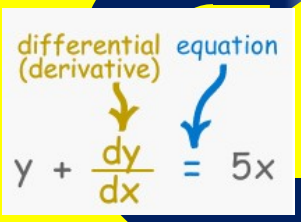
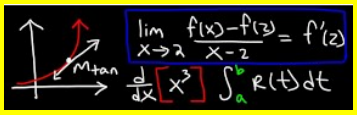
algebra

Degree: Partial Differential Equations, Proof, Analysis, Linear Algebra





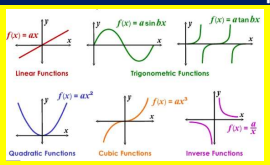
Core Maths

A-Level

Factor theorem
Coordinate geometry
Sequences and series
Calculus
Functions
Linear programming
Sequences and growth

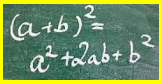
YEAR 11

Change of sign
$(x-2)^2 + (y-3)^2 = 25$
Rearranging formulae
Functions
Iteration
Equation circle
Proof
Turning points
Roots graphically
Trapezia
Tangent
Area under curve
Curved graphs
Simultaneous equations
Velocity time graphs
Expand triple brackets
Standard graphs
Fibonacci
Geometric and quadratic Sequences
Linear
Gradient
Roots
Quadratic formula
$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$



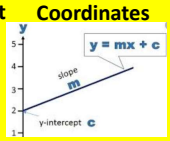
YEAR 10

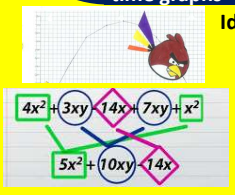
Rearranging formulae
Solving linear inequalities
Expanding double brackets
Factorising quadratics
Solving quadratics
Simple proofs
Difference of two squares



YEAR 9

Quadratic Reciprocal
Parabolas
Distance-time/ speed-distance time graphs
Equation of a straight line
Plotting functions
Substitution
Factorise linear expressions
Solving equations
$20x + 5 = 5x + 65$
Identifying straight line graphs
Coordinates
Decimals and fractions

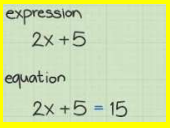


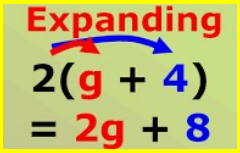


YEAR 8

Terms
Collecting like terms
Expressions
Simplifying
Substitution
Formulae
Solving simple equations
Expand single brackets
Sequences
Square, cube, triangular numbers

YEAR 7

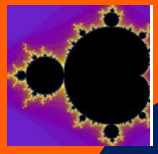




Coming From Key Stage 2...

Representation of unknown numbers with letters

Algebra



Degree: p-adic numbers, set theory, axiom of choice, surreal numbers

$$e = \lim_{n\to\infty}\left(1+\frac{1}{n}\right)^n$$

Core Maths

APR

AER

A-Level

e

Small angle trigonometry

Numerical Methods

$\mathbb{Z}$ $\mathbb{N}$ $\mathbb{R}$ $\mathbb{Q}$

number

YEAR 11

π

Iteration

Accuracy

Calculations

Scaling axes

Scale factors

Estimation

Solving ratio problems

Best buys

Income Tax

Savings and investments

Compound interest

Rationalise denominator

Surds

$0.666666\ldots = 0.\dot{6}$

Four operations

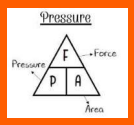
Recurring decimals

Truncation

Accuracy

Fractions

Solving proportional problems



π

Irrational numbers $\sqrt{2}$

YEAR 10

Upper and lower bounds

Fractional indices

Scientific calculations

Surds

Percentages

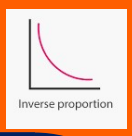
Combinations

Reciprocal

$42.65\text{cm} \le l < 42.75\text{cm}$

YEAR 9

$\uparrow 17\%$ $100\% + 17\% = 117\% = 1.17$ $\times 1.17$



Ratio problems

Reverse %

Multipliers

Percentage increase decrease

Standard Form

Budgeting – how much money do I have?!

£

Proportion

% change

%

Estimation

BARCLAYS

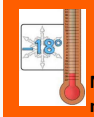
Interest

4 operations

SIF

YEAR 8

Square, cube, triangular numbers



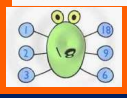
Negative numbers

Decimals

Integers

Multiples

Fractions, decimals, conversions



Types of number

Calculations

LCM

Sharing in a ratio

BIDMAS

HCF

Percentages

Fractions (x /)

Rounding

Fractions (+ -)

Prime factor decomposition

Fractions, decimals, percentages conversions

YEAR 7

Mental maths

2 3 5 7 11 13 17
19 23 29 31 37 41

30% of 40 = 12
60% 130 = 78

Coming From Key Stage 2...

