**Year 9 Assessment without Levels – Maths Progress Descriptor**

**Assessment 1**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Acquiring  | Developing | Securing | Extending |
| Decimal Places and Significant Figures | Revise rounding to decimal places, emphasising that when rounding, e.g. 7.99 to 1 decimal place the answer is 8.0. Include contextualised questionsLearn what significant figures are and how they are different to decimal placesRound to 1 significant figure with a range of type of numbers ie where the 1st significant figure is in the thousands column, hundreds column, tens column, units column, first decimal place, second decimal place eg Round the following to 1 sig fig 67,452 5,123 291 65.23 8.21 0.297 0.0123 Round to 2 significant figures if time | Rounding to decimal places, emphasising that when rounding, e.g. 7.99 to 1 decimal place the answer is 8.0. Mostly using contextualised questionsRounding to significant figures, emphasising that when rounding, e.g. 0.499 to 1 significant figure the answer is 0.5 not 1. Mostly using contextualised questionsAppropriate degree of accuracy. Emphasis on reasoning and problem solving in this lesson. Making estimates – rounding to 1 sig fig. | Rounding to decimal places, emphasising that when rounding, e.g. 7.99 to 1 decimal place the answer is 8.0. Mostly using contextualised questions Rounding to significant figures, emphasising that when rounding, e.g. 0.499 to 1 significant figure the answer is 0.5 not 1. Mostly using contextualised questionsAppropriate degree of accuracy. Emphasis on reasoning and problem solving in this lesson |  |
| Negative and Fractional Indices |  |  |  | Recap rules of indices focusing on more difficult questions eg 12$x^{-5}y^{7}÷4x^{3}y^{-4}$, $(2x^{-7})^{3}$ Recap knowledge from last year e.g. $6^{-2}$, $64^{\frac{1}{2}}$, $27^{\frac{1}{3}}$Evaluate examples of the form $8^{\frac{2}{3}}$ and if time$ 8^{-\frac{2}{3}}$ |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Percentages(Fractions, decimals and percentages for Acquiring) | Recap changing between “well known” fractions, decimals and percentagesTry and do this in contextualised questions -see problem examples below.Emphasise less familiar fractions eg $\frac{1}{8}$ $\frac{3}{8}$ $\frac{5}{8}$ and the decimal and percentage equivalentsTeach systematic strategies to change between fractions and decimals and percentages without a calculatorTeach systematic strategies to change between fractions and decimals and percentages with a calculatorFind the amount after a percentage increase/decrease by adding/subtracting values and by multiplicative factorsCitizenship lesson on percentages | Recap writing one number as a percentage of another and percentage change along with the skill checks above. Reasoning and problem solving with percentage change including that different starting amounts lead to different answers, e.g. A game costs £16.99. The price of the game is reduced by 50% during the sales then increased by 50% after the sales. How much does the game cost now?Finding the original quantity given the percentage change and the final amount. | Recap writing one number as a percentage of another and percentage change along with the skill checks above. Reasoning and problem solving with percentage change including that different starting amounts lead to different answers, e.g. A game costs £16.99. The price of the game is reduced by 50% during the sales then increased by 50% after the sales. How much does the game cost now?Finding the original quantity given the percentage change and the final amount. | Recap percentage changeRecap simple and compound interest, focusing on compound interestCitizenship Charities Lesson  |
| Compound Interest  |  | Percentage increase and decrease, emphasising repeated or more than 1 percentage increase/decreaseSimple and compound interest, focusing on compound interestCitizenship charities lesson | Percentage increase and decrease, emphasising repeated or more than 1 percentage increase/decreaseSimple and compound interest, focusing on compound interestCitizenship charities lesson |  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Fractions | Recap equivalent fractions and changing mixed numbers into improper fractionsAdding and subtracting fractions with the same denominator Adding and subtracting fractions with different denominators including questions where answer is a mixed number include some contextualised problemsAdding and subtracting mixed numbersMultiplying fractions including cancelling factors before multiplying Dividing fractions Multiplying and dividing mixed numbers | Quick recap of 4 basic operations with fractions then combine with BIDMAS rules. Use contextualised questions (e.g. area and perimeter of shapes) throughout. Include calculator work and show pupils explicitly where the fraction button is. Include explicitly questions with a mix of fractions and integers e.g. $\frac{7}{3}-2×\frac{2}{8}$ and negative numbers.Making links to yesterday’s work recap the 4 operations with mixed numbers then combine with BIDMAS e.g. $6\frac{3}{4}-1\frac{3}{5}×2\frac{1}{8}$. Show pupils how to use the calculator’s mixed number button. Applying fraction skills to questions that use other topics, for example 1) The radius of a circle is 7, work out the area of the circle, using $π$ as $\frac{22}{7}$ 2) The area of a triangle is $\frac{14}{15}$ and the height is $\frac{3}{5}$ what is its base? 3) The distance walked by a person is $10\frac{1}{2}$ miles in 3 hours and 15 minutes. Work out the person’s speed giving your answer as a fraction. Include reasoning e.g.  | Quick recap of 4 basic operations with fractions then combine with BIDMAS rules. Use contextualised questions (e.g. area and perimeter of shapes) throughout. Include calculator work and show pupils explicitly where the fraction button is. Include explicitly questions with a mix of fractions and integers e.g. $\frac{7}{3}-2×\frac{2}{8}$ and negative numbers.Making links to yesterday’s work recap the 4 operations with mixed numbers then combine with BIDMAS e.g. $6\frac{3}{4}-1\frac{3}{5}×2\frac{1}{8}$. Show pupils how to use the calculator’s mixed number button.Applying fraction skills to questions that use other topics, for example 1) The radius of a circle is 7, work out the area of the circle, using $π$ as $\frac{22}{7}$ 2) The area of a triangle is $\frac{14}{15}$ and the height is $\frac{3}{5}$ what is its base? 3) The distance walked by a person is $10\frac{1}{2}$ miles in 3 hours and 15 minutes. Work out the person’s speed giving your answer as a fraction. Include reasoning e.g. What’s the same and what’s different about $\frac{\frac{3}{4}}{7}$ and $\frac{3}{\frac{4}{7}}$ (3 divided by $\frac{4}{7}$ and $\frac{3}{4}$ divided by 7)?  |  |
| Bounds & Propagation of Errors |  |  |  | Revise work done in Year 7 and extend to numbers which have been rounded to eg 1, 2, 3 significant figures- students can find this difficult to do, including error intervalsPropagation of errors-adding and multiplyingPropagation of errors – subtracting and dividing  |
| Algebra |  | Substituting numbers into expressions. Emphasise substituting negative numbers and fractions.Recap simplifying expressions including expanding single brackets1. Solve linear equations including with fraction coefficients and negative/fraction solutions, brackets and unknown on both sides.
2. Creating linear equations from context and solving
 | Substituting numbers into expressions. Emphasise substituting negative numbers and fractions.Recap simplifying expressions including expanding single bracketsSolve linear equations including with fraction coefficients and negative/fraction solutions, brackets and unknown on both sides.1. Creating linear equations from context and solving
 | Substitution numbers into expressions, include negative numbers and fractions.Solving linear equations up to and e.g. $\frac{x+3}{2}$ + $\frac{x-4}{5}$ = 8.Solving inequalities up to 2($x+6)<3(5-4x)$ include how to deal with e.g. -3x > 15.Expanding 2 brackets eg ($x+4)(x-2)$ and ($2x-5)(x-3)$Recap factorising into 1 bracket eg 12$x^{2}y+4x^{3}y^{5}$Factorise quadratic expressions focusing on when the coefficient of $x^{2} is $1 and difference of two squaresSolve quadratic equations by factorisingRearranging formulae where the subject appears once – include squares and square root |

**Assessment 2**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Acquiring | Developing | Securing | Extending |
| Algebra | Substituting into simple formulae and expressions, including negative numbers and fractionsSolving equations up to and including 3 step equations where answers are fractional and negative. Include some questions where the equation has to be createdUsing Lesson plans in TeamsRepresenting inequalities visuallySolving inequalities Expanding single bracketsRevising factors and multiplesFactorising simple linear expressions | Factorising linear expressions (new topic)Expanding double brackets up to e.g. ($2x-5)(x-3)$, $\left(x-3\right)^{2}$Representing and interpreting linear inequalities including $n$ is an integer, $n>13.6$. What is the smallest possible value of $n$?Solving inequalities up to 2($x+6)<3(5-4x)$ include how to deal with negative coefficients of $x$Rearrange simple formulae, subject appears once (new topic) | Substituting numbers into expressions. Emphasise substituting negative numbers and fractions.Recap simplifying expressions including expanding single bracketsSolve linear equations including with fraction coefficients and negative/fraction solutions, brackets and unknown on both sides.Creating linear equations from context and solving |  |
