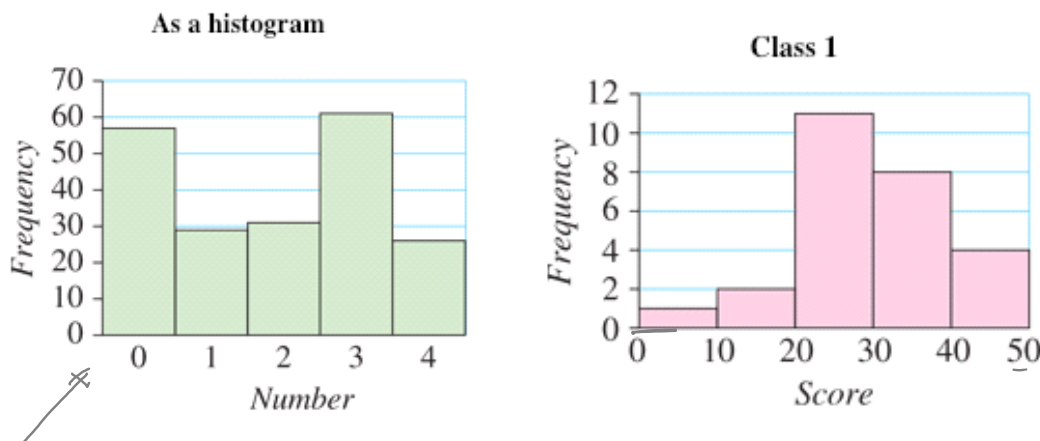
Whilst stem-and-leaf plots are great, they are only useful with small data sets.

Bar charts are great for categorical data.

Line graphs are great for Continuous Data.

When we have a lot of data spread over a large range, we find it best to use a Histogram to display it.

We have met Histograms in a previous lesson:



### What is the difference between a Histogram and a Bar Chart?

Bar charts have gaps between the bars

Bar charts are great for showing categorical data

Histograms deal with large data sets

There are no gaps between the bars of a histogram

### Why are some numbers between the bars and others either side of the bars?

In the examples shown above, we can see that Number is placed between the bars.

This is because the bars don't have numbers split into intervals.

The second Histogram has data which has been split into intervals

**What are intervals?**

This is where we group data between certain numbers

0-10	
10-20	
20-30	
30-40	
40-50	
50-60	
etc	

Bad example of grouping.  
Where does the number 10 go?

0-	
10-	
20-	
30-	
40-	
50-60	

Good example of grouping  
We know where each number goes  
The dash means up to, but not including the next limit.

When we put data into the above table, we have an example of a **Frequency Table**

**Drawing a Histogram**

Once we know what the general shape of a Histogram is, we can now construct one.

Firstly, we need the data.

Then we need to split the data into Intervals,

Then we might use a **tally column** to help us know how many data items fit into each interval

Then we need to add a new column which will be Frequency (the total of all the tallies)

**Example:**

*Extracted from the Cambridge Essentials Textbook Series*

The data below shows the number of hamburgers sold each hour by a 24-hour fast-food store during a 50-hour period.

<del>1</del>	<del>10</del>	<del>18</del>	<del>14</del>	<del>20</del>	<del>11</del>	<del>19</del>	<del>10</del>	<del>17</del>	<del>21</del>
<del>5</del>	<del>16</del>	<del>7</del>	<del>15</del>	<del>21</del>	<del>15</del>	<del>10</del>	<del>22</del>	<del>11</del>	<del>18</del>
<del>12</del>	<del>12</del>	<del>3</del>	<del>12</del>	<del>8</del>	<del>12</del>	<del>6</del>	<del>5</del>	<del>14</del>	<del>14</del>
<del>14</del>	<del>4</del>	<del>9</del>	<del>15</del>	<del>17</del>	<del>19</del>	<del>6</del>	<del>24</del>	<del>16</del>	<del>17</del>
<del>14</del>	<del>11</del>	<del>17</del>	<del>18</del>	<del>19</del>	<del>19</del>	<del>19</del>	<del>18</del>	<del>18</del>	<del>20</del>

- Set up and complete a grouped frequency table, using class intervals 0-,5-,10-, etc. Include a percentage frequency column.
- Construct a frequency histogram.
- How many hours did the fast-food store sell:
  - fewer than 10 hamburgers?
  - at least 15 hamburgers?