Place value, negative numbers, factors, multiples, primes fractions, decimals, percentages

Number

Degree: Topology, manifolds, differential geometry

Core Maths

A-Level

Centre of Mass | Vectors | Trigonometry | Coordinate geometry | Sequences and growth

YEAR 11

3D Plans and elevations | Circle Theorems | Similar shapes | Bearings | Sectors and arc lengths | Sine Rule | Cosine Rule | Area of triangle ½absinC | Distance, area, volume, speed, time | Cones, pyramids, spheres | Column vectors | Enlargements | Transformations | Functional problems | Volume | Surface Area | Congruence | SSS, SAS, ASA, RHS | Constructions | Loci

YEAR 10

Scale drawings | Bearings | Pythagoras' Theorem | SOHCAHTOA | Sectors and arc lengths (¼ ½) | Vectors

YEAR 9

PFA | DMV | Speed distance time | Volume prisms | Plans and elevations | Quadrilaterals | Reflection | Rotation | Area circumference circle | Parts of circle | Surface area | Symmetry | Nets | Translations

YEAR 8

Obtuse | Acute | Interior | Exterior | Equilateral | Compound shapes | Draw/ measure angles | Angle and line facts | Metric measure conversions | Perimeter | Area rectangle | Area triangle | Parallel lines | Special Quadrilaterals | Reflex | Isosceles | Scalene | Corresponding and alternate angles | Types triangle

YEAR 7

Coming From Key Stage 2...

Units of measure, volume, area, triangles, quadrilaterals, angles

Shape

Degree: Mathematical Biology, Student T-test, Central Limit Theorem

Core Maths

A-Level

YEAR 11

YEAR 10

YEAR 9

YEAR 8

YEAR 7

Statistics / probability

Binomial

$$b_1 = \frac{\sum xy - \frac{(\sum x)(\sum y)}{n}}{\sum x^2 - \frac{(\sum x)^2}{n}}$$

$$_nC_r = \frac{n!}{(n-r)!r!}$$

Hypothesis testing

Probability

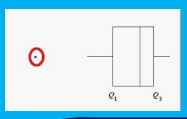
Standard deviation

Data presentation and interpretation

PMCC

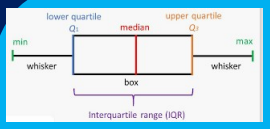
Normal distribution

Probability



Histograms

Outliers



Box plots

UQ, LQ, IQR

Experimental probability

Cumulative frequency

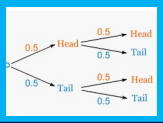
Quartiles

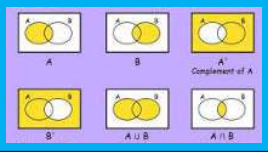
Median

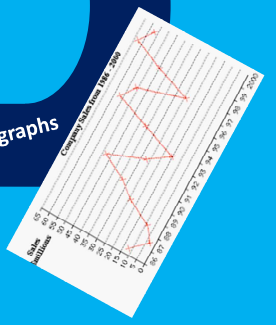
Venn diagrams set notation

Conditional probabilities

Theoretical probability







Independent events

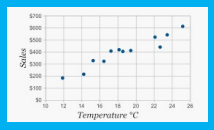
Tree Diagrams

Venn diagrams

Time series graphs

Mutually exclusive events

$$P(A \text{ and } B) = P(A) \times P(B)$$



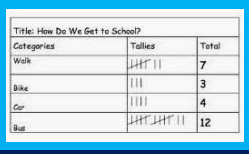
Inequalities

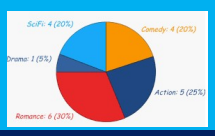
Averages from table

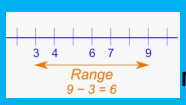
Scatter diagram

Sample spaces

Relative frequency







Mean

Range

Probability scale

Types of data

Tally

Frequency tables

Bar charts

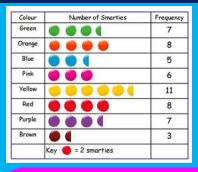
Pictograms

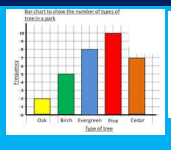
Pie charts

Comparing data sets

Averages

Stem and leaf

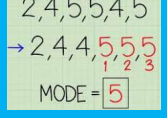




Comparative bar charts

Mode

Median



Analysing experiments

Coming From Key Stage 2...

Bar charts, averages, tally charts, pie charts

Data