| Fractions |  |  |  | Quick recap of 4 basic operations then combine with BIDMAS e.g 1. 6$\frac{3}{4}$ – 1$\frac{3}{5}$ $×$2$\frac{1}{8}$What’s different about $\frac{\frac{3}{4}}{7}$ and $\frac{3}{\frac{4}{7}}$?Contextual questions/Questions that use other topics E.g 1. The radius of a circle is 7, work out the area of the circle, using $π$ as $\frac{22}{7}$ E.g. 2 The area of a triangle is $\frac{14}{15}$ and the height is $\frac{3}{5}$ what is its base? E.g. 3 The distance walked by a person is 10½ miles in 3 hours and 12 minutes. Work out the person’s speed giving your answer as a fraction.E.g 4 Solve $\frac{3}{5}x= 1\frac{5}{7}$E.g. 5 Solve 3$x+ \frac{1}{5}$ = $\frac{7}{8}$ |
| Simultaneous Equations |  |  |  | Refer to solving SE graphically last year at the beginning or the end of the topic and link to algebraic solvingSolve SE by addingSolve SE by subtractingSolve SE where you multiply one equationSolve SE where both equations are multipliedDepending on timeContextualised SESolving SE by substitution  |
| Sequences and nth terms | Investigates different types of sequences and can categorise them into different groups eg Fibonacci, arithmetic Finding the nth term of a sequence from a number sequence and working out eg the 20th term in the sequence – emphasises the position and the value of the term in the sequenceWork out if eg 567 is a term in the sequence – initially identifying if it is odd and all the numbers in the sequences are even but then using solving equations to identify if n is an integer or notFrom a number sequence - find an nth term, the eg 20th term and identify is 567 a term in the sequence | Recap number (increasing, decreasing, fraction, decimal, percentages, arithmetic, square, cube, square root) and pattern sequences. How do you make the next/previous/ 19th term of the sequence? Is a given number/pattern in the sequence? Include sequences with gaps and have pupils explain how to find the missing numbers. Make links to times tables.Recap finding nth terms of arithmetic number (increasing, decreasing, fraction, decimal, percentages) and pattern sequence. Finding different terms. What is the 8th term, the 36th term, the term BEFORE the first term? Generating sequences.Is a given number/pattern a term of the sequence? [Extend to find and use the nth term of a sequence like $\frac{1}{2},\frac{3}{8},\frac{5}{32},\frac{7}{128}, … $?]. Problem solving with linear nth termsFinding and using nth terms of simple quadratic sequences by inspection e.g. $n^{2}+6, 3n^{2}, n^{2}+7n$ | Recap number (increasing, decreasing, fraction, decimal, percentages, arithmetic, square, cube, square root) and pattern sequences. How do you make the next/previous/ 19th term of the sequence? Is a given number/pattern in the sequence? Include sequences with gaps and have pupils explain how to find the missing numbers. Make links to times tables.Recap finding nth terms of arithmetic number (increasing, decreasing, fraction, decimal, percentages) and pattern sequence. What is the 8th term, the 36th term, the term BEFORE the first term? Is a given number/pattern a term of the sequence? [Extend to find and use the nth term of a sequence like $\frac{1}{2},\frac{3}{8},\frac{5}{32},\frac{7}{128}, … $?]Finding and using nth terms of simple quadratic sequences by inspection e.g. $n^{2}+6, 3n^{2}, n^{2}+7n$ | Revise linear nth terms including finding the nth term from a number sequence and a spatial pattern, finding e.g. the 20th term using the nth term and deciding whether e.g. 63 is a term in the sequence.Investigate non linear sequences including Fibonacci, geometric, quadratic and cubicRecognise that a quadratic sequence will have a constant 2nd difference and a cubic sequence will have a constant 3rd difference. Find nth terms for quadratic sequences using a formal method so that students can find an nth term of the form $an^{2}+bn+c$ and use this to find e.g. the 20th term Depending on time could derive and use the formula for a geometric nth term |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Simultaneous Equations  |  |  | COMPUTER ROOM or using Desmos/Geogebra on their phones. Solving linear simultaneous equations by drawing the graphs of the equations.Solve linear simultaneous equations algebraically by addingSolve linear simultaneous equations algebraically by subtracting |  |
