GCSE Mathematics

AQA 8300 & OCR J560

Programme of Study

Learning Outcomes

(Updated Feb 2019)

GCSE MATHEMATICS SUBJECT CONTENT FOR AQA 8300 AND FULL LEARNING OUTCOMES FOR PROGRAMME OF LEARNING

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 1.1 THE NUMBER SYSTEM**
	I can read and write numbers given in figures.
	I can read and write numbers given in words.
	I can recognise positive and negative numbers.
	I can recognise odd and even numbers.
	I know the place values for whole numbers.
	I can recall the multiplication tables for numbers up to 12 X 12
	I can add and subtract large numbers.
	I can multiply and divide large numbers.
	I know the place value for decimal numbers.
	I can order decimal numbers.
	I can add and subtract negative numbers using a number line.
	I can use BODMAS for calculations.
	I know how to apply inverse operations to reverse a calculation
	I can use and know how to interpret a calculator correctly
	I can add and subtract decimal numbers
	I can multiply and divide decimals by 10, 100 and 1000.
	I know the rules for negative numbers when adding, subtracting, dividing and multiplying.
	I can add, subtract, multiply and divide negative numbers such as (-3) – (-4) or -3 x (-4)
	I can multiply decimals such as 2.4 x 3.6

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 1.2 ROUNDING, APPROXIMATING AND ESTIMATIONS**
	I can round numbers to the nearest integer – knowing that this means to the nearest unit or nearest whole number.
	I can round numbers to the nearest 10, 100 or 1000.
	I can find estimates for square roots by using a list of square numbers.
	I can round numbers to 1 decimal place.
	I can round numbers to any number of decimal places.
	I can round numbers to 1 significant figure.
	I know that when finding an estimate this means that the exact answer is not needed.
	I can estimate answers to calculations such as (22.6 x 18.7) ÷ 5.2 by rounding each part to 1 significant figure.

	I know what happens to numbers when they are divided by decimal numbers less than 1.
	I know what happens to numbers when they are multiplied by decimal numbers less than 1.
	I can estimate answers to calculations such as (22.6 x 18.7) ÷ 0.52.
	I can make decisions on which numbers to round to any number of significant figures for complex problems.
	I can find minimum and maximum values for numbers which have been rounded.
	I can represent these minimum and maximum values as an error interval using inequality notation.
	I can find the upper and lower bounds of simple calculations involving quantities to a particular degree of accuracy.
	I can find the upper and lower bounds of more difficult calculations involving decisions of when to use the maximum or minimum values as part of the calculations.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 1.3 NUMBER PROPERTIES**
	I can find the factors of a number.
	I can calculate squares and square roots of numbers both with and without the use of a calculator.
	I can write down the multiples of numbers.
	I can write down common factors and multiples for two or more numbers.
	I can calculate cubes and cube roots of numbers both with and without the use of a calculator.
	I can use index notation for squares and cubes.
	I can use the power, square root and cube root keys on my calculator.
	I can recall the squares from 2 x 2 up to 15 x 15.
	I can recall the cubes of 2, 3, 4, 5 and 10.
	I understand that numbers can have a positive and negative square root.
	I can estimate powers and roots of any given positive number
	I can complete calculations that involve roots and powers without using a calculator.
	I can recognise and recall prime numbers.
	I can find the reciprocal of any number.
	I can write any number as a product of its prime factors.
	I can use the prime products to work out the highest common factor and lowest common multiple of two or more numbers.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC: 1.4 FRACTIONS AND FRACTION ARITHMETIC
	I can recognise and find half, quarter or three-quarters of an amount given as a diagram or quantity.
	I can name the parts of a fraction using the terms numerator and denominator.
	I can arrange fractions with different denominators in order of size when 1 is the numerator.
	I can simplify simple fractions such as $^{24}/_{36}$
	I can convert between mixed numbers and improper fractions.
	I can convert fractions into equivalent ones.
	I can order fractions with other numerators and different denominators.
	I can convert fractions into decimals.
	I can covert fractions into percentages.
	I can order a set of numbers containing a mixture of fractions, decimals and percentages.
	I can find one number as a fraction of another numbers.
	I can work out fractions of quantities.
	I can add and subtract fractions.
	I can convert decimals into fractions.
	I can do calculations with simple fractions involving division and multiplication
	I know that 'of' means to multiply eg $\frac{2}{5}\ of\ 30\ means\ \frac{2}{5}\ x\ 30$
	I can do calculations with mixed numbers.
	I can identify recurring and terminating decimals.
	I can convert recurring decimals to fractions and fractions to recurring decimals

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC: 1.5 PERCENTAGES AND WORKING WITH PERCENTAGES
	I can recognise the percentage notation - %
	I know that percentage means 'out of 100'.
	I can write down the shaded region of a shape as a percentage.
	I can change a percentage into a fraction or decimal and vice versa.
	I can express one quantity as a percentage of another number.
	I can find 10%, 1%, 50% and 20% of a quantity without using a calculator.
	I can recognise the multiplier when trying to find a percentage of an amount.
	I can find any percentage of a quantity using a calculator.
	I can increase or decrease a quantity by a given percentage.

	I can recognise the multiplier when increasing or decreasing a quantity by a percentage.
	I can calculate simple interest using the same percentage each time on the original amount.
	I can calculate compound interest when using percentage increase repeatedly on successive amounts.
	I can work out a percentage change. For example 'percentage loss or percentage profit'
	I can represent percentage change as a decimal or fraction e.g. $12\%\ increase\ \equiv multiplying\ by\ 1.12\ \equiv multiplying\ by\ \frac{112}{100}$
	I can work out reverse percentage problems.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 2.1 Algebra Notation and Rules for Indices**
	I can use symbols to represent numbers in expressions
	I can tell the difference between expressions, identities, formulas, equations and inequalities.
	I can recognise and use the symbols =, ≠, <, >, ≤, ≥, ≡
	I know what the abbreviations mean when interpreting or using algebraic expressions.
	I know that when I am simplifying or writing expressions in a different form that I should use the identity, ≡, symbol.
	I can use very simple formulas given in words and symbols.
	I can use simple flow charts representing formulas
	I can use the rules for indices when expressions are being multiplied.
	I can use the rules for indices when expressions are being divided.
	I can use the rules for indices when expressions contain more than one letter.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 2.2 Manipulating Expressions**
	I can simplify expressions that contain the same letter.
	I can simplify expressions that contain more than one letter.
	I can simplify expressions that contain letters given in index form.
	I can multiply out expressions like **3(x + 2)**
	I can factorise expressions like **6a + 8**
	I can factorise expressions like **x^2 – 3x**
	I can expand and simplify expressions like **$x(x^2$ -5) and 3(x + 2) – 5(2x -1)**
	I can expand and simplify expressions like **(x + 4)(x – 2), (2x + y)(3x – 2y) and $(x + 2)^2$**
	I can expand and simplify expressions like $(x+4)(x-3)(2x+4)$

