Year 9 Scheme of Learning

MODULE 2

GCSE EXAMS

Year 11

- Bespoke revision
- Perimeter, area & volume
- Bounce back: Constructions & Loci
- Quadratic equations
- Compound measures
- Percentages, including interest
- Indices & standard form
- Bounce back: Quadratic equations
- Constructions & Loci
- Probability & diagrams
- Expressions & equations
- Pythagoras & Trigonometry

Year 10

- Perimeter, area & volume
- Averages
- Angles & Transformations
- Straight line & other graphs
- Graphs
- Sequences
- Pythagoras & Trigonometry
- Ratio & proportion
- Pythagoras & Trigonometry
- Fractions & percentages
- Data handling
- Algebra: including substitution & brackets

Year 9

- Handling data & measures of location
- Angles in parallel lines, lines & polygons
- Fractions & percentages
- Sequences & Indices
- Brackets, equations & inequalities
- Number; including index laws
- Area of trapezia & circles; Line symmetry & reflections
- Standard form & number sense
- Working in Cartesian plane
- Multiplicative reasoning
- Representing data, tables & probability

Year 8

- Sets & probability
- Proof
- Ratio & proportion
- Fraction arithmetic
- Geometric reasoning
- Prime numbers
- Ratio & scale
- Multiplying & dividing fractions

Year 7

- Fraction & % of amounts
- Fractions, decimals & percentages
- Use and understand algebraic notation
- Place value and ordering, including decimals
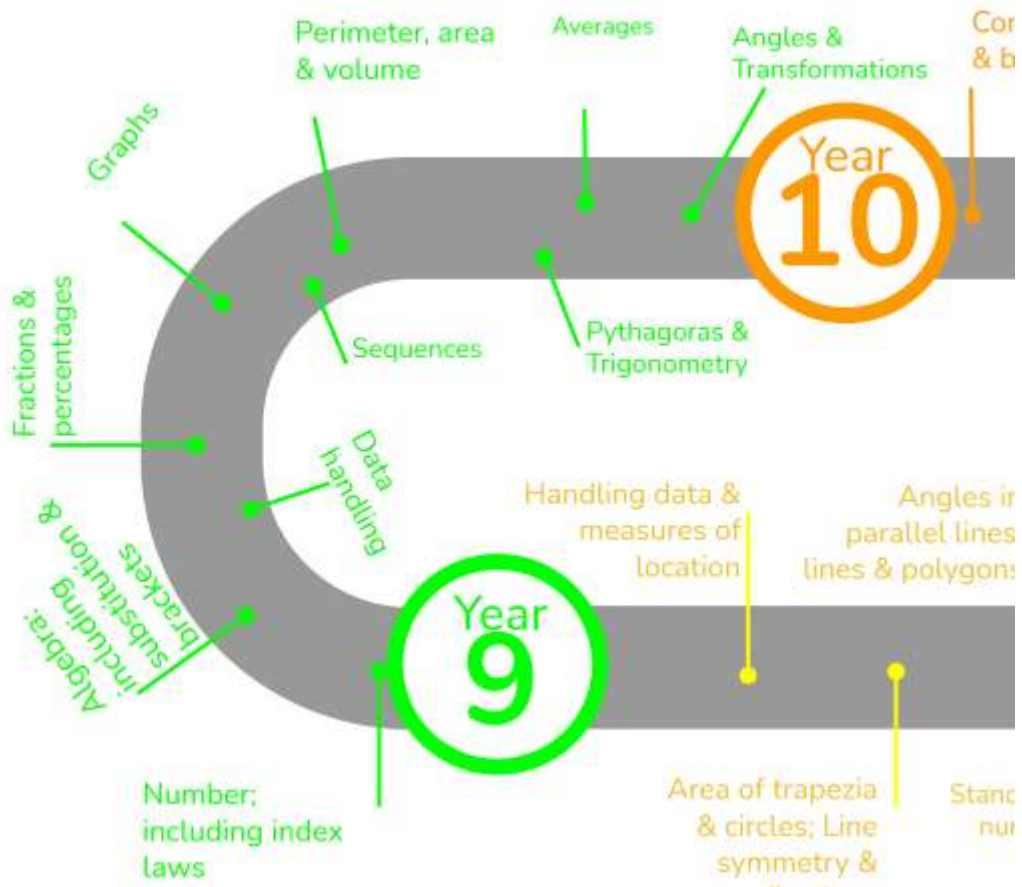- Operations with equations & directed numbers
- Problem solving with four main operations
- Equality & Equivalence - solving equations
- Sequences

