## Year 11 Maths: Personalised Learning Checklist (PLC) – Support

**Learning Journey**

| | |
|---|---|
| 1 | Probability |
| 2 | Quadratics |
| 3 | Units & Graphs |
| 4 | Shape & Construction |
| 5 | Equations & Inequalities |
| 6 | Ratio & Proportion |
| 7 | Angles, Measure & Pythagoras |
| 8 | Number & Accuracy |
| 9 | Statistics |
| 10 | Calculating & Place Value |
| 11 | Perimeter, Area & Volume |
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| 13 | Graphs |
| 14 | Percentages |
| 15 | Sequences |
| 16 | Reasoning & Proof |

| **Unit 1 – Probability** | **MathsWatch** |
|---|---|
| Language of probability, 0-1 probability scale, random, fair, equally likely, bias, unequally likely | 14 |
| Calculate probability and write as fractions, decimals or percentages | 59 |
| Sample space diagrams for combined events | 126 |
| Mutually exclusive events & their probabilities | 60 |
| Experimental probability | 125 |
| Expected results from repeated experiments | 125 |
| Use a frequency tree to record outcomes of an event | 57 |
| Use listing strategies to identify all permutations or combinations | 58 |
| Represent outcomes using a Venn diagram<br>Find the union and intersection of sets | 127a, 186 |
| Recognise the symbols { } for sets, ∩ for intersection and ∪ for union | 127b, 186 |
| **The following skills are extension work** | |
| Know the addition law for mutually exclusive events:<br>P(A or B) = P(A) + P(B) | 204 |
| Know the multiplication law for independent events:<br>P(A & B) = P(A) x P(B) | 204 |
| Use a tree diagram to solve problems involving combined events that are independent and dependent | 151, 175 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Probability | Expected | • Scientists |
| Chance | Expectation | • Market Research |
| Likelihood | Experiment | • Finance |
| Impossible | Trial | • Statisticians |
| Unlikely | Theoretical probability | • And many more! |
| Likely | Experimental probability | |
| Even chance | Relative frequency |  |
| Certain | Frequency tree | |
| Random | Combination | |
| Fair | Permutation | |
| Biased | Probability tree diagram | |
| Event | Independent events | |
| Outcome | Dependent events | **Career Transferable Skill** |
| Frequency | Conditional probability | **Analytical Skills.** |
| Equally likely | Venn diagram | Construct logical arguments and expose illogical ones |
| Mutually exclusive | Set | |
| Sample space | Union | |
| Two-way table | Intersection | |
| Combined | Complement | |

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| **Unit 2 – Quadratics** | **MathsWatch** |
|---|---|
| Using algebraic notation | 7 |
| Simplifying expressions by collecting like terms | 33 |
| Simplifying expressions using index laws | 34, 35, 82, 131 |
| Expanding single brackets | 93, 134a |
| Factorising into one bracket | 94 |
| Expanding double brackets | 134b |
| Draw the graph of quadratic functions of the form $y = ax^2 + bx + c$ | 133a |
| Use quadratic graphs to estimate values of y for given values of x and vice versa | 133a |
| **The following skills are extension work** | |
| Identify and interpret roots, intercepts and turning points of quadratic functions graphically | 160 |
| Find approximate solutions to a quadratic equation using a graph | 160 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Quadratic | Parabola | • Engineering (all types) |
| Square | Intersection | • Finance and Accounting |
| Solution | Intercept | • Computer Programming |
| Solve | Turning point | • Business including investment |
| Factorising | Vertex | • Scientist |
| Complete the square | Minimum | • Operational Research |
| Quadratic formula | Maximum |  |
| Discriminant | Approximate | |
| Root | | **Career Transferable Skill** |
| Real root | | **Problem Solving Skills** |
| | | Present a solution clearly, making your assumptions explicit. |
| | | **Useful Personality Traits** |
| | | Intellectual rigour |

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| **Unit 3 – Units & Graphs** | **MathsWatch** |
|---|---|
| Read, convert and calculate with time | 6a |
| Convert units of length, mass and capacity | 111 |
| Understand and calculate compound units involving speed, distance and time | 142a |
| Understand and calculate compound units involving density, mass and volume | 142b |
| Solve problems involving time, timetables, speed and distance tables | 6b |
| Plot and interpret graphs in real contexts | |
| Plot and interpret distance-time graphs | 143 |
| **The following skills are extension work** | |
| Understand and calculate pressure | 142c |
| Understand and calculate population density | |
| Solve problems involving compound units | 142a, b, c |
| Interpret the gradient of a straight line graph as a rate of change | 97 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Hour, minute, second<br>Kilometre, metre, centimetre<br>Millimetre<br>Tonne, kilogram, gram, milligram<br>Compound unit<br>Rate<br>Measure<br>Unit<br>Conversion<br>Speed<br>Distance<br>Time<br>Miles per hour<br>Metres per second<br>Kilometres per hour<br>Average speed | Density<br>Mass<br>Volume<br>Grams per cubic centimetre<br>Kilograms per cubic metre<br>Pressure<br>Force<br>Area<br>Newtons per square metre<br>Pascal<br>Population density<br>Cost per item<br>Pay rate<br>Flow rate<br>Gradient<br>Rate of change | • Business including advertising, real estate and purchasing<br>• Finance and Economics<br>• Research including science, engineering and computing<br>• Construction<br>• Surveyor<br>• Architect<br>• Healthcare<br><br>**Career Transferable Skill**<br>**Deductive Reasoning**<br>The ability to apply general rules to specific problems to produce answers that make sense. |