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 2.3 FORMULAE AND SUBSTITUTION**
	I know that a formula can contain more than one letter and that these can represent variables.
	I know what the dependent and independent variables are in a formula.
	I can use a simple formula written in words such as Cost = 20 x distance
	I can put numbers into a formula and know that this is what substitution means.
	I can use simple formula written using symbols such as T = 10d Or C = a + b to find values by substitution remembering to apply the correct order of operations.
	I can use formulae such as P = 2L + 2W and find values by substitution of positive numbers only.
	I can find values for formulae by substituting positive and negative numbers
	I can read a problem and work out the expression for it. For example '5 more than x' will have the expression 5 + x
	I can substitute numbers into more complex formulae such as $C = \frac{(A+1)D}{9}$
	I can substitute numbers into formulae that contain powers and roots such as; $v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$
Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 2.4 LINEAR EQUATIONS AND INEQUALTIES**
	I can complete a question when I see the word 'solve' or the words 'find the solution'.
	I can solve simple linear expressions that contain only one operation, such as 3x = 12 or x + 5 = 9.
	I can solve simple linear expressions that contain division, such as $\frac{x}{2} = 7$.
	I can solve equations that involve more than one operation such as 3x -1 = 9.
	I am able to find solutions that are positive or negative.
	I am able to find solutions that are fractions or decimals.
	I can solve equations that contain brackets such as 2(5x +1) = 28.

	I can solve equations where the unknown occurs on both sides of the equal sign such as 3x - 4 = 5 + x
	I can solve equations that contain brackets and the unknown occurring on both sides of the equal sign such as 3x - 12 = 2(x - 5).
	I can solve harder equations that contain more than one operation such as $\frac{7-x}{3} = 3$
	I can form an equation for a situation.
	I can solve an equation that I have formed.
	I can solve equations that require fraction arithmetic such as $\frac{2x}{3} - \frac{x}{4} = 5$.
	I can recognise and use the symbols for inequalities <, >, ≤, ≥
	I know that solving inequalities means that the solution is a set of numbers
	I can represent the solution set of an inequality on a number line including using open and closed circles.
	I can solve simple inequalities such as 3x < 9
	I can solve inequalities such as 12 ≤ 3n ≤ 20
	I can solve inequalities such as 4x – 3 < 10 and 4x < 2x + 7
	I can solve inequalities such as x + 3 > 5x – 3
	I know how to represent the solution set of an inequality using set notation e.g. -3 ≤ x ≤ 2 is given by $x \in \{-3, -2, -1, 0, 1, 2\}$

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 3.1 Collecting Data**
	I can collect information and record it using a tally chart
	I can collect information and record it into a frequency table
	I can tell whether a data set is a discrete set of information
	I can tell whether a data set is from a continuous set of numbers
	I know and understand the difference between quantitative and qualitative data
	I know and understand the difference between primary and secondary
	I can design and use a two-way table
	I can use a variety of sampling methods
	I know and understand the limitations of sampling methods
	I can tell whether bias is affecting a data collection exercise

Subject content from Draft Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 3.2 Statistical Measures**
	I can find the mode and median for a small set of numbers.
	I can work out the range for a set of numbers
	I can work out the mode and range from a graph
	I can calculate the mean for a small set of numbers.
	I can complete a frequency table for grouped data
	I can work out the 'fx' column for a frequency table and use this to calculate the mean.
	I can make a comment about two sets of data by comparing an average and the range.
	I can work out the effect of very large or very small values on each type of averages and the range of a data set.
	I can work out the modal class from a grouped frequency table.
	I can calculate a mean estimate for data given in a grouped frequency table

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 3.3 Presenting Data 1**
	I can construct and interpret a pictogram
	I can construct and interpret a bar chart
	I can obtain information from a vertical line graph
	I can construct and interpret a dual bar chart
	I can construct a frequency diagram for data given in a grouped frequency table.
	I understand which diagrams are suitable for certain types of data.

	I know and understand how to complete a table of results for a time series
	I know how to work out the moving average for time series data.
	I know how to produce a graph for time series data.
	I can comment on different data sets by comparing their graphs or charts.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 3.4 Probability and Outcomes**
	I can work out the different outcomes that can take place during an event.
	I can work out the frequency of different outcomes in the form of a frequency tree.
	I can describe a probability using words.
	I can work out probabilities as fractions, decimals or percentages.
	I can use a probability scale.
	I can tell the difference between experimental and theoretical probability.
	I can work out the probability of something happening.
	I can work out the probability of something **not** happening.
	I can use the fact 'the total of the probabilities of all the outcomes of an event is 1'.
	I can work out tables of outcomes, including two-way tables, for one or combined events.
	I can calculate probabilities of outcomes from any type of presentation including tables and frequency diagrams.
	I can estimate probabilities using a frequency table.
	I know what 'relative frequency' means.
	I can work out relative frequency for outcomes given in a frequency table.
	I know that if an experiment is repeated many times or the size of the sample is very large then the relative frequency will be very close to the theoretical frequency.
	I can use relative frequency to work out the expected number of times an outcome could occur.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 4.1 MEASURES**
	I can tell the time and solve problems involving time.
	I can work with money and solve problems involving money.
	I can interpret a calculator display when solving problems involving time.
	I can interpret a calculator display with solving problems involving money.
	I can measure and draw lines using a ruler
	I can use maps and can interpret grid references