Core/Foundation 2021/22 (includes Y11 bounce back)

# This is what your child will be taught in Year 9 in MATHS

Year 10
- Perimeter, area & volume
- Averages
- Angles & Transformations
- Con & b
- Graphs
- Sequences
- Pythagoras & Trigonometry

Year 9
- Fractions & percentages
- Data handling
- Algebra including substitution & brackets
- Number; including index laws
- Handling data & measures of location
- Angles in parallel lines lines & polygons
- Area of trapezia & circles; Line symmetry &
- Stand nu

Cross Curricular Lessons

English Maths Science Coding

They will have also have specific lessons linked to other subjects and a diet of retrieval built into their lessons

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In Year 9 Module 2 your child will study:

- Data Handling
- Fractions and Percentages
- Ratio
- Sequences
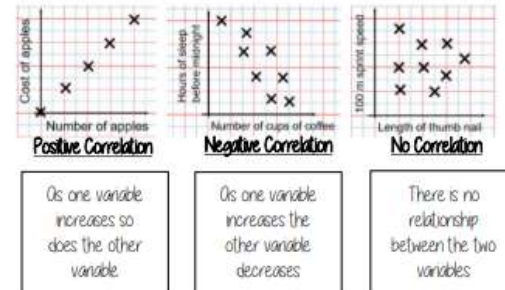- Graphs
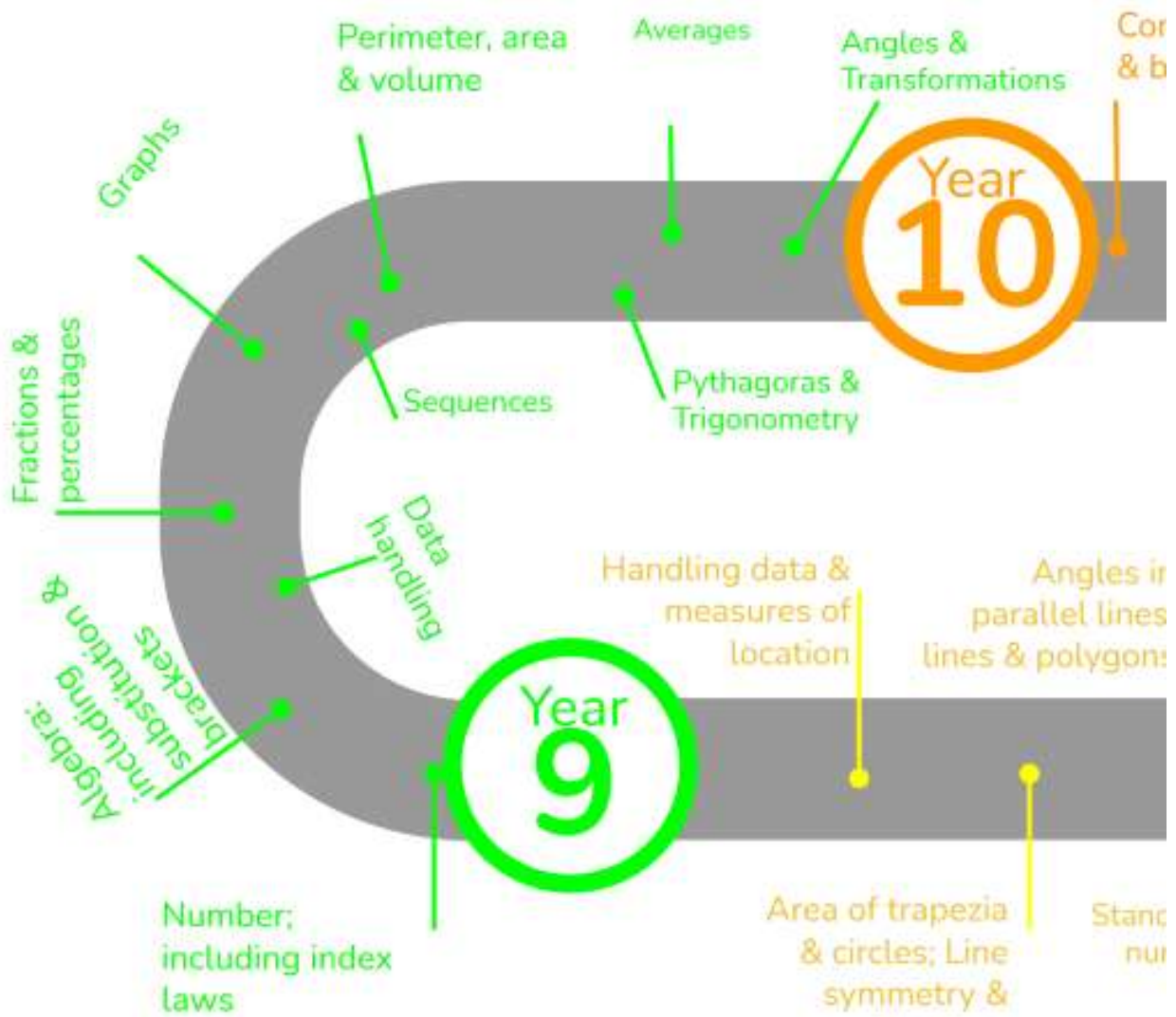
Unit 3: Data Handling

