

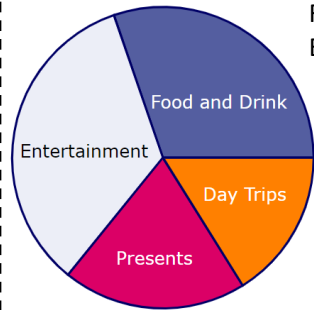
1. Pie Charts

In a pie chart the size of a segment represents its **proportion**.

To calculate the angles needed to draw the pie chart, divide 360° by the total frequency, this gives you an angle multiplier.

Freya worked out how she spent her holiday money.

reason	£		degrees
Food and Drink	32	$32 \times 3.396... = 108.679^\circ$	109°
Entertainment	36	$36 \times 3.396... = 122.264^\circ$	122°
Presents	21	$21 \times 3.396... = 71.321^\circ$	71°
Day Trips	17	$17 \times 3.396... = 57.736^\circ$	58°
			360°



Freya's total spend was £106

Each pound would have

$$360 \div 106 = 3.396...^\circ$$

At this stage we do not round this value.

Each pound needs $3.396...^\circ$ of the pie chart.

The pie chart shows the proportions of Freya's money that she spent on each category.

2. Using group frequency tables

A survey is taken at the gym to ask people their age.

The data was put into categories called classes.

Modal class: the group with the highest frequency.

22 - 25

Class containing the median: the group in which the

middle value can be found. There are 224 people in total, so we are looking for the group which contains the 112th person.

19 - 21

Estimate of the mean: 56 people are between 16 and 18. We do not know how many are 16, 17 or 18. We can make an estimate that on average these 56 people were 17 years old, because 17 is the midpoint of 16 and 18. Find the midpoint for each group and then multiply the midpoints by the frequency, this gives the total ages.

Now add together the total ages and divide this answer by the total frequency.

$$\frac{4724}{224} = 21.1$$

age	freq.
16-18	56
19-21	64
22-25	92
26-29	12

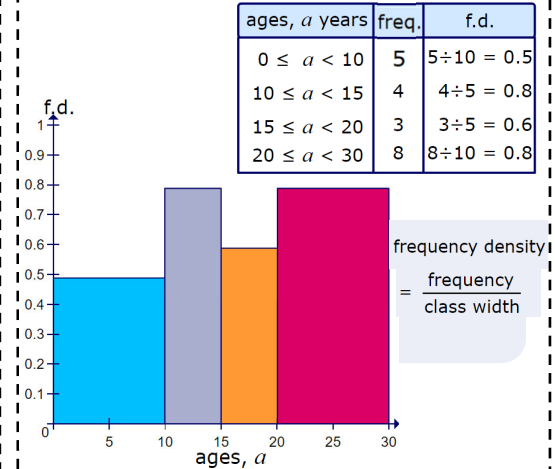
age	freq.	mid-point	total age freq × midpoint
16-18	56	17	952
19-21	64	20	1280
22-25	92	23.5	2162
26-29	12	27.5	330
	224		4724

5. Histograms

Histograms look very similar to **bar charts**.

The difference is that a histogram can have bars of **different widths**.

The **frequency** is then measured by the **area of each bar**, not the height.



Maths, Y9 - Data

3. Scatter diagrams

This **scatter graph** shows test results in maths and art.

There is a **strong negative correlation**.

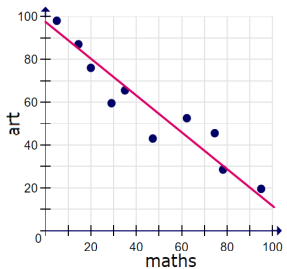
We can predict the art score of a student who scores 40 in maths.

We need a **line of best fit**.

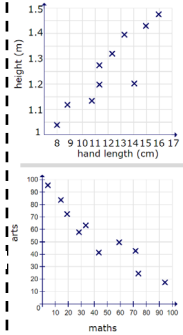
A line of best fit follows the trend of the data, with roughly the same amount of points either side of the line.

The line of best fit shows a student scoring 40 marks in maths will score around 63 marks in art.

Using the line of best fit to make a prediction is called **interpolation**.



A. Correlation



Positive correlation

As one variable increases so does the other

Negative correlation

As one variable increases the other decreases

No correlation

There is no link between the variables

4. Inter-quartile range

A. Box plots

A survey was made of the lengths of 12 worms.

Here are the results. The lengths are in cm.

8.4 9.8 5.5 8.2 6.8 7.8 3.2 9.1 6.8 5.0 6.7 8.2

Find the **median**, **lower quartile** and **upper quartile**.

Firstly, put the numbers into size order.

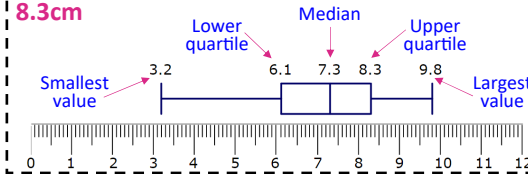
6.1 7.3 8.3

3.2 5.0 5.5 | 6.7 6.8 6.8 | 7.8 8.2 8.2 | 8.4 9.1 9.8

The **median** is the halfway point. 50% of the worms are less than **7.3cm**

The **lower quartile** is a quarter of the way into the data. 25% of the worms are less than **6.1cm**

The **upper quartile** is three quarters of the way into the data. 75% of the worms are less than **8.3cm**



B. Cumulative frequency graphs

time t (s)	freq.	cumulative frequency
$0 < t \leq 1$	1	1
$1 < t \leq 2$	3	$1 + 3 = 4$
$2 < t \leq 3$	12	$4 + 12 = 16$
$3 < t \leq 4$	16	$16 + 16 = 32$
$4 < t \leq 5$	19	51
$5 < t \leq 6$	21	72
$6 < t \leq 7$	17	89
$7 < t \leq 8$	11	100
$8 < t \leq 9$	6	106
$9 < t \leq 10$	2	108

Cumulative frequency is a running total.

Plot the cumulative frequency against the value at the end of the group.

There are 108 values

Median = 54th value

= 5.1

Lower quartile

= 27th value

= 3.7

Upper quartile

= 81st value

= 6.5