	I can recognize whether units are metric or imperial.
	I can convert between metric units.
	I know the rough equivalents between metric and imperial units.
	I can convert between imperial and metric units.
	I can decide which metric unit to use for everyday measurements.
	I can make sensible estimates of a range of measures in everyday settings.
	I can solve a range of problems involving measures
	I can read and use map scales to find or estimate distances.
	I can solve simple speed problems.
	I can change between area measures, such as m^2 to cm^2.
	I can change between area measures, such as m^3 to cm^3 or cm^3 to litres.
	I can recognise the accuracy in measurements given to the nearest whole unit.
	I can work out the upper and lower bounds for combinations of lengths.
	I can solve more difficult speed problems
	I can understand and use compound measures such as speed, density and pressure.
	I can work out the upper and lower bounds for speed, density, pressure and any other given formula.
	I can distinguish between formulae for perimeter, area and volume by considering dimensions.
Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 4.2 2D Shapes and their Properties**
	I can name and label the parts of a shape using the words: vertex, edge, face, plane, perpendicular and parallel.
	I can draw the lines of symmetry on 2D shapes
	I can recognize and use the word 'congruent'
	I can recognize and name shapes such as parallelogram, rhombus, trapezium and hexagon.
	I can name the different types of triangles and recognise their angle and side properties.
	I can work out the order of rotation for shapes.
	I know what a quadrilateral is.
	I can name the different types of quadrilaterals by using their properties.
	I can classify quadrilaterals into groups using their geometrical properties.
	I can recognise and name other 2D shape such as pentagon, hexagon, octagon and decagon.
	I can find the volume of prisms and cylinders.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 4.3 Perimeter, Area and Volume**
	I can find the area of shapes by counting the number of squares.
	I can estimate the area of irregular shapes by counting squares and part-squares.
	I can find the volume of solids by counting the number of cubes.
	I can find the perimeter of rectangles.
	I can find the area of rectangles.
	I can find the area of triangles.
	I can find the volume of cuboids by using the formula
	I can find the area of parallelograms, kites and trapezium.
	I can find the perimeter and area of shapes made up of 2D shapes.
	I can find surface area of prisms and cylinders.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 4.4 THE CIRCLE**
	I can draw a circle using a pair of compasses when I know the radius or diameter.
	I can identify and name parts of a circle using the words: centre, radius, diameter, circumference, chord, tangent.
	I know that π represents the ratio between the circumference and diameter of any circle.
	I can write down and use the formula to find the circumference of any circle.
	I can write down and use the formula to find the area of any circle.
	I can work out the perimeter of a semi-circle.
	I can work out the area of a semi-circle.
	I can work out the perimeter of a shape made up of circles or part circles with other known shapes.
	I can work out the area of a shape made up of circles or part circles with other known shapes.
	I can identify on any circle the arc, sector and segment.
	I can find the length of an arc of a circle.
	I can find the area of a sector of a circle.
	I can find the area of a segment of a circle.
	I know what to do when an answer needs to be given in terms of π.
	I know how to manipulate expressions such as $9\pi + \frac{3}{4}\pi$

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC: 5.1 ANGLES AND ANGLE PROPERTIES OF LINES AND SHAPES
	I can recognise and name acute, obtuse, reflex and right angles.
	I know that angles that form a straight line add up to 180^0.
	I know that angles that form a full turn add up to 360^0.
	I can recognise and name isosceles, equilateral, scalene and right-angled triangles.
	I can recognise when a shape is a regular polygon.
	I can recognise and use the terms perpendicular and parallel.
	I can draw and measure angles using an angle measurer.
	I can show that the angles of a triangle add up to 180^0 and use this to find angles.
	I can recall the angle properties of isosceles, equilateral and right-angled triangles and use these to find angles.
	I can show that the angles of a quadrilateral add up to 360^0.
	I can distinguish between the interior and exterior angles of any polygon.
	I can show that the exterior angle of a triangle is equal to the sum of the interior opposite angles.
	I can calculate the interior and exterior angles of a regular polygon.
	I can recognise corresponding and alternate angles in diagrams that contain parallel lines.
	I know that when straight lines cross the angles formed are equal and are called vertically opposite.
	I know that the exterior angles of any polygon add up to 360^0.
	I know how to work out the sum of the interior angles of any polygon.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC: 5.2 RATIOS
	I can write quantities using the ratio notation. For example 3 boys and 4 girls are in the ratio 3:4
	I can re-write ratios in their simplest form.
	I can make the link between ratios and fractions.
	I can divide a quantity in a given ratio.
	I can work out missing values of a ratio when only part of the information is known.
	I can recognise what it means by the unitary method. For example 1 : n or n : 1.
	I can use the unitary method to solve problems that involve ‘best value’
	I can interpret a statement such as ‘A is three times as big as B’ and write it as a ratio A:B is 3:1

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC: 5.3 Sequences
	I can recognize a pattern when given a sequence of diagrams.
	I can recognize a pattern when given a sequence of numbers.
	I can continue a sequence of diagrams or numbers.
	I can write the terms of a simple sequence when given the starting point and rule.
	I can find a particular term in a sequence involving positive numbers when I am given the rule.
	I can recognise sequences that contain triangular, square and cube numbers and work out any missing numbers.
	I can write the term-to-term rule in a sequence involving positive numbers.
	I can find a particular term in a sequence involving negative or fractional numbers when I am given the rule.
	I can write the term-to-term rule in a sequence involving negative or fractional numbers.
	I understand the position-to-term rule of a linear sequence and know that this is the nth term.
	I can work out any term of a linear sequence or a series of diagrams by using the nth term.
	I can work out the nth term of a linear sequence or a series of diagrams.
	I know what the Fibonacci sequence is and how to work out missing numbers.
	I can recognise when a sequence involves powers and how to work out missing numbers.
	I understand the position-to-term rule of a quadratic sequence and know that this is the nth term.
	I can work out any term of a quadratic sequence or a series of diagrams by using the nth term.
	I can work out the nth term of a quadratic sequence or a series of diagrams.
	I can recognise any sequence, including ones that contain the square root symbol.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC 5.4 REASONS AND PROOF
	I can tell by reading a simple statement whether it is true or false such as ‘All prime numbers are odd’.
	I can describe with a reason why a simple statement is true or false.
	I know what to do when I see the words ‘show that’ or ‘prove’ and what to do when I see the identity, ≡, symbol between expressions.

	I can decide whether a harder statement is true or false such as '2x + 1 will always give an even answer'.
	I can give a reason why harder statements like '2x + 1 will always give an even answer' is true or false.
	I can find a counter example if a statement is false or not always true.
	I can give a demonstration to show why a statement is true or false.
	I can give a proof to justify a statement.
	I can give step-by-step deductions when I am writing a basic algebraic explanation.
	I can show step-by-step deductions that contains more detail and a full mathematical explanation.
	I can derive simple algebraic proofs using reasoning.
	I can derive harder algebraic proofs using reasoning and logic.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 6.1 CO-ORDINATES AND GRAPHS**
	I can write down the coordinate of a point plotted with positive numbers.
	I can plot points where the coordinates are both positive.
	I can plot and interpret coordinates where numbers are positive and negative.
	I can recognise and draw the graphs for equations such as $y = 3$ and $x = 5$
	I can work out the coordinates for graphs where the equations are like $y = x + 2$ and $y = 2x + 3$ by completing a table.
	I can plot graphs for equations such as $y = 2x + 3$
	I can plot coordinates and then work out the missing points to complete shapes such as squares and rectangles.
	I can solve problems involving graphs such as finding where the line $y = x + 1$ crosses the line $y = 1$.
	I can decide which points to plot without using a table of values to draw graphs for equations such as $y = 2x + 3$
	I can recognise the general equation for a straight line graph as $y = mx + c$.
	I can work out from an equation which part represents the gradient and which part represents the y-intercept.
	I can find the gradient of straight line graphs and use this to determine the equation of the line.
	I know when the gradient of a straight-line graph is positive or negative.
	I can interpret gradient as a rate of change.
	I can work out the mid-point of a line which is part of a straight-line graph.
	I can recognise that when straight lines graphs are parallel then their gradients will be equal.