Topics covered include:

- Design and use two way tables
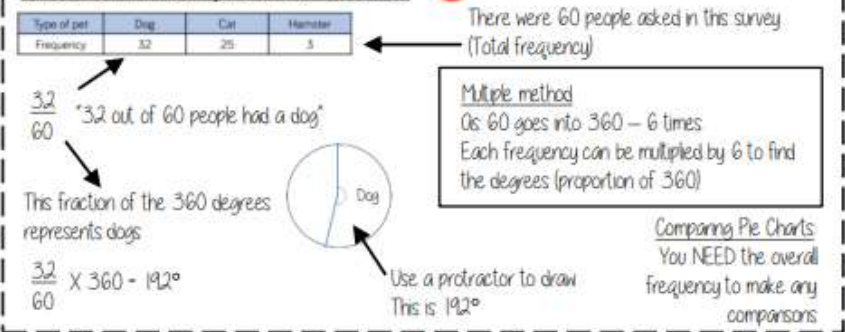- Draw and interpret bar charts, pie charts, scatter graphs and time-series graphs

Keywords

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

Relationship: the link between two variables (items). E.g. 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.
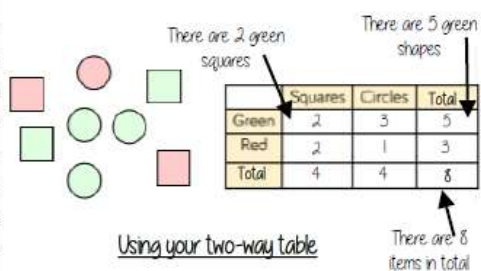
Linear Correlation

Positive Correlation	Negative Correlation	No Correlation
As one variable increases so does the other variable.	As one variable increases the other variable decreases	There is no relationship between the two variables

Draw and interpret Pie Charts (R)