| Probability | Review of using equally likely outcomes to find probabilitiesSolve problems using the sum of all outcomes is 1Finding the unexpected number of successesListing outcomes and compound events- moving from listing outcomes to using sample space diagramsRelative frequencyComparing experimental results with theoretical results – do an experiment to show this | Recap using more challenging question to find the probability of an event happening; not happening; include tables with two missing values where, for example, you know the probability of choosing green and yellow and the probability of choosing a red is double the probability of choosing a blue. Do expected frequency, mutually exclusive events and sum to 1 here too.Probability of compound events (use sample space diagrams too) Relative frequencyTree diagrams for independent eventsSimple tree diagrams for dependent events | Recap using more challenging question to find the probability of an event happening; not happening; include tables with two missing values where, for example, you know the probability of choosing green and yellow and the probability of choosing a red is double the probability of choosing a blue. Do expected frequency, mutually exclusive events and sum to 1 here too.Probability of compound events (use sample space diagrams too) Relative frequencyTree diagrams for independent eventsSimple tree diagrams for dependent events | Recap – more challenging questions on basic conceptsSample SpacesRelative FrequencyMutually Exclusive eventsIndependent EventsTree Diagrams |

**Assessment 3**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Acquiring  | Developing | Securing | Extending |
| Areas, Volume and Formulae | Recap of areas of rectangles, parallelograms and triangles – focus examples on working backwards and changing units of measurement eg one measurement in cms and the other in mmFind the area of simple compound shapes – include questions where missing lengths need to be found before working out areasFind surface area of cuboids and cubesIntroduce $π$ and learn how to find the circumference of a circle – if possible find the perimeter of semi and quarter circles and working backwards to find diameter given circumferenceLearn how to find the area of a circle and if possible the area of semi and quarter circles and working backwards to find the radius given the area.Problem solving area questions involving money eg have they got enough money to carpet the floor of a roomVolumes of cuboids and cubes include questions with different measurements and working backwards to find a missing side given the volumeQuestions about how many small cuboids can fit in a larger cuboid.Volumes of triangular prisms include questions with different measurements and working backwards to find a missing side given the volumeVolumes of cylindersNets of 3D shapesProblem solving questions with volume | Perimeter of shapes move quickly to compound shapes made of squares, rectangles, parallelograms, triangles, trapeziums and circles. Emphasise reasoning, problem solving and working backwards.Problem solving focus on perimeter and circumferenceRevision of areas of squares, rectangles, triangles, parallelograms and trapeziums. Focus on problem solving and working backwards e.g. the area of the parallelogram is 4 times the area of the square. What is the perimeter of the square? Include mixed units Revision of areas of circles. Focus on problem solving and working backwards. Include mixed units Recap changing metric units of area and teach converting metric units of volume so that questions on this can be incorporated into other lessons. Compound areas including with circles. Include questions where the area units must be converted DIY questions.Revision of volumes of cubes, cuboids, prisms and cylinders. Do lots of questions where the volume of one shape is, e.g., 4 times the volume of the other or e.g. a block of metal is melted down and made into medals. How many medals?Revision of surface areas of cubes, cuboids, cylinders and prisms.  | Perimeter of shapes. Move quickly to compound shapes made of squares, rectangles, parallelograms, triangles, trapeziums and circles. Emphasise reasoning, problem solving and working backwards.Problem solving focus on perimeter and circumference, how many revolutions of a wheel will be needed to go 1km if the radius is 40cm.Revision of areas of squares, rectangles, triangles, parallelograms and trapeziums. Focus on problem solving and working backwards e.g. the area of the parallelogram is 4 times the area of the square. What is the perimeter of the square? Include mixed units and stress convert the units to all the same first if you can. Revision of areas of circles. Focus on problem solving and working backwards. Include mixed units and stress convert the units to all the same first if you can e.g. Work out the area of a circle with radius 70cm and the area of $\frac{3}{4}$ of a circle with radius 1.2m. Which area is bigger?Recap changing metric units of area and teach converting metric units of volume so that questions on this can be incorporated into other lessons. Build fluency quickly then do the work in the context of area.Compound areas including with circles. Include questions where the area units must be converted DIY questions.Revision of volumes of cubes, cuboids, prisms and cylinders. Do lots of questions where the volume of one shape is, e.g., 4 times the volume of the other or e.g. a block of metal is melted down and made into medals. How many medals?Revision of surface areas of cubes, cuboids, cylinders and prisms.  | Recap on changing metric units of volume and area so that questions on this can be incorporated into other lessons. Eg Work out the area of a circle with radius 70cm and the area of ¾ of a circle with radius 1.2m. Which area is bigger?Revision of areas of circles, trapezia, kites and parallelograms – focus on problem solving and working backwardsTime permitting – circumferences of circles – problem solving focus eg how many revolutions of a wheel will be necessary to travel 1km if the radius is 40cm.Revision of volumes of cuboids, prisms, cylinders and new are spheres and pyramids.Revision of surface areas of cuboids, cylinders and prisms and new are spheres and pyramids |