	I can work out the equation of a line that is parallel to another line whose gradient is known.
	I can work out the gradient of a straight line that joins up two coordinates.
	I can work out the equation of a straight line that joins up two coordinates.
	I know and understand how the gradients of perpendicular lines are connected to each other.
	I can work out the gradient of a line that is perpendicular to another line whose gradient is known.
	I can solve a set of inequalities that contain two variables and represent the solution as a region on a coordinate grid.
	I know when to use a dashed line or a solid line when representing inequalities on a coordinate grid.
	I know how to represent the solution set of an inequality using set notation e.g. $-3 \leq x \leq 2$ is given by $x \in \{-3,-2,-1,0,0,1,2\}$

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 6.2 GRAPHS FOR REAL SITUATIONS**
	I can recognise a conversion graph. For example one that converts euros to pounds.
	I can read off positive values from a conversion graph.
	I can work out and plot the points for a conversion graph.
	I can use information from a conversion graph to solve other related problems.
	I can read off negative values from a conversion graph.
	I can recognise a graph that represents distance and time.
	I can read of values from a distance time graph.
	I can work out speed by using a simple distance time graph which has just one part.
	I can work out average speeds from a distance time graph which is made up of more than one part.
	I can recognise a velocity-time graph.
	I can interpret a velocity-time graph.
	I can use values from a velocity-time graph to work out related problems such as finding acceleration and distance.
	I can calculate the area under a velocity time graph by using the area of trapezia, triangles and rectangles.
	I can discuss and interpret non-linear graphs that model real situations.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 6.3 PRESENTING DATA 2 – PIE CHARTS**
	I can recognise a pie chart as representing a set of data.
	I know that the complete pie chart represents the total number of values in a data set.

	I can work out what values parts of a pie chart represent when they are divided into halves, quarters or thirds.
	I can work out what values parts of a pie chart represent when the sections are divided using **angles**.
	I can work out what values parts of a pie chart represent when the sections are divided using **percentages**.
	I can work out how big **using angles** each part of a pie chart needs to be by using a frequency table.
	I can work out how big **using percentages** each part of a pie chart needs to be by using a frequency table.
	I can construct a pie chart using angles.
	I can construct a pie chart using percentages.
	I can solve harder problems by using information from a pie chart such as fractions of quantities, probabilities and averages.
	I can compare more than one pie chart and understand how they can be misinterpreted if they are not the same size.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 7.1 PROPORTIONS AND PROPORTIONAL CHANGE**
	I can calculate a percentage of an amount.
	I can calculate a percentage increase or decrease using a multiplier.
	I can work out how to calculate successive percentage increase or decrease.
	I can work out the original values for reverse percentage calculations.
	I can work out how to use successive percentages for problems involving repeated proportional change.
	I can use iteration to work out approximate solutions to problems that involve successive percentage calculations.
	I can work out compound interest.
	I can recognise when a situation involves direct or indirect proportion from a table of values.
	I can recognise the graphs that represent direct or indirect proportion
	I can recognise and construct the graph for a reciprocal function such as $y = {}^{1}/_{x}$ or $y = {}^{k}/_{x}$ where k is a positive integer.
	I can write expressions using the symbol for 'proportional to'
	I can work out the formula that connects variables that are directly or indirectly proportional to each other.
	I can apply the formula to work out values of a variable.
	I can work out the formula for variables that are directly or indirectly proportional to each other involving powers or roots.
	I can use the information from a problem or table of values to work out the expression that shows the connection between two variables which are either directly or indirectly proportional to each other.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC: 7.2 SCATTER DIAGRAMS AND CORRELATION
	I can draw a scatter diagram by plotting points on a graph.
	I can interpret a scatter diagram and work out a relationship between two sets of data.
	I can identify any 'rogue values' or 'outliers' from a scatter diagram.
	I can draw a line of best fit on a scatter diagram.
	I understand the word correlation
	I can recognise when correlation is weak or strong, positive or negative.
	I understand that the line of best fit should not go beyond the range of data that has been plotted.
	I am able to recognise what the line of best fit represents
	I can use the line of best fit to make estimates for the variables represented by the axis.
	I understand the assumptions that I make when interpolating or extrapolating a line of best fit to find the possible values for variables that are beyond the main set of points that are given.

Subject content from Specification (May 2014) Higher Only	TOPIC: 7.3 TRIAL AND IMPROVEMENT AND ITERATION
	I understand what trial and improvement means.
	I can substitute values into an equation and decide on whether the solution is too big or too small.
	I can decide on which values to substitute so that I can improve my solution
	I can fill in the relevant information in a table to show my trials and decisions.
	I can recognise when I have reached a solution with the correct number of decimal places.
	I can solve more complete equations such as $x^3 + x = 12$ Using trial and improvement.
	I can make decisions as to which values give the closest solutions to an equation.
	I know that iteration is way of solving equations such as $x^2 = 2x + 1$.
	I can manipulate an equation so that the unknown appears on its own on one side of the equation Eg $x^2 = 2x + 1$ becomes $x = 2 + \frac{1}{x}$
	I understand how to use suffix notation Eg $x = 2 + \frac{1}{x}$ becomes $x_{n+1} = 2 + \frac{1}{x_n}$
	I know how to substitute values for x_n to generate the value for x_{n+1}

	I understand that a solution is found when the difference between consecutive values is very small