Type of pet	Dog	Cat	Hamster
Frequency	32	25	3

There were 60 people asked in this survey (Total frequency)

$\frac{32}{60}$ "32 out of 60 people had a dog"

This fraction of the 360 degrees represents dogs

$\frac{32}{60} \times 360 = 192°$

Multiple method
As 60 goes into 360 – 6 times
Each frequency can be multiplied by 6 to find the degrees (proportion of 360)

Comparing Pie Charts:
You NEED the overall frequency to make any comparisons

Use a protractor to draw
This is 192°

The line of best fit

The Line of best fit is used to make estimates about the information in your scatter graph

Things to know:
- The line of best fit **DOES NOT** need to go through the origin (The point the axes cross)
- There should be approximately the same number of points above and below the line (It may not go through any points)
- The line extends across the whole graph

It is only an estimate because the line is designed to be an average representation of the data

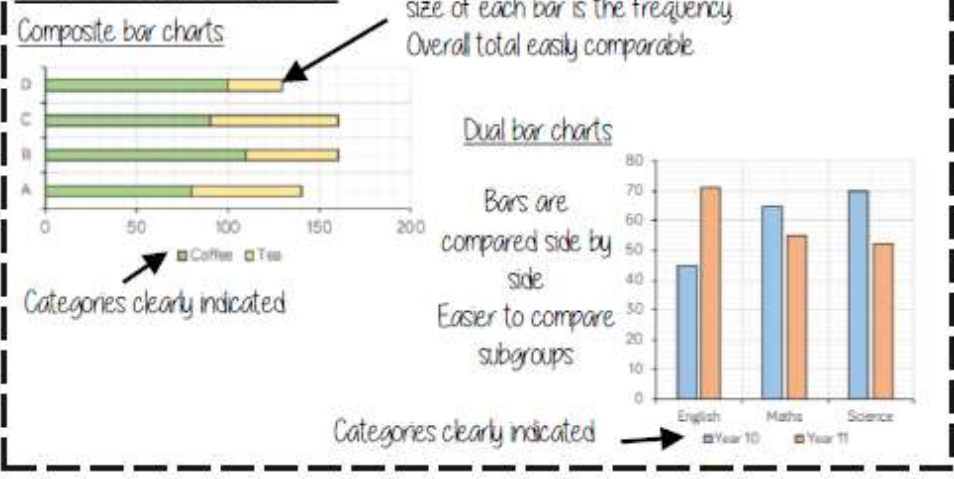It is always a **straight line.**

Representing data in two-way tables

Two-way tables represent discrete information in a visual way that allows you to make conclusions, find probability or find totals of sub groups

There are 2 green squares

There are 5 green shapes

	Squares	Circles	Total
Green	2	3	5
Red	2	1	3
Total	4	4	8

There are 8 items in total

Using your two-way table

To find a fraction
e.g. What fraction of the items are red? 3 red items
but 8 items in total $= \frac{3}{8}$

Interleaving: Use your fraction, decimal percentage equivalence knowledge

Bar and line charts

Composite bar charts

☐ Coffee ☐ Tea

Categories clearly indicated

Compare the bars green compared to yellow. The size of each bar is the frequency. Overall total easily comparable

Dual bar charts

Bars are compared side by side

Easier to compare subgroups

Categories clearly indicated

☐ Year 10 ☐ Year 11

In this unit your child will study:

- Identify and use equivalent fractions
- Convert between mixed numbers and improper fractions
- Arithmetic with fractions
- Converting between fractions, decimals and percentages
- Calculating fractions and percentages of amounts
- Percentage increase and decrease
- Percentage change

