STATISTICS & PROBABILITY

AVERAGES

The **mean** is the total of all of the values divided by the number of values.

The **median** is the middle value when the data is listed in numerical order.
If there is an even number of data values then the median is the mean of the middle 2 values.

The **mode**, or **modal** value, is the value which has the greatest frequency.
The mode is useful for non-numerical data i.e. we can find the modal car colour of the cars in the car park.

SPREAD

The **range** is a measure of the spread of the data. The **range** is the highest value – lowest value.

FREQUENCY TABLES

A **frequency table** is used to organise a set of data. Frequency tables can be used for numerical or non-numerical data.

No of Siblings	Tally	Frequency
0	𝍸	4
1	𝍸 ||	7
2	𝍸 𝍸 |	11
3	𝍸	5
4	||	2
5	|	1

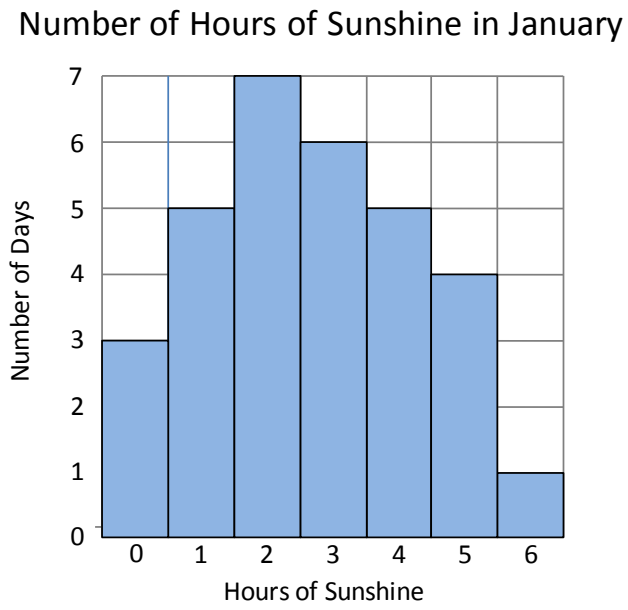
Eye Colour	Tally	Frequency
Blue	𝍸 𝍸 ||||	14
Brown	𝍸 |||	8
Green	|||	3

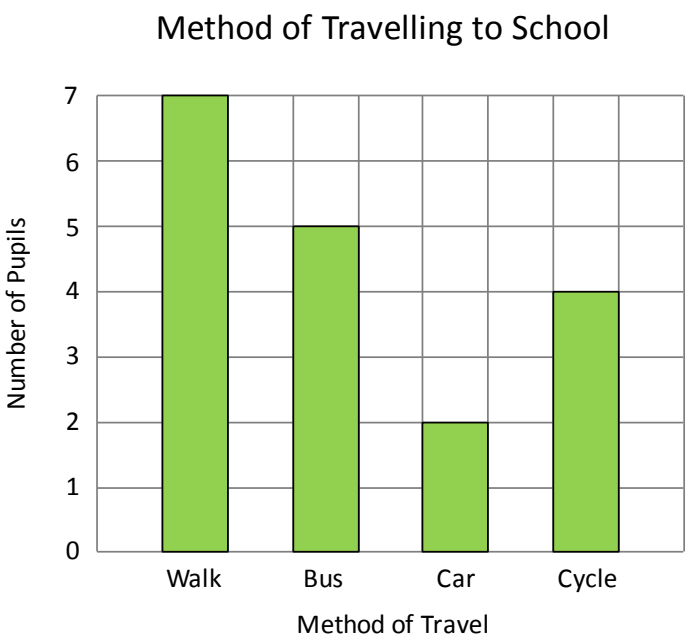
When numerical data has a large range we use a frequency table with class intervals.