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 8.1 TRANSFORMATIONS**
	I understand that the word transformation refers to reflection, rotation, translation and enlargement.
	I can reflect any 2D shape in a mirror line.
	I can work out where the line of reflection is for two shapes.
	I can reflect shapes in the axes of a graph.
	I can reflect shapes in lines parallel to the axes such as x = 2 and y = -1.
	I can describe reflections using the equations for lines on a coordinate grid.
	I can reflect shapes in the lines such as y = x and y = - x
	I can rotate shapes about the origin for a given amount of turn.
	I can describe how a shape has been rotated about the origin.
	I can rotate shapes about any point.
	I can describe how a shape has been rotated about any point and by how many degrees and in which direction.
	I can find the centre of rotation when a shape is rotated and describe a rotation fully.
	I can work out the scale factor of an enlarged shape.
	I can enlarge a shape by a positive scale factor.
	I can find the measurements of the dimensions of an enlarged shape.
	I can compare the area of an enlarged shape with the original shape.
	I can enlarge a shape by a positive scale factor from a given centre of enlargement.
	I can construct enlargements of shapes using fractional scale factors.
	I can work out the scale factor and the centre of enlargement for two similar shapes.
	I can translate a shape using a description such as 4 unit right and 3 units down.
	I can translate a shape by using a column vector.
	I can work out the column vector for shapes that have been translated.
	I can transform shapes by a combination of translation, rotation and reflection.
	I know the properties of shapes that **remain unchanged** when shapes are transformed by a combination of translation, rotation and reflection.
	I can describe how the properties of shapes **are changed** when shapes are transformed by a combination of translation, rotation and reflection.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	TOPIC: 8.2 PYTHAGORAS' THEOREM AND 2D PROBLEMS
	I can use my calculator to find the squares and square roots of numbers.
	I can identify the hypotenuse of any right-angled triangle.
	I can write down Pythagoras' theorem.
	I can correctly label the sides of any right-angled triangle using the letters used in Pythagoras' theorem.
	I can calculate the length of the hypotenuse using the theorem.
	I can calculate the length of either of the shorter sides using the theorem.
	I know that any isosceles triangle can be split into two congruent right-angled triangles.
	I can calculate the height of an isosceles triangle using Pythagoras' theorem.
	I can use the theorem in practical contexts by identifying the right-angled triangle and calculating unknown lengths.
	I can calculate the distance between two points from their coordinates using Pythagoras' theorem.
	I can identify right-angled triangles within 3D objects.
	I can use Pythagoras' theorem to find unknown lengths within 3D objects.

Subject content from Specification (May 2014) Higher Only	TOPIC: 8.3 CUMULATIVE FREQUENCY AND BOX PLOTS
	I know what cumulative frequency means.
	I can calculate cumulative frequency for a grouped frequency table.
	I can construct a cumulative frequency graph.
	I can use a cumulative frequency graph to find frequencies.
	I can use a cumulative frequency graph to find an estimate for the median.
	I can use a cumulative frequency graphs to find estimates for the upper and lower quartiles.
	I can construct a box plot using information from a cumulative frequency graph or table.
	I can interpret a box plot and make comments about a population such as if it is a symmetrical or skewed distribution.
	I can interpret more than one cumulative frequency graph and make comments on how two distributions compare against each other.
	I can interpret more than one box plot and make comments on how two distributions compare against each other.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 9.1 NETS, ISOMETRIC DRAWING AND VIEWS OF 3D SHAPES**
	I can recognise and name 3D solids such as: cube, cuboid, pyramid, triangular prism.
	I can draw sketches of 3D shapes.
	I can recognise the nets of a cube and cuboid.
	I can draw the nets of a cube and cuboid.
	I can draw cuboids on isometric paper and mark on the drawing the lengths of the sides.
	I can draw shapes made up of cubes and cuboids on isometric paper.
	I can draw the nets of a square-based or triangular-based pyramid.
	I can draw the net of a triangular prism.
	I can identify the planes of symmetry in 3D objects.
	I can interpret plans and elevations and work out what the 3D shapes are.
	I can draw the plan views of 3D solids.
	I can draw the side elevations of 3D solids.

Subject content from Draft Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 9.2 CONSTRUCTING TRIANGLES AND OTHER 2D SHAPES**
	I know how to use a pair of compasses, an angle measurer, a protractor and a ruler.
	I can construct a triangle when two angles and a side are given using a ruler and protractor/angle measurer.
	I can construct a triangle when three sides are given using a ruler and a pair of compasses.
	I can construct a triangle with two sides and the included angle are given using a ruler and protractor.
	I can accurately construct any 2D shapes using a ruler and protractor.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 9.3 CONSTRUCTIONS AND LOCI**
	I understand what the words perpendicular and bisect mean.
	I can construct the perpendicular bisector of a line.
	I can construct the perpendicular bisector of an angle.
	I can construct the perpendicular from a point to a line.
	I can construct the perpendicular at a point on a line.
	I can construct an angle of 60^0.

	I know that locus means the path of a moving object and that loci is the plural of locus.
	I can construct the locus of an object which is equidistant from a fixed point.
	I can construct the locus of an object which is equidistant from two fixed points.
	I can construct the locus of an object which is equidistant from two lines which form an angle.
	I can construct the locus of an object which is equidistant from a straight line.
	I can solve loci problems, such as identifying points or regions which are restricted by given conditions. Such as: points less than a certain distance from a point; or regions which are closer to one point or line than another point or line.

Subject content from Draft Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 9.4 COMPASS DIRECTIONS AND BEARINGS**
	I know the compass directions North, East, South and West.
	I can use compass directions to identify positions on a map.
	I can use compass directions such as North-East etc.
	I can use compass directions and distances to identify and plot the locations of objects on a map or grid.
	I know that bearings are measured from North in the clockwise direction and are given as three-figures.
	I can use an angle measurer to measure and draw a bearing from a point.
	I can use bearings and distances to identify the position of an object from one point.
	I can use bearings and distances to identify the position of an object from two points.
	I can apply Pythagoras' Theorem for problems involving compass directions or bearings

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 10.1 QUADRATIC GRAPHS**
	I can plot coordinates in all four quadrants on a grid.
	I can recognise that functions such as $y = 3x^2$ are called quadratic functions and will give graphs that have a U-shape.
	I can substitute a range of values for x into a function and be able to complete a table using these values.
	I can work out which coordinates to plot from a table of values for a function.