| Mean, median and mode and range | Recap of finding mean, median and mode from single valuesFinding a missing number when given the mean, mode or medianComparing 2 groups of data using means and rangesFinding means, modes and ranges frequency tables with discrete dataFinding estimates of means and modal interval from grouped continuous data  |  |  |  |
| Ratio, direct and indirect Proportion | Recap of ratio Simplify ratio and find equivalent ratio –use ratio tablesShare quantities in unitary ratioProblem solving by sharing quantities in a given ratioScaling quantities in direct proportion | Dividing amounts in a given ratioSimplifying ratioUnitary ratiosEquivalent ratiosChanging ratios to fractionsApplication of ratio to enlargements and converting metric and imperial measurements et. Mile:km 5:8 | Recap of ratio and link to fractionsProblem solvingBest buysDirect ProportionConsolidation  | Recap of ratio and link to fractionsProblem solvingDirect ProportionIndirect ProportionConsolidation  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Representation of data | Grouping data and bar charts for grouped data. Interpreting and reasoning only, no drawing. Do some work on misleading graphs here. Compare 2 different bar chartsFrequency polygons – drawing, what’s wrong?Pie charts and frequency polygons. Interpreting, reasoning and comparing with other charts for the same data – limited drawing.Scatter graphs. Spend time interpreting relationships between two variables and correlation and using a line of best fit. Pupils will not be required to draw an entire scatter graph by hand at GCSE , just to add a point or two to a graph.Stem and leaf diagrams - Interpreting and finding mode and range from. |  |  |  |

**Assessment 4**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Acquiring | Developing | Securing | Extending |
|  |  |  | Investigation lesson. Pick out or create similar shapes including similar triangles. Establish that the angles will all be the same and that pairs of corresponding lengths will all be in the same ratio. Establish that all squares are similar to one another and investigate whether all rectangles are (they have the same angles after all). Give pairs of triangles and have the pupils decide if they are similar including some where you have to work out the size of the third angle.Find missing lengths given two similar shapes |  |
| MMR |  | Revision of finding statistical measures from frequency tables and grouped frequency tablesReasoning and problem solving using statistical measures for grouped data e.g. a new pupil joins/leaves the group. How does this affect the mean, median, mode or range.Compare grouped data sets using averages and range | Revision of finding statistical measures from frequency tables and grouped frequency tablesReasoning and problem solving using statistical measures for grouped data e.g. a new pupil joins/leaves the group. How does this affect the mean, median, mode or range.Compare grouped data sets using averages and range | Revision of finding averages from frequency tables and grouped frequency tables Calculations with means |
| Handling Data  |  | Grouping data and bar charts for grouped data. Interpreting and reasoning only, no drawing. Do some work on misleading graphs here.Pie charts and frequency polygons. Interpreting, reasoning and comparing with other charts for the same data, no drawing.Scatter graphs. Spend time interpreting and using. Pupils will not ever be required to draw an entire scatter graph by hand, just to add a point or two to a graph.Stem and leaf diagrams (including back to back?). Interpreting and finding mode and range from.Drawing cumulative frequency graphs. Frequency trees. A bit of drawing and lots of interpreting and using (e.g. what fraction of the girls have a cat; or working out a missing value to go into the graph). | Grouping data and bar charts for grouped data. Interpreting and reasoning only, no drawing. Do some work on misleading graphs here.Pie charts and frequency polygons. Interpreting, reasoning and comparing with other charts for the same data, no drawing.Scatter graphs. Spend time interpreting and using. Pupils will not ever be required to draw an entire scatter graph by hand, just to add a point or two to a graph.Stem and leaf diagrams (including back to back?). Interpreting and finding mode and range from.Drawing cumulative frequency graphs. Frequency trees. A bit of drawing and lots of interpreting and using (e.g. what fraction of the girls have a cat; or working out a missing value to go into the graph). | Constructing boxplots from a set of data.Drawing and using Cumulative Frequency graph. Drawing boxplots from CF graphsBack to back Stem and leaf diagrams and comparing data from them and from 2 boxplots.Frequency Trees |