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Mixed numbers and fractions

$\frac{7}{5}$ Improper fraction

$1\frac{2}{5}$ Mixed number

In this model 5 parts make up a whole

Fractions can be bigger than a whole

Addition/ Subtraction of fractions ®

$\frac{4}{5} - \frac{2}{3}$

$\frac{12}{15}$ $\frac{10}{15}$ $= \frac{2}{15}$

Use equivalent fractions to find a common multiple for both denominators

Multiplication/ Division of fractions ®

Shade in 3 parts

Repeat 4 on this many rows

$\frac{3}{4} \times \frac{2}{3} = \frac{6}{12}$

Parts shaded

Modelled

This many columns

This many rows

Total number of parts in the diagram

Remember to use reciprocals

$\frac{2}{5} \div \frac{3}{4}$

$\frac{2}{5} \times \frac{4}{3}$

Multiplying by a reciprocal gives the same outcome

Represented

$= \frac{8}{15}$

Convert FDP ®

$\frac{70}{100}$ → This also means 70 ÷ 100 → 70 out of 100 squares → 70 hundredths = 7 "tenths" 0.7 → 70 hundredths = 70%

Using a calculator

Be careful of recurring decimals e.g. $\frac{1}{3}$ = 0.3333333 $\frac{1}{3}$ = 0.3 The dot above the 5

This will give you the answer in the simplest form

Convert to a decimal → × 100 converts to a percentage

Keywords

Percent: parts per 100 – written using the / symbol
Decimal: a number in our base 10 number system. Numbers to the right of the decimal place are called decimals
Fraction: a fraction represents how many parts of a whole value you have
Equivalent: of equal value
Reduce: to make smaller in value
Growth: to increase/ to grow
Integer: whole number, can be positive, negative or zero
Invest: use money with the goal of it increasing in value over time (usually in a bank)

Fraction/ Percentage of amount ®

£60

Find $\frac{3}{5}$ of £60 | £12 | £12 | £12 | £12 | £12 |

£36

Remember
$\frac{3}{5}$ = 60%

10% of £60 = £6
50% of £60 = £30
60% of £60 = £36

Remember
$\frac{3}{5}$ = 60% = 0.6

60% of £60
= 0.6 x 60
= £36

Unit 4: Fractions and Percentages

Unit 5: Ratio

Topics covered include:

- Simplifying ratio
- Dividing into a given ratio
- Problem solving with ratio

Simplifying a ratio

Cancel down the ratio to its lowest form

"For every 6 days of rain there are 4 days of sun"

6:4

÷ by 2

rain   sun

3:2

Find the biggest common factor that goes into all parts of the ratio

For **6** and **4** the biggest factor (number that multiples into them is **2**)

"For every 3 days of rain there are 2 days of sun" — when this happens twice the ratio becomes 6:4

Ratio as a fraction

Trees: Flowers

3 : 7

Trees

Flowers

There are 3 parts for trees

$$\frac{\text{Number of parts of in group}}{\text{Total number of parts}}$$

Ratio

Fraction of trees

$\frac{3}{10}$

Fraction

Tree parts 3 + Flower parts 7 = 10

Sharing a whole into a given ratio

James and Lucy share £350 in the ratio 3:4. Work out how much each person earns

Model the Question

James: Lucy

3 : 4

James

Lucy

£350

Find the value of one part

Whole: £350
7 parts to share between (3 James, 4 Lucy)

£350 ÷ 7 = £50

□ = one part
= £50

Put back into the question

James: Lucy

(x 50) 3 : 4 (x 50)

£150:£200

James = 3 x £50 = £150

£350

Lucy = 4 x £50 = £200

Keywords

Sequence: items or numbers put in a pre-decided order
Term: a single number or variable
Position: the place something is located
Linear: the difference between terms increases or decreases (+ or -) by a constant value each time
Non-linear: the difference between terms increases or decreases in different amounts, or by x or ÷
Difference: the gap between two terms
Arithmetic: a sequence where the difference between the terms is constant
Geometric: a sequence where each term is found by multiplying the previous one by a fixed non zero number

Representing a ratio

"For every 5 boys there are 3 girls"

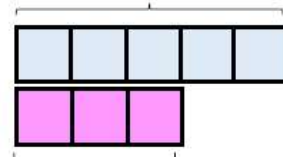This is the "whole" — boys and girls together

