Mathematics

Year 7

Autumn Term

BIDMAS – order of operations

Negative numbers - Add and subtract, multiply and divide negative numbers

Algebra
- Use letters for numbers
- Collect like terms
- Multiply algebraic terms
- Substitute numbers into a formula (including negative numbers)
- Solve basic equations
- Multiply out single brackets
- Equations with brackets
- Substitute numbers into a formula (including negative numbers)

Fractions
- Add and subtract fractions (including mixed numbers)
- Harder Problems
- Multiplying and Dividing Fractions

Angles
- Label angles
- Measure and draw angles with a protractor
- Calculate angles on a straight line & at a point
- Calculate angles in a triangle
- Calculate angles in a quadrilateral
- Calculate angles with parallel lines

Rounding
- Rounding to decimal places (all types)
- Rounding to one significant figure
- Calculate using estimates
- Rounding to significant figures (all types)

Properties of 2D Shapes
- Illustrate properties of triangles, quadrilaterals, circles, and other plane figures (e.g. equal lengths and angles), using appropriate language and technologies

Metric Units
- Convert metric units
- Change units for some problems

Properties of Numbers
- Prime numbers
- Factors and multiples
- HCF and LCM using factor trees
- Square numbers
- Prime factor decomposition
- Cube numbers and higher powers

Updated November 2018

Spring Term

Coordinates   - Use coordinates with positive and negative numbers
                   - Solve problems involving shapes

Straight Line Graphs
              - Lines which are parallel to the axes (including x=0 and y=0)
              - Sloping lines
              - Finding the equation of a line
              - Drawing straight line graphs
              - Finding points on a line
              - Find the equation of a line using $y = mx + c$.
              - Drawing straight line graphs using $y = mx + c$

Sequences   - Find the next term in a sequence
                   - Find and use a rule for a sequence
                   - Solve problems involving harder sequences
                   - Find rules for sequences (including nth term)
                   - Recognise the sequence of square numbers e.g.1, 4, 9 etc.
                   - Sequence of Square, cube, and triangle numbers.
                   - Look at Pascal's Triangle
                   - Oscillating Sequences

Constructing Triangles
              - Construct triangles with a protractor and ruler
               - Construct triangles with three sides given
              - Construction of rhombus, parallelogram
               - Constructing 30° and 60°

Probability   - Discuss equally and unequally likely outcomes
                   - The 0-1 probability scale
                   - The probability of events not occurring
                   - The expected number of times an event will occur
                   - Experimental probability
                   - Probability involving two events

Transformations
              - Line symmetry
              - Rotating shapes
              - Finding the centre of rotation
              - Rotational symmetry
              - Translations (including describing them using vectors)
              - Reflections (including on graphs, identifying lines of reflection and drawing lines of reflection using graphs)
              - Rotation (include rotation around a point that is away from the shape and describing them)
              - Combinations of two transformations.

Averages   - The mean, median, mode and range from raw data
                   - Comparing sets of data
                   - Stem and leaf – finding the median and range
                   - The mean, median, mode and range from frequency tables

Summer Term

Using Ratios
- Use and simplify simple ratios
- Share quantities in a given ratio
- Use ratio in a range of contexts
- Solve problems using map scales

Circles
- Find the circumference of a circle
- Find the area of a circle
- Perimeter and area of compound shapes

Area and Perimeter
- Learn about rectangles, triangles, parallelograms and trapezia
- Solve a variety of problems
- Extend to deriving areas of rhombus and kite

Scatter Graphs - Draw and interpret scatter graphs (including lines of best fit

Fractions, Decimals, Percentages
- Converting fractions, decimals and percentages in different forms
- Using division to convert to recurring decimals
- Express one quantity as a percentage of another
- Discuss comparing two quantities using percentages
- Solve problems involving increasing or decreasing a number by a percentage
- Work with percentages greater than 100%

Volume
- The volume of cuboids, prisms (including cylinders)
- Compound prisms.