| Pythagoras (and Trig ) |  | Introduce the theorem with its history and application – lots of nice demos.Find the length of the hypotenuse and shorter sides – may want to split lessons.Converse of Pythagoras. Recognising and using 3,4,5 and 5,12,13 Pythagorean triples and multiples of thoseUsing Pythagoras Theorem with isosceles triangles and other applications of Pythagoras.Problems solving including identifying when Pythagoras Theorem might be useful and repeated applications (and leaving answers in exact form?) Include finding the length of a line segment. Pythagoras Theorem in 3D | Revision of Pythagoras in 2D. Build fluency.Converse of Pythagoras. Recognising and using 3,4,5 and 5,12,13 Pythagorean triples and multiples of thoseUsing Pythagoras Theorem with isosceles trianglesProblems solving including identifying when Pythagoras Theorem might be useful and repeated applications (and leaving answers in exact form?) Include finding the length of a line segment.Using Pythagoras Theorem in 3D | Brief revision of Pythagoras in 2D -focusing on repeated application and leaving answers in surd formConverse of Pythagoras and recognising Pythagorean triples 3D Pythagoras - could extend rule to $\sqrt{a^{2}+b^{2}+c^{2}}$ for diagonal of cuboid Introduce trig ratios – link to similar trianglesFinding sides where the numerator is the side to be found Finding sides where the denominator is the side to be foundFinding angles – discuss the inverse process of using sine Consolidation -how to decide which process you are usingProblem solving questions using trig Problem solving using trig and Pythagoras |
| Calculations | Recap multiplying and dividing decimals by powers of 10 focusing on the importance of place valueMultiplication methods for a 2 digit number by 3 digit numberMultiplying decimals Division methods for dividing by an integers and decimalsFractions of amounts -just recap -done earlier in year – do this in the context of problem solvingAddition and subtraction of decimals – include money contextsApproximating and estimating answers |  |  |  |

**Rest of Year**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Acquiring  | Developing | Securing | Extending |
| Scale Factors and Enlargement  |  |  |  | Recap of enlarging similar shapes with positive and integer SF and describing enlargement. Develop into discussing the scale factor from small to large is eg 3 but from large to small is $\frac{1}{3}$ and ratios 1:3 and 3:1 accordingly Focus mainly on negative scale factor enlargement: enlarging and describingIf time do two successive enlargements  |
| Graphs | Plotting straight line graphs including vertical and horizontal linesInvestigate what effect changing the gradient and y intercept makes to lines – use desmos/omnigraph. Discuss parallel linesFinding gradients and y interceptsFinding the equation of straight linesChecking if a point is on a given lineUsing Conversion graphs & real life graphsPractise working out eg 52 (-4)2, 62 + 11Plot simple quadratics graphs y = x2, y = x2 + 5, y = x2 – 7 y = x2 +x y = x2 – 6xInvestigate quadratic graphs using desmos/omnigraph so that students are familiar with the shape and symmetry properties of quadratic graphs, discuss vertex, turning points, lines of symmetry | Brief revision of plotting straight lines. Also do work on showing whether a given point is on a given line.Finding gradients and $y-$intercepts from graphsFinding equations of straight lines from graphsFinding the equation of a parallel line algebraicallyInvestigate quadratic graphs using desmos on phones or in a computer room and understand the shape and symmetry propertiesPlot quadratics graphs include positive and negative quadratics. Interpreting quadratic graphs. Finding intercepts and roots from the graphs. Notice that the x-coordinate of the vertex is midway between the roots (if the quadratic has roots) and use this to find the coordinates of the vertex. Finding the equation of the line of symmetry. Pick the correct sketch to match a given quadratic equation. | Brief revision of plotting straight lines. Also do work on showing whether a given point is on a given line.Finding gradients and $y-$intercepts from graphsFinding equations of straight lines from graphsFinding the equation of a parallel line algebraicallyFinding the equation of a