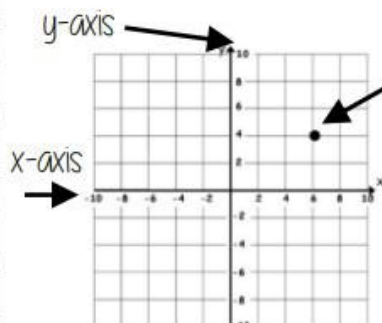




### Coordinates in four quadrants



Coordinate (x, y) (6, 4)

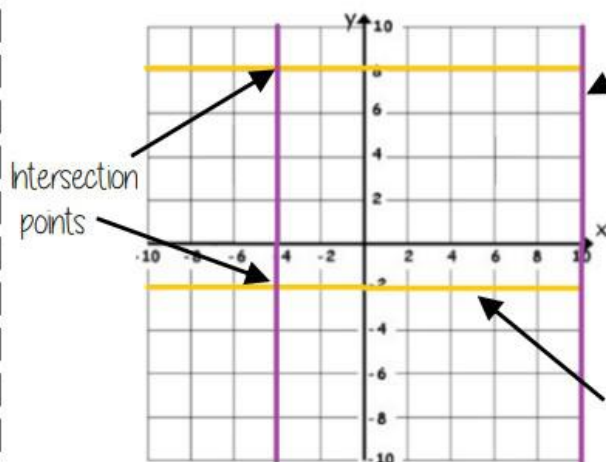
From the origin this coordinate is 6 places along the positive x axis and 4 places up the positive y axis.

Always the position on the x axis first  
Always the position on the y axis second

(0, a) Will be always be a point on the y axis (a can be any number)

(a, 0) Will be always be a point on the x axis (a can be any number)

### Lines parallel to the axes



All the points on this line have a x coordinate of 10

Lines parallel to the y axis take the form  $x = a$  and are vertical

Lines parallel to the x axis take the form  $y = a$  and are horizontal

All the points on this line have a y coordinate of -2  
e.g (3, -2) (7, -2) (-2, -2)  
all lay on this line because the y coordinate is -2

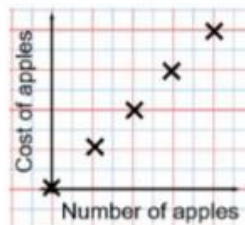
'a' can be ANY positive or negative value including 0

### Keywords

- Quadrant:** four quarters of the coordinate plane.
- Coordinate:** a set of values that show an exact position.
- Horizontal:** a straight line from left to right (parallel to the x axis)
- Vertical:** a straight line from top to bottom (parallel to the y axis)
- Origin:** (0,0) on a graph. The point the two axes cross
- Parallel:** Lines that never meet
- Gradient:** The steepness of a line
- Intercept:** Where lines cross

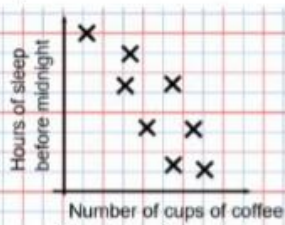


### Linear Correlation



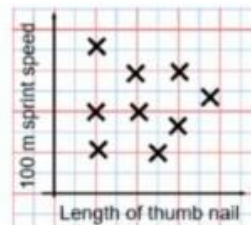
**Positive Correlation**

As one variable increases so does the other variable



**Negative Correlation**

As one variable increases the other variable decreases



**No Correlation**

There is no relationship between the two variables

### Ungrouped Data

The number of times an event happened

The table shows the number of siblings students have. The answers were  
3, 1, 2, 2, 0, 3, 4, 1, 1, 2, 0, 2

Number of siblings	Frequency
0	2
1	3
2	4
3	2
4	1

Best represented by discrete data (Not always a number)

2 people had 0 siblings. This means there are 0 siblings to be counted here

0  
3  
 $2 + 2 + 2 + 2$  OR  $2 \times 4 = 8$   
 $3 + 3$  OR  $3 \times 2 = 6$

2 people have 3 siblings so there are 6 siblings in total

**OVERALL there are**  
 $0 + 3 + 8 + 6 + 4$   
**Siblings = 21 siblings**

### Grouped Data

If we have a large spread of data it is better to group it. This is so it is easier to look for a trend. Form groups of equal size to make comparison more valid and spread the groups out from the smallest to the largest value.