5:3
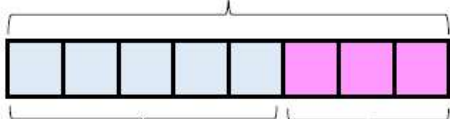
This represents the 5 boys   This represents the 3 girls

Double Number Line

This represents the 5 boys

This is the "whole" — boys and girls together

This represents the 3 girls

In this unit your child will study:

- Next terms and generating sequences
- Finding the nth term of a linear sequence
- Recognise and use other sequences

H Finding the algebraic rule

This is the 4 times table

4n

→ 4, 8, 12, 16, 20....

↓ ↓ ↓

7, 11, 15, 19, 22

This has the same constant difference – but is 3 more than the original sequence

4n + 3

4n + 3

This is the constant difference between the terms in the sequence

This is the comparison (difference) between the original and new sequence

Keywords

Sequence: items or numbers put in a pre-decided order

Term: a single number or variable

Position: the place something is located

Linear: the difference between terms increases or decreases (+ or -) by a constant value each time

Non-linear: the difference between terms increases or decreases in different amounts, or by x or ÷

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Linear and Non Linear Sequences

Linear Sequences – increase by addition or subtraction and the same amount each time

Non-linear Sequences – do not increase by a constant amount – quadratic, geometric and Fibonacci.

- Do not plot as straight lines when modelled graphically
- The differences between terms can be found by addition, subtraction, multiplication or division
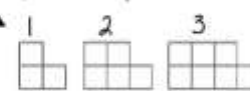
Fibonacci Sequence – look out for this type of sequence

0 1 1 2 3 5 8 ...

Each term is the sum of the previous two terms.

Sequence in a table and graphically

Position: the place in the sequence

1   2   3

3   5   7

"The term in position 3 has 7 squares"

Term: the number or variable (the number of squares in each image)

Graphically

In a table

Position	1	2	3
Term	3	5	7

+2 +2
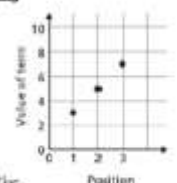
Because the terms increase by the same addition each time this is linear – as seen in the graph
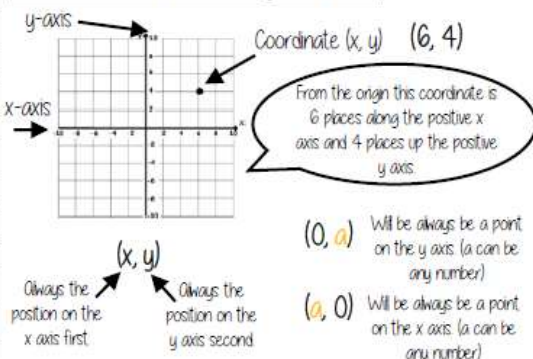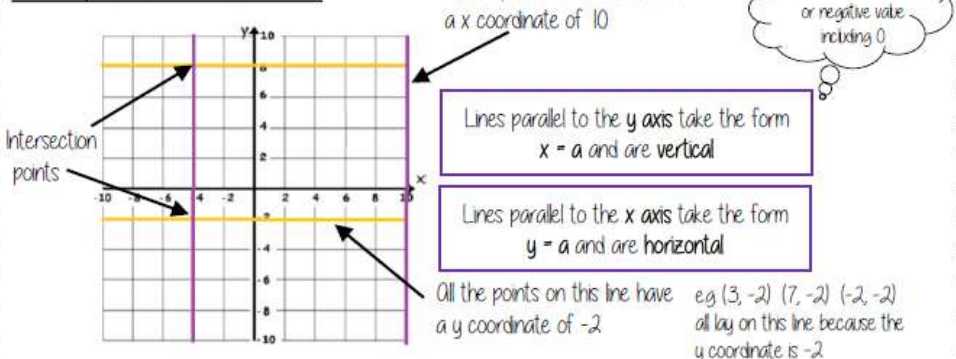
Unit 6: Sequences