% Test Mark	Tally	Frequency
31-40	|	1
41-50	|||	3
51-60	𝍸	5
61-70	𝍸 |||	8
71-80	𝍸 |	6
81-90	|||	3
91-100	||	2

BAR GRAPHS

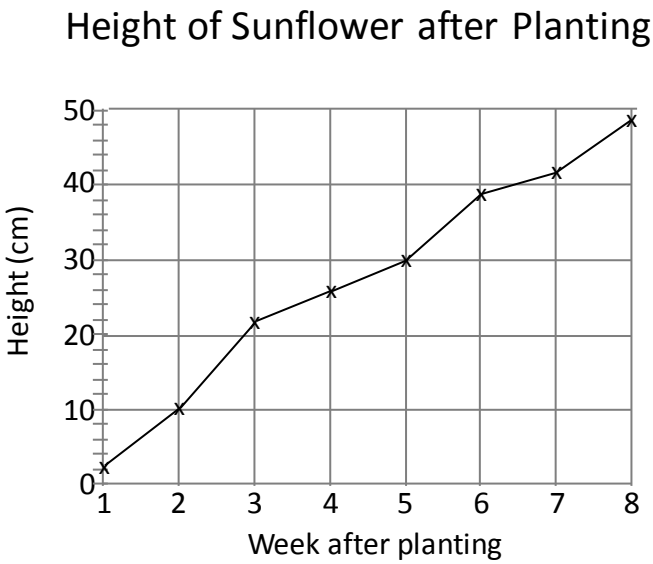
A bar graph is a graph consisting of parallel, usually vertical bars with lengths proportional to the frequency with which the quantities occur. When the horizontal axis shows categories rather than numerical values we usually leave gaps between the bars. The gaps between different bars MUST be the same width.





LINE GRAPHS

Line graphs have sets of points which are plotted and joined by straight lines. When asked to find the trend of a graph we are looking for a general description of it. The trend of the graph above is increasing.



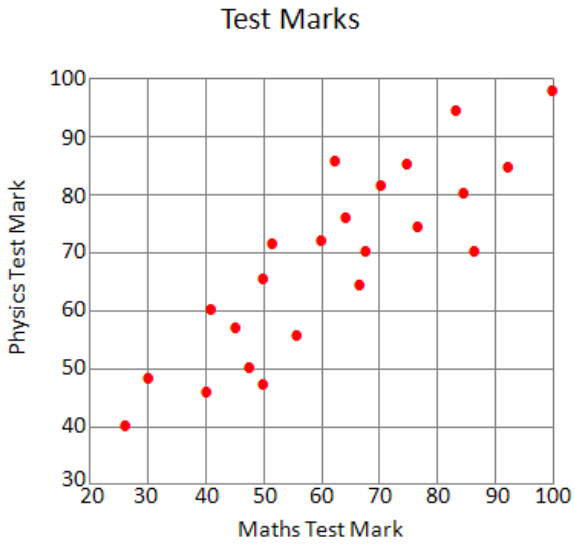
SCATTER GRAPHS

A scatter diagram is used to establish a connection between 2 variables. eg Plot a scatter graph to show the Maths and Physics test marks for a group of pupils.

Maths	92	86	62	50	83	68	45	70	56	41	30	40	52	67	60	64	75	50	77	47	84	26	100
Physics	85	70	86	47	94	70	57	82	56	60	48	46	72	64	73	77	85	66	74	50	80	40	98

The graph shows a positive correlation between the Maths test marks and the Physics test marks i.e. as the Maths test marks increasethe Physics marks increase.

A negative correlation means that as one variable increases the other decreases. Negative correlation is shown by a downward trend on the graph.