	I can recognise and name the main features of a quadratic graph including the roots, vertex and y-intercept.
	I can draw the graphs for functions such as $y = 3x^2$ and $y = x^2 + 4$
	I can draw graphs for harder quadratic functions such as $y = x^2 – 2x + 1$.
	I can find the points of intersection of quadratic graphs with lines.
	I can use a quadratic graph to find the approximate value of y for a given value of x or the approximate values of x for a given value of y.
	I can use a quadratic graph and a straight line graph to find solutions for equations such as $x^2 - 2x + 4 = 3$
	I can use quadratic graphs to find approximate solutions of quadratic equations by interpreting where the graphs cross the x-axis.
	I know that if I want to graphically solve an equation such as $3x^2 + 2x -3 = 2x + 1$ I need the quadratic graph of $y = 3x^2 + 2x -3$ and the linear graph of $y = 2x + 1$
	I know that if I am given the graph for $y = 3x^2 + 5x + 2$ but need to solve the equation $3x^2 + 2x -3 = 0$ then I must first manipulate this to extract the expression for the given graph and then go on to identify the expression for the straight line graph to be drawn.
	I can recognise and construct the graph for a cubic function such as $y = x^3$.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 10.2 SOLVING QUADRATIC EQUATIONS AND INEQUALTIES**
•	I know that factorising an expression leads to another expression containing brackets.
	I can factorise quadratic expressions such as $4x^2 + 6xy$
	I can factorise quadratic expressions such as $x^2 – 8x -16$
	I know that when I solve a quadratic equation such as $x^2 - 8x + 15 = 0$, this gives me the values of x when the graph crosses the x-axis.
	I can solve quadratic equation such as $x^2 - 8x + 15 = 0$ by **factorisation**
	I know that the roots of a quadratic graph can be found from the factorised form of a quadratic expression.
	I understand what ‘the difference of two squares’ means.
	I can recognise when an expression is the difference of two squares and factorise it.
	I can use the difference of squares to re-write more complex expressions such as $18x^2 - 32y^2 \equiv 2(9x^2 - 16y^2) \equiv 2(3x - 4y)(3x + 4y)$

	I can factorise harder quadratic expressions such as $5x^2 + 3x - 6$.
	I can re-write a quadratic expression in the **completed square** form $(x + p)^2 + q$
	I can solve quadratic equations that have been written in the completed square form.
	I can make the connection between the completed square form of a quadratic function and the coordinate of the vertex of a quadratic graph as a minimum or maximum point
	I can solve an equation such as $5x^2 + 3x - 6 = 2x + 1$
	I know that the solutions to $ax^2 + bx + c = 0$ give me the points of intersection of the quadratic graph $y = ax^2 + bx + c$ with the x-axis i.e. when y = 0 and that these are called the **roots**.
	I can recall and use the **quadratic formula** $$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$ to solve equations in the form $ax^2 + bx + c = 0$
	I know that the **discriminant** of a quadratic formula is $\boldsymbol{b^2 - 4ac}$
	I know that if $\boldsymbol{b^2 - 4ac = 0}$ **then the quadratic graph will only have one real root.**
	I know that if $\boldsymbol{b^2 - 4ac > 0}$ **then the quadratic graph will have two real roots.**
	I know that if $\boldsymbol{b^2 - 4ac < 0}$ **then the quadratic graph will have no real roots i.e. the graph does not cross the x-axis.**
	I know how to solve a quadratic inequality such as $2x^2 + 5x \leq 3$ and $x^2 < 9$
	I can represent the solution set for a quadratic inequality on a graph.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 11.1 STANDARD INDEX FORM**
	Recall the rule of indices when numbers are being multiplied in index form and with the same base.
	Recall the rule of indices when numbers are being divided in index form and with the same base.
	I know that a number with a power of zero is equal to 1.
	I can recognise numbers that are written in standard index form.
	I know that for a number to be in standard index form such as $a \times 10^n$ that $1 \leq a < 10$
	I know that for numbers that are greater than or equal to one, 10 will have a positive power.
	I know that for numbers that are less than one, 10 will have a negative power.
	I can convert any ordinary number into standard index form.
	I can convert any number that is in standard index form to an ordinary number.
	I know how to input numbers that are in standard index form into my calculator.

	I can interpret my calculator display when answers are given in standard index form.
	I can solve problems involving numbers in standard index form without using a calculator.
	I can solve problems involving numbers in standard index form using a calculator.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 11.2 TRIGONOMETRY IN PROBLEMS USING RIGHT-ANGLED TRIANGLES IN 2D AND 3D**
	I can identify and label the sides of any right-angled triangle using the words ‘hypotenuse’, ‘adjacent’ and ‘opposite’
	I know that for similar triangles the interior angles remain unchanged.
	I know the relationships between the trigonometric ratios for Sine, Cosine and Tangent and the sides of a right-angled triangle.
	I can select the appropriate trig ratio that can be used for solving problems.
	I know how to use the trig function keys on my calculator to find lengths.
	I know how to use the inverse-trig function keys on my calculator to find angles.
	I can calculate lengths by using the appropriate trig ratio.
	I can calculate the angle by using the appropriate trig ratio.
	I can use trigonometry to solve problems involving bearings.
	I can use trigonometry to solve problems involving angles of elevation and depression.
	I can solve problems involving trigonometry without using a calculator.
	I know how to deduce the exact values of sinθ and cosθ for θ = 0^0, 30^0, 45^0, 60^0 and 90^0.
	I know how to deduce the exact values of tanθ for θ = 0^0, 30^0, $45^0$and 60^0.
	I can identify right-angled triangles within 3D objects.
	I can use Trigonometry to find sides and angles within 3D objects.

Subject content from Draft Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 11.3 CHANGING THE SUBJECT OF A FORMULA**
	I know that a formula can contain more than one variable.
	I can use reverse operations correctly and in the correct order.
	I can rearrange a formula such as p = 3q + 5
	I can manipulate formulae that contain brackets, fractions and square roots.

	I can rearrange formulae that contain brackets, fractions and square roots.
	I can change the subject of formulas such as: $v = u + at$ $s = ut + \frac{1}{2}at^2$ $v^2 = u^2 + 2as$
	I can manipulate and rearrange formulae where the variable appears twice.
	I know that if the variable appears twice I have to use factorisation.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 11.4 SIMILARITY AND ENLARGEMENT**
	I can recall and use scale factors and centres of enlargement.
	I can recall that when shapes are enlarged the size of any angles remain the same.
	I can match the sides of similar triangles from diagrams and work out the scale factors and any missing sides.
	I can enlarge any shapes using negative scale factors.
	I can recall and use the fact that when shapes are enlarged using a linear scale factor = k then the area scale factor = k^2.
	I can recall and use the fact that when shapes are enlarged using a linear scale factor = k then the volume scale factor = k^3.
	I can use area and volume scale factors to find the corresponding linear scale factors and any missing lengths.
	I can manipulate the orientation of triangles to determine matching sides and angles.
	I can prove that two triangles are congruent by determining whether matching sides and angles meet the SSS, SAS, ASA or RHS criteria.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 12.1 VOLUME OF SPHERES, CONES, PYRAMIDS AND COMPOUND SHAPES**
	I can recognise a sphere, cone and pyramid.
	I can use the formulae to calculate the surface area of a sphere, cone or pyramid
	I can manipulate the formulae for surface area to find any unknown dimensions when the surface area is known.
	I can use the formulae to calculate the volume of a sphere, cone or pyramid.
	I can manipulate the formulae for volume to find any unknown dimensions when the volume is known.
	I can recognise a truncated cone or pyramid.

