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| Subject: Mathematics Year 11 Curriculum Map 2024-2025 |
| Terms | **Topics covered** and **core knowledge and skills** | Links to careers | Links to the Knowledge organiser and other additional resources |
| Half term 1 | Gradients and Lines:Plot and interpret graphsInterpret the gradient of a straight line graph as a rate of changeUse the form y=mx+c to identify parallel {**Higher - and perpendicular**} linesFind the equation of a line when given a gradient and point(s)Find approximate solutions to two simultaneous equations {**Higher – including linear/quadratic**} from a graphNon-linear Graphs:Recognise, sketch and interpret graphs of linear, quadratic, cubic, reciprocal {**Higher – and exponential**} functionsPlot and interpret graphs, including reciprocal graphs {**Higher - and exponential graphs**}Find approximate solutions using a graphIdentify and interpret roots and intercepts of quadratic functions graphicallyRecognise and use the equation of a circle with centre at the originUsing GraphsPlot and interpret graphs of non-standard functions in real contexts**Higher - Interpret the gradient at a point on a curve as the instantaneous rate of change****Higher - Apply the concepts of instantaneous and average rate of change in a variety of contexts****Higher - Calculate or estimate gradients of graphs and areas under graphs** **Higher - Interpret gradients and area under graphs for distance-time graphs, velocity-time graphs and graphs in financial contexts** | Graphs, Gradients and Lines:<https://www.youtube.com/watch?v=JcEHR6O5E6Q> | <https://teachers.thenational.academy/subjects/maths/key-stages/key-stage-4><https://www.bbc.co.uk/bitesize/subjects/z38pycw><https://vle.mathswatch.co.uk/vle/><https://corbettmaths.com/contents/> |
| Half term 2 | Expanding and FactorisingKnow the difference between an equation and an identity, argue mathematically to show algebraic expressions are equivalent ad use algebra to support and construct arguments and **proofs** Simplify and manipulate algebraic expressions by : factorising quadratic expressions of the form x2+bx+c, including difference of two squares; **factorising quadratic expressions of the form ax2+bx+c** Know the difference between an equation and an identity; solve quadratic equations **including those that require rearrangement** algebraically by factorising **by completing the square and by using the quadratic formula** Identify and interpret roots; deduce roots algebraically **and turning points by completing the square** Solve two simultaneous equations in two variables (linear/linear **or linear/quadratic**) algebraically; find approximate solutions using a graph Changing the SubjectSolve linear inequalities in one variable Know the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent and use algebra to support and construct arguments **and proofs** Translate simple situations or procedures into algebraic expressions or formulae; derive an equation (or two simultaneous equations) solve the equations (s) and interpret the solution **Find approximate solutions to equations numerically using iteration**  FunctionsWhere appropriate, interpret simple expressions as functions with inputs and outputs; **interpret the reverse process as the ‘inverse function’; interpret the succession of two functions as a ‘composite function’** Solve two simultaneous equations in two variables (linear/linear **linear/quadratic** algebraically; find approximate solutions using a graph Identify and interpret roots; deduce roots algebraically **and turning points by completing the square** Solve linear inequalities in one **or two** variable**(s)** **and quadratic inequalities in one variable** represent the solution set on a number line,  **using set notation and on a graph** Recognise, sketch and interpret graphs of quadratic functions Apply Pythagoras’ Theorem and trigonometric ratios to find angles and lengths in right-angled triangles **and, where possible, general triangles** in two  **and three** dimensional figures  | Algebra:<https://www.youtube.com/watch?v=c4xwvFtsrMU>Quadratic Equations: <https://www.youtube.com/watch?v=QAmbU12zs8c> |  |
| Half term 3 | Multiplicative ReasoningCompare length, areas and volumes using ratio notation and /or scale factors; make links to similarityUnderstand that “X is inversely proportional to Y” is equivalent to “X is proportional to 1/y”**Construct and** interpret equations that describe and inverse proportionExtend and formalise their knowledge of ratio and proportion, including trigonometric ratios, in working with measures and geometry, and in working with proportional relations algebraically and graphicallyGeometric ReasoningReason deductively in geometry, number and algebra, including using geometrical constructions**Apply and prove the standard circle theorems concerning angles, radii, tangents and chords, and use them to prove related results**Interpret and use bearingsApply addition and subtraction of vectors, multiplication of vectors by a scalar and diagrammatic and column representations of vectors**Use vectors to construct geometric arguments and proofs**Algebraic ReasoningMake and test conjectures about the generalisations that underlie patterns and relationships: looks for proof or counter-examples; begin to use algebra to support and construct arguments **and proofs**Deduce expressions to calculate the nth term of linear **and quadratic** sequencesSolve two simultaneous equations in two variables (linear/linear **linear/quadratic**) sequencesSolve two simultaneous equations in two variables (linear/linear **linear/quadratic**) algebraically, find approximate solutions using a graphSolve linear inequalities in one **or two** variable(**s) and quadratic inequalities in one variable**; represent the solution set on a number line, **using set notation and on a graph** | Multiplicative Reasoning:<https://www.youtube.com/watch?v=Mz4nMRtTDCw>Geometric Reasoning:<https://www.youtube.com/watch?v=b4Shg4r8gng>Algebraic Reasoning:<https://www.youtube.com/watch?v=7Vf6BJwdy_0> |  |
| Half term 4 | Transforming and ConstructingDescribe translations as 2D vectorsReason deductively in geometry, number and algebra, including using geometrical constructionsInterpret and use fractional **and negative** scale factors for enlargements**Describe the changes and invariance achieved by combinations of rotations, reflections and translations**Recognise sketch and interpret graphs of the **trigonometric functions with arguments in degrees of angles of any size****Sketch translations and reflections of the graph of a given function**Listing and DescribingExplore what can and cannot be inferred in statistical and probabilistic settings, and express their arguments formallyCalculate the probability of independent and dependent combined events, including using tree diagrams and other representations, and know the underlying assumptions**Calculate and interpret conditional probabilities through representations using expected frequencies with two-way tables, tree diagrams and Venn diagrams**Apply systematic listing strategies **including use of the product rule for counting**Construct and interpret plans and elevation of 3D shapesShow ThatKnow the difference between an equation and an identity; argue mathematically to show algebraic expressions are equivalent, and use algebra to support and construct arguments **(and proofs)**Apply the concepts of congruence and similarityMake and use connections between different parts of mathematics to solve problems**Change recurring decimals into their corresponding fractions and vice versa**Apply addition and subtraction of vectors, multiplication of vectors by a scalar and diagrammatic and column representation of vectors; **use vectors to construct geometric arguments and proofs** | Transforming and Constructing:<https://www.youtube.com/watch?v=ejuJ20JroTo>Listing and Describing:<https://www.youtube.com/watch?v=cJ1QPiGnGEM>Show That:<https://www.youtube.com/watch?v=430Cs09V2n4> |  |