**Discrete Data**  
The groups do not overlap

Cost of TV (£)	Tally	Frequency
101 - 150	THL II	7
151 - 200	THL THL I	11
201 - 250	THL	5
251 - 300	III	3

We do not know the exact value of each item in a group - so an estimate would be used to calculate the overall total (Midpoint)

**Continuous Data**  
To make sure all values are included inequalities represent the subgroups

x Weight (g)	Frequency
$40 < x \leq 50$	1
$50 < x \leq 60$	3
$60 < x \leq 70$	5

e.g. this group includes every weight bigger than 60g, up to and including 70g

### Keywords

**Variable:** a quantity that may change within the context of the problem

**Relationship:** the link between two variables (items). Eg. Between sunny days and ice cream sales

**Correlation:** the mathematical definition for the type of relationship.

**Origin:** where two axes meet on a graph

**Line of best fit:** a straight line on a graph that represents the data on a scatter graph

**Outlier:** a point that lies outside the trend of graph

**Quantitative:** numerical data

**Qualitative:** descriptive information, colours, genders, names, emotions etc.

**Continuous:** quantitative data that has an infinite number of possible values within its range.

**Discrete:** quantitative or qualitative data that only takes certain values

**Frequency:** the number of times a particular data value occurs





### Construct sample space diagrams



Sample space diagrams provide a systematic way to display outcomes from events

The possible outcomes from rolling a dice

	1	2	3	4	5	6
H	1H	2H	3H	4H	5H	6H
T	1T	2T	3T	4T	5T	6T

The possible outcomes from tossing a coin

This is the set notation to list the outcomes S =

In between the { } are the possible outcomes

$$S = \{ 1H, 2H, 3H, 4H, 5H, 6H, 1T, 2T, 3T, 4T, 5T, 6T \}$$

### Probability from sample space

The possible outcomes from rolling a dice

	1	2	3	4	5	6
H	1H	2H	3H	4H	5H	6H
T	1T	2T	3T	4T	5T	6T

The possible outcomes from tossing a coin

What is the probability that an outcome has an even number and a tails?

This is the set notation that represents the question P

$$P(\text{Even number and Tails}) = \frac{3}{12}$$

In between the ( ) is the event asked for

There are three even numbers with tails

Numerator: the event

Denominator: the total number of outcomes

There are twelve possible outcomes

### Probability from two-way tables

	Car	Bus	Walk	Total
Boys	15	24	14	53
Girls	6	20	21	47
Total	21	44	35	100

$$P(\text{Girl walk to school}) = \frac{21}{100}$$

The event

The total in the set

The total number of items

### Product Rule

The number of items in event a

x

The number of items in event b

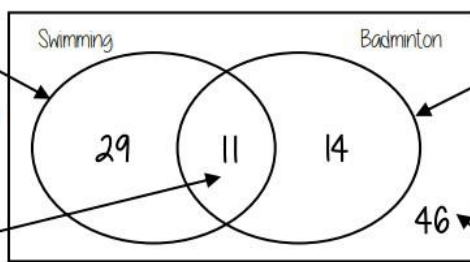
### Probability from Venn diagrams

100 students were questioned if they played badminton or went to swimming club  
40 went swimming, 25 went to badminton and 11 went to both.

This whole curve includes everyone that went swimming

Because 11 did both we calculate just swimming by 40 - 11

The intersection represents both Swimming AND badminton



This whole curve includes everyone that went to badminton

Because 11 did both we calculate just badminton by 25 - 11

The number outside represents those that did neither badminton or swimming

$$P(\text{Just swimming}) = \frac{29}{100}$$

$$100 - 29 - 11 - 14$$