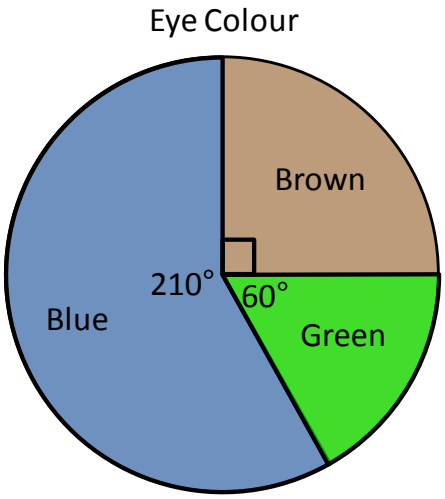


PIE CHARTS

A pie chart is a circular diagram used to display data.
The pie chart shows the eye colour of 180 first year pupils.
Looking at the angles we can see that

$\frac{90}{360}$ or $\frac{1}{4}$ have brown eyes, $\frac{60}{360}$ or $\frac{1}{6}$ have green eyes and $\frac{210}{360}$ or $\frac{7}{12}$ have blue eyes.

So 45 pupils have brown eyes, 30 pupils have green eyes and 105 have blue eyes.



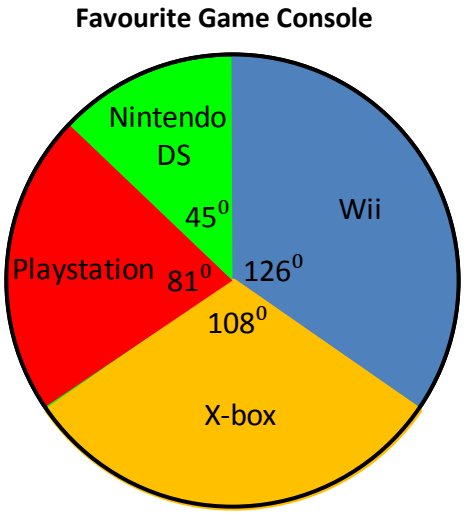
80 pupils were asked to name their favourite game console. The results are:

Wii – 28, X-box – 24, Playstation – 18, Nintendo DS - 10

Show this information on a pie-chart.

- Find the fraction of the pie-chart required for each game console.
- Use the fraction to find the angle required for each game console.

Fraction	Angle
Wii - $\frac{28}{80}$	$\frac{28}{80} \times 360 = 126°$
X-box - $\frac{24}{80}$	$\frac{24}{80} \times 360 = 108°$
Playstation - $\frac{18}{80}$	$\frac{18}{80} \times 360 = 81°$
Nintendo DS - $\frac{10}{80}$	$\frac{10}{80} \times 360 = 45°$



PROBABILITY

Probability tells you the likelihood of something happening.
If the probability = 0 then the event will NOT happen.
If the probability = 1 then the event will definitely happen.

$$\text{Probability of event happening} = P(\text{event}) = \frac{number\ of\ favourable\ outcomes}{number\ of\ possible\ outcomes}$$

e.g. Flip of a coin – P(heads) = ½
Ross of a dice – P(4) = $^1/_6$
Selecting 1 card from a deck – P(Ace) = $^4/_{52} = {}^1/_{13}$

Statistics Practice

http://www.cimt.plymouth.ac.uk/projects/mepres/book7/bk7i3/bk7_3i1.htm - Learn about SCATTER GRAPHS.

http://www.cimt.plymouth.ac.uk/projects/mepres/book7/bk7i11/bk7_11i2.htm - Learn about PICTOGRAMS, BARCHARTS and PIE CHARTS.

http://www.cimt.plymouth.ac.uk/projects/mepres/book7/bk7i21/bk7_21i1.htm -INTRODUCTION TO PROBABILITY

http://www.cimt.plymouth.ac.uk/projects/mepres/book7/bk7i21/bk7_21i2.htm - CALCULATING PROBABILTIY

www.supermathsworld.com Ask your teacher for login details.

Select DATA from the options.
Try AVERAGES, DISPLAYING DATA 1, DISPLAYING DATA 2, GROUPED DATA, PIE CHARTS, PROBABILITY 1 and SCATTER GRAPHS.

http://www.mathsisfun.com/data/index.html

Read about statistics and probability. Try the practice questions.