Unit 7: Graphs

Topics covered include:

- Coordinates
- Plotting linear graphs
- Identifying and comparing gradient and y-intercept
- Understanding and using y = mx+c
- Plot quadratic graphs
- Solve equations using graphs
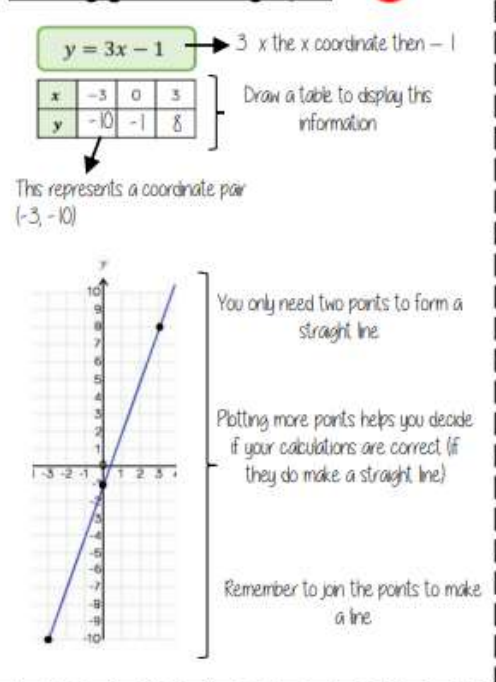- Plot cubic graphs
- Plot reciprocal graphs
- Distance-time graphs
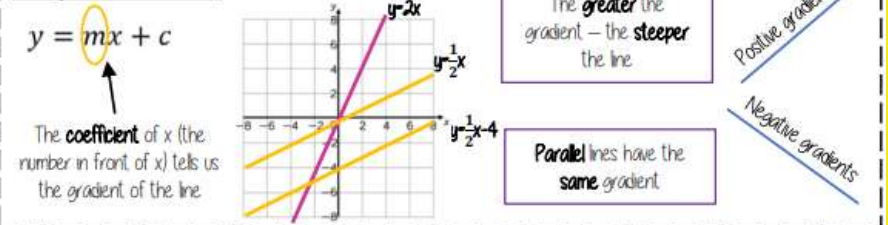
Coordinates in four quadrants

y-axis

x-axis

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

(x, y)

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

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

Intersection points

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

eg (3, -2) (7, -2) (-2, -2) all lay on this line because the y coordinate is -2

Plotting y = mx + c graphs ®

$y = 3x - 1$ → 3 x the x coordinate then − 1

x	-3	0	3
y	-10	-1	8

Draw a table to display this information

This represents a coordinate pair (-3, -10)

You only need two points to form a straight line

Plotting more points helps you decide if your calculations are correct (if they do make a straight line)

Remember to join the points to make a line

Compare Gradients

$y = \textcircled{m}x + c$

The **coefficient** of x (the number in front of x) tells us the gradient of the line

y=2x

y=½x

y=½x-4

The **greater** the gradient – the **steeper** the line

Positive gradients

Negative gradients

Parallel lines have the **same** gradient

Keywords

Gradient: the steepness of a line

Intercept: where two lines cross. The y-intercept: where the line meets the y-axis

Parallel: two lines that never meet with the same gradient

Co-ordinate: a set of values that show an exact position on a graph

Linear: linear graphs (straight line) – linear common difference by addition/ subtraction

Asymptote: a straight line that a graph will never meet

Reciprocal: a pair of numbers that multiply together to give 1

Perpendicular: two lines that meet at a right angle

We recommend pupils have a Casio scientific calculator.
The Casio calculator featured is the one we use when demonstrating in lessons.

On our school website there is a calculation policy showing the methods we use for common operations. It can be found at: Our School > Policies

St Joseph's Catholic Academy

Calculation Policy