perpendicular line algebraicallyInvestigate quadratic graphs using desmos on phones or in a computer room and understand the shape and symmetry propertiesPlot quadratics graphs include positive and negative quadratics. Interpreting quadratic graphs. Finding intercepts and roots from the graphs. Notice that the x-coordinate of the vertex is midway between the roots (if the quadratic has roots) and use this to find the coordinates of the vertex. Finding the equation of the line of symmetry. Pick the correct sketch to match a given quadratic equation. | Brief revision of plotting straight lines and finding equations of straight linesStudents should be able to “Sketch” a line from knowing the y-intercept and the gradient. Finding the equation of a parallel line algebraicallyEstablish the product of gradients of perpendicular lines is -1 and use this to find the equation of perpendicular lines algebraically. Investigate quadratic graphs using desmos on phones and understand the shape and symmetry properties Plot quadratics graphs Investigate cubic graphs using desmos on phones and understand properties of cubic graphs Plot cubic graphssolve 2 linear equations and a linear and quadratic equations graphicallyIf time investigate and plot reciprocal graphs. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Algebraic Fractions |  |  |  | Adding and subtracting fractions gradually increase complexityRevise factorising briefly and multiplying and dividing numerical fractions and cancellingMultiplying algebraic fractions – no cancelling and then including cancelling.Dividing algebraic fractions – no cancelling and then including cancelling.Time permitting and if students can cope do some double decker fractions work eg simplify $\frac{5}{\frac{2x}{7}} \frac{\frac{7x}{2}}{3} $ $\frac{\frac{x+3}{5}}{\frac{10}{4x+12}} $ or $\frac{\frac{4x-8}{5}}{x-2}$ or $\frac{6x+18}{\frac{x+3}{5}}$ |
| Enlargements and Similar Shapes | Review enlarging shapes without a centre of enlargementDemonstrate using omnigraph how different centres of enlargement affect the position of the enlarged shapeEnlarge Shapes with positive integer and fractional scale factors using the centre of enlargement.Describe enlargements using SF and CofE | Enlarging shapes without a centre of enlargement. Demonstrate using omnigraph how different centres of enlargement affect the position of the enlarged shapeEnlarge Shapes with positive and negative integer and fractional scale factors using the centre of enlargement.Describe enlargements using SF and CofE. Finding the centre of enlargement given the original and enlarged shape.Investigation lesson. Pick out or create similar shapes including similar triangles. Establish that the angles will all be the same and that pairs of corresponding lengths will all be in the same ratio. Establish that all squares are similar to one another and investigate whether all rectangles are (they have the same angles after all). Give pairs of triangles and have the pupils decide if they are similar including some where you have to work out the size of the third angle.Find missing lengths given two similar shapes |  |  |
| Angles, Loci and Constructions | Angles on straight lines, in triangles and quadrilateralsReasoning with angles on straight lines, in triangles and quadrilateralsAngles in PolygonsAngles on Parallel linesConstruct different types of trianglesConstructing the perpendicular bisector of a lineConstructing the bisector of an angleConstruct the loci eg 5cm from a pointConstruct the loci equidistant from points A and BConstrict the loci equidistant from two linesUse shading with loci constructions if time | Angles on parallel lines. Focus on giving structured reasons.Reasoning 1Reasoning 2Angles in polygonsBearingsStandard constructions 1- the set of points a given distance from a given point- the set of points equidistant from 2 points- the set of points a given distance from a line- the set of points equidistant from two linesStandard constructions 2- perpendicular bisector of a line segment- bisect an angle- a perpendicular from a point to a line G4- a perpendicular from a line to a pointLoci – easier questionsConstructing triangles.  | Angles on parallel lines. Focus on giving structured reasons.Reasoning 1Reasoning 2Angles in polygonsBearingsStandard constructions 1- the set of points a given distance from a given point- the set of points equidistant from 2 points- the set of points a given distance from a line- the set of points equidistant from two linesStandard constructions 2- perpendicular bisector of a line segment- bisect an angle- a perpendicular from a point to a line G4- a perpendicular from a point on a lineLoci – easier questionsConstructing triangles | All of this is recap really -focus on the structuring of solutions and problem, solvingAngles on parallel lines and in triangles and quadrilaterals – focus on giving structured reasons. Angles in polygonsBearings, angles of elevation and depressionCconstructions -all set constructionsLoci -focus on two instructions and shaded regionRecap of construction of triangles to lead into conditions of congruency  |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Circle Theorems |  |  | Introduce key terminology and spend time building understanding of “subtends/subtended by”Introduce that angles subtended by the same chord in the same segment are equal. Use Geogebra to show that if one angle goes into the other segment you get a cyclic quadrilateral and then opposite angles of cyclic quadrilateral add up to 1800. Build fluencyProblems using theorems encountered so far. Emphasise justifying the steps in a logical processIntroduce angle at the centre is twice the angle at the circumference when subtended from the same chord. Use Geogebra to show that a special case of this is angles in a semi-circle are $90°$. Build fluencyProblems using all the theorems encountered so far. Emphasise justifying the steps in a logical processIntroduce the two tangent theoremsProblems using all the theorems encountered so far. Emphasise justifying the steps in a logical process | Introduce key terminology. Introduce Angles subtended by the same chord in the same segment are equal – show on geogebra that if one angle goes into the other segment you get a cyclic quadrilateral and then opposite angles of cyclic quadrilateral add up to 1800. Introduce angle at the centre is twice the angle at the circumference when subtended from the same chord. Show using geogebra that a special case of this is Angles in a semi-circle are 900Introduce the 2 tangent theoremsIf time explain the Alternate Segment Theorem. |

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Product of Primes, HCF & LCM | Revise what prime numbers are and what product means in mathsStudents learn to write numbers as the product of prime numbers – explain that every number can be written as the product of prime numbersRevise factor diagrams before beginning finding HCFTeach HCF and LCM by drawing two factor diagrams and look for HCF and listing multiples to find LCM. Hopefully this should support understanding of the concepts.Use applications questions – recapping time may be useful for some questions prior to LCM questions | Revise what prime numbers are and what product means in mathsStudents learn to write numbers as the product of prime numbers – explain that every number can be written as the product of prime numbersTeach HCF and LCM by drawing two factor diagrams and look for HCF and listing multiples to find LCM. Hopefully this should support understanding of the concepts. Use applications questionsUse Venn diagrams and product of primes to find LCM and HCF for bigger numbers | Revise what prime numbers are and what product means in mathsStudents learn to write numbers as the product of prime numbers – explain that every number can be written as the product of prime numbersTeach HCF and LCM by drawing two factor diagrams and look for HCF and listing multiples to find LCM. Hopefully this should support understanding of the concepts. Use applications questionsUse Venn diagrams and product of primes to find LCM and HCF for bigger numbers | Revise what prime numbers are and what product means in mathsStudents learn to write numbers as the product of prime numbers – explain that every number can be written as the product of prime numbersTeach HCF and LCM by drawing two factor diagrams and look for HCF and listing multiples to find LCM. Hopefully this should support understanding of the concepts. Use applications questionsUse Venn diagrams and product of primes to find LCM and HCF for bigger numbers |
| Set Theory |  | Practise putting information in a venn diagram with 2 sets without any notation.Introduce Set notation , , ,  -discuss mutually exclusive events and how this links to what the Venn diagram looks likePractise using set notation terminology , , ,  with questionsUse a Venn diagram to calculate theoretical probabilitiesDepending on time and how confident students are with 2 sets develop all of the above processes with 3 sets  | Practise putting information in a venn diagram with 2 sets without any notation.Introduce Set notation , , ,  -discuss mutually exclusive events and how this links to what the Venn diagram looks likePractise using set notation terminology , , ,  with questions Use a Venn diagram to calculate theoretical probabilities | Practise putting information in a venn diagram with 2 sets without any notation.Introduce Set notation , , ,  -discuss mutually exclusive events and how this links to what the Venn diagram looks likePractise using set notation terminology , , ,  with questionsUse a Venn diagram to calculate theoretical probabilitiesDepending on time and how confident students are with 2 sets develop all of the above processes with 3 sets |