	I can work out missing dimensions for the top cone or the frustum of a truncated cone.
	I can work out the volume for the top cone or the frustum of a truncated cone.
	I can identify on any circle the arc, sector and segment.
	I can find the length of an arc of a circle.
	I can find the area of a sector of a circle.
	I can find the area of a segment of a circle.
	I know what to do when an answer needs to be given in terms of π.
	I know how to manipulate expressions such as $9\pi + \frac{3}{4}\pi$

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 12.2 SOLVING SIMULTANEOUS EQUATIONS**
	I can solve a linear equation.
	I understand what solving simultaneous equations means.
	I can represent linear equations graphically.
	I can use the graphs of linear equations to find simultaneous solutions by interpreting the point of intersection.
	I can manipulate any equation in order to change the coefficients. e.g. $2x + y = 5$ becomes $4x + 2y = 10$ when each term of the original equation has been multiplied by 2.
	I can manipulate pairs of linear equations in order to solve them algebraically to find simultaneous solutions such as $2x + y = 5$ and $3x - 2y = 4$.
	I can solve a pair of simultaneous equations where one is linear and one is non- linear, such as $y = 3x – 2$ and $y = x^2$ by using the method of substitution.
	I can solve a pair of simultaneous equations where one is linear and one is non- linear, such as $y = 3x – 2$ and $y = x^2$ by using their graphs.
	I can see that to graphically solve an equation such as $x^2 - 2x - 4 = 2x + 1$ I will need to find the points of intersection of the graphs $y = x^2 - 2x – 4$ and $y = 2x + 1$.
	I can recognise that the equation $x^2 + y^2 = r^2$ gives a circle whose centre is at (0,0) and has a radius = r.
	I can use graphs to solve simultaneous equations where one is linear such as $y = x – 1$ and one which gives a circle such as $x^2 + y^2 = 16$.
	I can algebraically solve simultaneous equations where one is linear such as $x + 5y = 13$ and one which gives a circle such as $x^2 + y^2 = 13$ using the method of substitution and knowing that I will need to solve quadratic equations and possibly giving answers in surd form.
	I know that at the point where there is a tangent to a circle, the tangent will be perpendicular to the radius.

	I can deduce the equation of a tangent to a circle at a given point.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 12.3 PROBABILITY TREE DIAGRAMS**
	I understand that lists of outcomes can be given as **elements of sets.**
	I can work out the elements of sets or combinations of sets from descriptions or instructions.
	I can work out the probability of a single event and give it as either a fraction, decimal or percentage.
	I can recall what mutually exclusive events are.
	I can recall what independent events are.
	I know and understand what Venn diagrams are.
	I can construct Venn diagrams for independent and mutually exclusive events.
	I can work out the probability of two or more mutually exclusive events by using the 'or rule'. **i.e. if A, B are mutually exclusive then** **P(A or B) = P(A) + P(B)**
	I can work out the probability of two or more independent events by using the 'and rule'. **i.e. if A, B are independent then** **P(A and B) = P(A) x P(B)**
	I can work out the probability of two or more independent events by using the 'or rule'. **i.e. if A, B are independent then** **P(A or B) = P(A) + P(B) – P(A and B)**
	I can construct a tree diagrams to represent the possible outcomes when two or more events take place.
	I can complete a tree diagram by annotating with the probabilities for the possible outcomes including when certain conditions are given.
	I can use a probability tree diagram to calculate the probabilities for combined outcomes using the 'and rule'.
	I can use a probability tree diagram to calculate the probabilities for a **choice** of combined outcomes using the 'or rule'.
	I understand what conditional probability means.
	I can work out conditional probability from a two-way table.
	I can work out conditional probability from a tree diagram.
	I can work out conditional probability from a Venn diagram.
	I know that the formula for conditional probability is **P(A and B) = P(A given B) x P(B)**
	I can manipulate the formula for conditional probability to work out unknown values when I am not given a table or diagram showing all of the outcomes or probabilities.

Subject content from Specification (May 2014) Basic foundation Additional foundation Higher Only	**TOPIC: 12.4 VECTOR NOTATION AND VECTOR GEOMETRY**
	I know that a scalar quantity has magnitude only such as mass or temperature.
	I know that a vector quantity has both magnitude and direction, such as velocity or force.
	I can recall what a column vector is and that it describes a translation.
	I can relate vector notation using **bold letters** and arrows above the vertices of the start and end points e.g. $\overrightarrow{AB}$ is the same as **a** (translation from A to B) and that **–a** represents $\overrightarrow{BA}$ (translation from B to A)
	I can calculate and represent graphically the sum and difference of two vectors.
	I can calculate and represent graphically the scalar multiple of a vector.
	I know that a resultant vector is formed when two or more vectors are applied.
	I can calculate the resultant of two or more vectors.
	I can calculate the **magnitude** of a vector by applying Pythagoras' theorem.
	I can use algebraic manipulation with vectors given in **bold letter** form.
	I can prove that lines are parallel by comparing and interpreting vectors and show that they have the same direction.
	I can prove that vectors form a straight line by showing that they are collinear.

Subject content from Specification (May 2014) Higher Only	**TOPIC: 13.1 MORE RULES OF INDICES**
	I can use the rule of indices when numbers in index form and with the same base are being multiplied.
	I can use the rule of indices when numbers in index form and with the same base are being divided.
	I know that a number with a power of zero is equal to 1.
	I can write the reciprocal of a number.
	I know that if a number has a power of -1 then it is the same as finding the reciprocal of the number.
	I know that if a number has any negative power then it is the same as writing the reciprocal of the number with the positive power. For example: $4^{-3} \equiv \frac{1^3}{4^3} \equiv \frac{1}{4^3}$

	I know that if a number has a power that is a unit fraction then it is the same as finding the root of the number, where the denominator represents the root. For example: $15^{1/3} = \sqrt[3]{15}$
	I know that if a number has a power that is any fractions then the denominator represents the root and the numerator represents the power of the number. For example: $56^{2/3} = \sqrt[3]{56^2}$
	I can apply all the rules of indices for any number that is written in index form where the power is positive, negative or a fraction.