Bar Charts & Pie Charts
- Draw and interpret bar charts and pie charts

3D Objects - Learn about drawing three views of an object

Mathematics

Year 8

Autumn Term

HCF & LCM Review
- Prime factor decomposition
- Finding HCF & LCM using factor trees
- Recognise powers of 2, 10, 5.
- Finding square/cube roots without calculator.
- Using $\sqrt{}$ and $\sqrt[3]{}$ buttons on calculator.

Constructions
- Revision of constructing triangles
- Perpendicular bisector of a line
- Angle bisector
- Constructing angles of size 30°, 45°, 60°, 75°
- Constructing a perpendicular to a given line from/at a given point
- Constructing Hexagons.

Brackets & Equations
- Multiply out brackets and simplify expressions
- Solve linear equations
- Solve equations involving brackets
- Solve equations involving fractions (write coefficients as fractions rather than as decimals)
- Solving Equations with unknowns on both sides
- Solve problems by forming equations
- Solve word problems by forming equations
- Use algebra to explain connections

Pythagoras' Theorem
- Calculate the length of a side in a right angled triangle
- Solve problems using Pythagoras' Theorem

Loci
- Learn to draw and describe the locus of a point
- Learn to draw constructions with ruler and compass only

Sequences
- Solve problems using differences in sequences
- Use mapping diagrams or tables or any other method to find the nth term of a sequence.
- Word problems finding nth term

Enlargement
- Recognise enlargements and their properties
- Draw enlargements of shapes with and without grids
- No negative or fractional enlargements at this stage
- Use and find the centre of enlargement
- Describe enlargements

Geometric Reasoning
- Find angles using a wide range of angle properties
- Prove results in geometry

Bearings & Scale Drawing
- Learn about bearings
- Make scale drawings to solve problems
- Back bearings
- Finding the location of an object given the bearing of it from two other locations.

Percentages
- Revise and consolidate percentage increase and decrease
- Learn about reverse percentages
- Answer mixed questions involving percentages
- Answer increasing difficult questions

Angles in Polygons
- Learn about interior and exterior angles of polygons
- Harder questions

Spring Term

Straight Line Graphs
- Learn how to find the gradient of a line
- Learn how to find the y-intercept of a line
- Answer questions with straight lines in the form y=mx+c
- Learn about the gradients of parallel and perpendicular lines
- Using y=mx + c to find equation of a line given the point and gradient (including gradient of the perpendicular line) – you will need extra resources for this (see right)

Factorising - Learn how to factorise expressions (one bracket only)

Fractions - Review from Year 7 on all four operations
- Solve problems involving fractions
- Learn about recurring decimals and changing them to fractions algebraically
- Learn about algebraic fractions

Averages - Review averages and range from frequency tables
- All averages from grouped frequency distributions (this includes modal group and median group, as well as range from grouped frequency distributions).

Compound Measures
- Solve problems involving speed, distance and time
- Learn how to solve problems involving density, rates of change and various compound measures.

Simultaneous Equations
- Learn how to solve simultaneous equations with a graph
- Learn how to solve simultaneous equations algebraically
- Solve problems by using simultaneous equations

Multiplying Brackets

- Learn how to multiply pairs of expressions in brackets
- Solve a variety of problems using algebra

Factorising - Factorise Quadratic expressions with coefficient of x^2 as 1.
- Difference of two Squares

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Summer Term

Working with Indices
- Learn about the rules for multiplying and dividing using indices
- Learn about raising to a further power and the zero index
- Negative indices
- Solve a variety of problems (if time)
- Solve equations involving indices
- Fractional indices (only ½, 1/3, ¼ etc., NOT negative fractional)
- Proofs of why all rules of indices work.

Standard Form - Learn to write numbers in standard form
- Solve problems involving numbers in standard form
- Learn how to use standard form on a calculator
- Learn how to multiply and divide numbers in standard form without a calculator

Similar Shapes - Learn to recognise similar shapes
- Solve a range of problems involving similar shapes

Trigonometry - Learn how to find an angle or a side in a right angled triangle
- Learn how to find the length of the hypotenuse
- Learn how to use trigonometry to solve problems based on real life situations

Area & Volume - Review the use of formulae for simple areas and volumes
- Learn how to find the radius of a given circle

Changing the Subject of a Formula
- Learn how to change the subject of a formula.