**Create the Frequency Table and enter the data:**

Class Interval	Tally	Frequency
0-		3
5-		

0-	(111)	3
5-	11	7
10-		15
15-	1111	19
20-25	1	6
Total		

**HOLD ON! The question wants a Percentage Frequency Table?!**

All good!

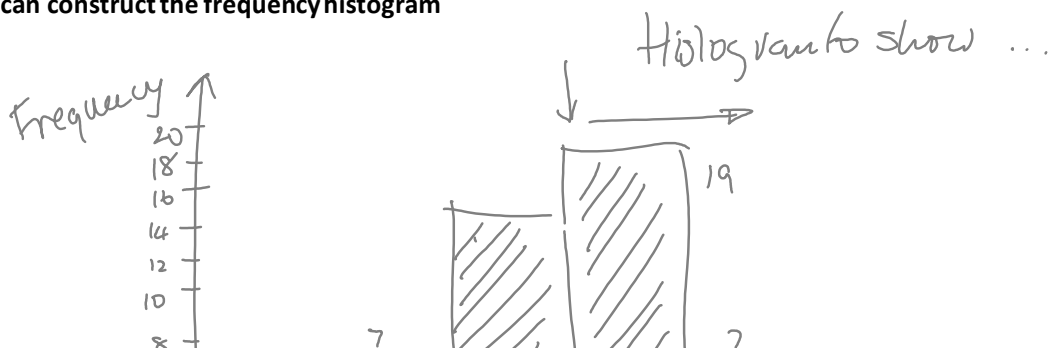
We just need to add a new column which lets us convert the frequency to percentages.

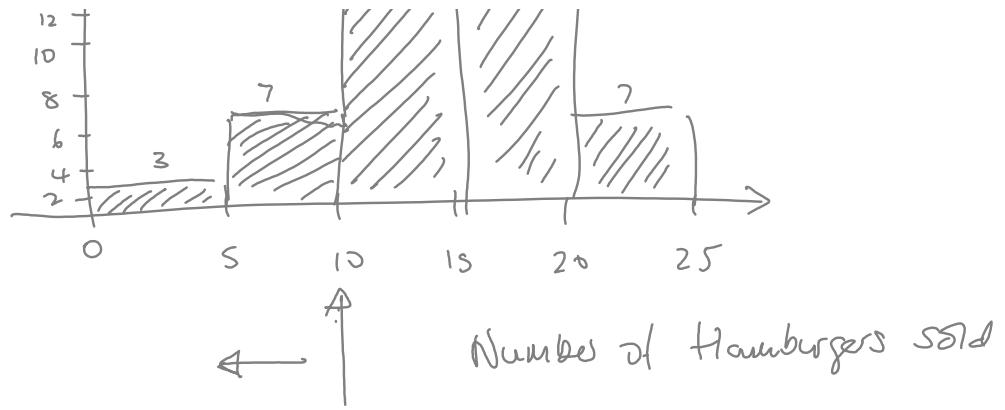
$$\text{Percentage Frequency} = \frac{\text{Frequency}}{\text{Total}} \times 100$$

Class Interval	Tally	Frequency	Percentage Frequency
0-		3	6%
5-		7	14%
10-		15	30%
15-		19	38%
20-25		6	12%
Total		50	100%

$$\frac{3}{50} \times 100$$

Now we can construct the frequency histogram





Now, use the histogram to answer the questions we were asked:

- i. How many hours did the fast-food store sell:
  - a. fewer than 10 hamburgers?
  - b. at least 15 hamburgers?

10 hours

26 hours