Subject content from Specification (May 2014) Higher Only	**TOPIC: 13.2 SURDS AND MANIPULATING EXPRESSIONS CONTAINING SURDS**
	I can recognise rational and irrational numbers.
	I know that some numbers have square roots that are irrational numbers and that when these are left with the root sign they are called surds.
	I can give the exact answer of a calculation by leaving it in surd form.
	I can rationalise a surd by multiplying it by itself. e.g. $\sqrt{3} \times \sqrt{3} = 3$
	I can manipulate surds e.g. $\sqrt{18} = \sqrt{(9 \times 2)} = \sqrt{9} \times \sqrt{2} = 3\sqrt{2}$ and $\frac{\sqrt{2}}{\sqrt{3}} = \sqrt{2/3}$
	I can rationalise the denominator of an algebraic fraction that contains surds. e.g. $\frac{2}{\sqrt{5}}$ Can be rationalised by multiplying the numerator and the denominator by $\sqrt{5}$ i.e. $\frac{2}{\sqrt{5}} \times \frac{\sqrt{5}}{\sqrt{5}} = \frac{2\sqrt{5}}{5}$
	I can simplify rational expressions such as $\frac{2(\sqrt{5}+1)^2}{(\sqrt{5}+1)}$
	I can simplify harder rational expressions such as $\frac{(\sqrt{2}-3)}{(\sqrt{5}-4)}$
	I can simplify surds, such as $(3 - \sqrt{5})^2$ in the form $a + b\sqrt{5}$

Subject content from Specification (May 2014) Higher Only	**TOPIC: 13.3 HISTOGRAMS AND FREQUENCY DENSITY**
	I can construct a grouped frequency table with unequal class intervals
	I can recall what frequency density means and why it is used
	I can calculate the class widths from a frequency distribution

	I can calculate frequency density using Frequency density = $\frac{\text{frequency}}{\text{class width}}$
	I can construct a histogram using frequency density as the vertical scale
	I can interpret a histogram to find the frequencies for the given class intervals
	I can calculate estimates for frequencies for class intervals that are not the ones given in the frequency distribution
	I can calculate an estimate for the mean from a histogram.
	I can calculate an estimate for the median from a histogram.
	I can calculate an estimate for the interquartile range from a histogram.

Subject content from Specification (May 2014) Higher Only	**TOPIC: 13.4 CIRCLE THEOREMS**
	I can name the parts of a circle including radius, diameter, tangent, chord segment and sector.
	I can recall and use the fact that angles formed by the ends of the diameter to the circumference are always 90^0.
	I can recall and use the fact that the angle formed between the radius and the point at which a tangent touches a circle is always 90^0.
	I can recall that tangents from an external point to a circle are equal in length.
	I can recall and use the fact that a cyclic quadrilateral has each of its vertices at the circumference of a circle and it is completely enclosed in the circle.
	I can recall and use the fact that the opposite angles in cyclic quadrilaterals add up to 180^0.
	I can recall and use the fact that when two tangents to a circle meet at a point outside the circle then two right-angled, congruent triangles are formed.
	I can recall and use the fact that the perpendicular from the centre of the circle to a chord will always bisect the chord.
	I can recall and use the fact that from the ends of a chord the angle formed at the centre is always twice the angle formed at the circumference.
	I can recall and use the fact that from the ends of a chord the angles formed at the circumference in the **same** segment are always equal.
	I can recall and use the fact that when a chord and a tangent meet and the angle is formed from the end of the chord to the circumference then the angle between the chord and tangent is equal to the angle formed in the alternate segment.
	I can recall any of the above facts and any others to do with shapes and lines to solve any angle problems involving circles.
	I can recall any angle facts and use these to justify and prove the solutions to any angle problems involving circles.

Subject content from Specification (May 2014) Higher Only	TOPIC: 14.1 TRIGONOMETRY FOR NON-RIGHT ANGLED TRIANGLES
	I know the formula to find the area of a triangle is $$\boldsymbol{Area = \frac{1}{2}abSin\ C}$$
	I can recognise **when and how** to use the formula to find the area of a triangle.
	I know the formula for the Sine rule is $$\frac{a}{sin\ A} = \frac{b}{\sin B} = \frac{c}{\sin C}$$
	I can recognise **when and how to** use the Sine rule to find missing angles or sides of a non-right angled triangle.
	I know the formula for the Cosine rule is $$a^2 = b^2 + c^2 - 2bcCosA$$
	I can recognise **when and how** to use the Cosine rule to find missing angles or sides of a non-right angled triangle.
	I can decide how to apply any of these rules when solving multi-step problems involving non-right-angled triangles.
	I can apply any of these rules and work with values given in **surd form**.
	I can use any of these rules to solve problems that involve **bearings**.
	I can use any of these rules to solve problems involving **3D shapes**.

Subject content from Specification (May 2014) Higher Only	TOPIC: 14.2 GRAPHS FOR NON-LINEAR FUNCTIONS
	I can recall the trigonometric ratios sine and cosine and tangent.
	I can recognise and recall the shapes of the graphs for y = sine x, y = cosine x and y = tan x and know that these are cyclic functions.
	I can sketch the graphs for y = sine x, y = cosine x and y = tan x be able to label the points when the graphs cross the x and y axes.
	I can interpret the graphs for y = sine x, y = cosine x and y = tan x to solve problems.
	I can recognise and construct the graph for an exponential function such as $y = k^x$ where k is a positive integer.
	I can use the graph for any non-linear function to solve equations such as $5^x = 3.7$ or sine x = 0.4
	I understand that the gradient of a non-linear graph is not going to be constant.
	I know that a tangent at a point on a curve can be used to work out the gradient of the curve at that point.
	I can interpret the gradient at a point on a curve as the instantaneous rate of change in the context of the problem.

	I can estimate the area under a curve such as a velocity time graph by using the area of trapezia, triangles and rectangles.
Subject content from Specification (May 2014) Higher Only	**TOPIC: 14.3 TRANSFORMATIONS OF FUNCTIONS AND THEIR GRAPHS**
	I understand function notation $f(x)$and that it means a function in terms of the variable x.
	I know that if a function is $f(x) = 3x^2$ Then the **inverse** function is $f^{-1}(x) = \sqrt{\frac{x}{3}}$
	I know that when two functions are applied one after the other then a **composite function** can be formed.
	I understand the notation for a composition function is $\boldsymbol{fg}(\boldsymbol{x})$ and that this means first apply function $g(x)$ then apply function $f(x)$.
	I know that y = f(x) means a graphical function in terms of x and can work out values for y for given values of x to construct the graph.
	I can sketch or construct the graph for any linear or non-linear function.
	I can work out what happens to the graph for y = f(x) when it goes through the transformation **y = f(x) + a** where a is a constant and be able to sketch the new graph.
	I can work out what happens to the graph for y = f(x) when it goes through the transformation **y = f(x + a**) where a is a constant and be able to sketch the new graph.
	I can work out what happens to the graph for y = f(x) when it goes through the transformation **y = af(x)** where a is a constant and be able to sketch the new graph.
	I can work out what happens to the graph for y = f(x) when it goes through the transformation **y = f(ax)** where a is a constant and be able to sketch the new graph.