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| **Unit 4 – Shape & Construction** | **MathsWatch** |
|---|---|
| Solve geometrical problems involving coordinates | 113 |
| Calculate midpoint of a line | 98 |
| Properties of 3D shapes (including faces, edges and vertices) | 43 |
| Construct and interpret plans and elevations of 3D shapes | 51 |
| Understand and use isometric drawings | |
| Recognise, draw and interpret nets of 3D shapes | 44 |
| Use scale diagrams | 38 |
| **The following skills are extension work** | |
| Congruence and congruence criteria for triangles (SSS, SAS, ASA, RHS) | 166 |
| Use compasses | |
| Use ruler and protractor or compasses to construct triangles | 147 |
| Construct an angle bisector | 145c |
| Construct perpendicular bisectors and lines | 145a, 145b |
| Construct loci | 146 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Face<br>Edge<br>Vertex<br>Plan<br>Elevation<br>View<br>Net<br>Congruent<br>Congruence<br>Similar<br>Similarity<br>Scale factor<br>Multiplier<br>Construct<br>Construction lines<br>Arc<br>Bisect<br>Perpendicular | Angle bisector<br>Perpendicular bisector<br>Locus<br>Loci<br>Scale<br>Bearing | • Architects<br>• Visual Design<br>• Construction and Installation<br>• Production<br>• Pilot/Air Traffic Controller<br><br>**Career Transferable Skill**<br>**Analytical Skills**<br>Follow complex reasoning.<br>Accuracy |

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| **Unit 5 – Equations & Inequalities** | **MathsWatch** |
|---|---|
| Solve equations with one step<br>Solve equations with two or more steps<br>Solve equations with the unknown on both sides | 99, 135a |
| Solve equations with the unknown in the denominator | 135a |
| Construct and solve an equation | 137 |
| Read and draw inequalities on a number line | 138 |
| Solve single inequalities<br>Solve inequalities with the variable on both sides | 139 |
| Construct and solve inequalities | 139 |
| Substitute numbers into expressions<br>Substitute numbers into algebraic formulae<br>Substitute numbers into real-life formulae<br>Substitute numbers into functions | 95 |
| Rearrange a formula to change the subject | 136 |
| **The following skills are extension work** | |
| Solve simultaneous equations using elimination | 162 |
| Solve simultaneous equations graphically | 140 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Equation<br>Solve<br>Solution<br>Unknown<br>Operation<br>Inverse<br>Balance<br>Variable<br>Inequality<br>Solution<br>Number line<br>Set<br>Boundary<br>Inclusive | Substitute<br>Substitution<br>Evaluate<br>Formula<br>Function<br>Rearrange<br>Subject<br>Simultaneous<br>Elimination<br>Substitution<br>Intersection | • Engineering (all types)<br>• Finance and Accounting<br>• Computer Programming<br>• Operational Research<br>• Business including investment<br>• Cooking (Substitution)<br>• Scientist<br> |

**Career Transferable Skill**

**Problem Solving Skills**

Present a solution clearly, making your assumptions explicit.

**Useful Personality Traits**

Intellectual rigour

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**Learning Journey**

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| 1 | Probability |
| 2 | Quadratics |
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| 4 | Shape & Construction |
| 5 | Equations & Inequalities |
| 6 | Ratio & Proportion |
| 7 | Angles, Measure & Pythagoras |
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| 9 | Statistics |
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| **Unit 6 – Ratio & Proportion** | **MathsWatch** |
|---|---|
| Write and simplify ratios | 38 |
| Use equivalent ratios to find unknown amounts | 106a, 165a |
| Convert between ratios, fractions and percentages | 106b |
| Share amounts in a ratio | 106a |
| Solve best-buy or better value problems | 41 |
| Understand direct proportion and solve problems involving direct proportion | 42, 199 |
| **The following skills are extension work** | |
| Understand inverse proportion and solve inverse proportion problems<br>Understand that X is inversely proportional to Y is equivalent to X is proportional to $\frac{1}{Y}$ | 107, 199 |
| Graphs of direct and inverse proportion | 199 |
| Interpret direct proportion equations | 199 |
| Interpret inverse proportion equations | 199 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Ratio<br>Part<br>Whole<br>Fraction<br>Equivalent<br>Simplify<br>Scale factor<br>Scaling<br>Convert<br>Conversion<br>Concentration<br>Better value<br>Best-buy | Proportion<br>Proportional<br>Direct proportion<br>Inverse proportion<br>Scale<br>Scale factor<br>Multiplier<br>Constant | • Finance including bank, stocks and shares<br>• Design including graphic, art and interior<br>• Cookery<br>• Construction<br> |

**Career Transferable Skill**

**Information Ordering**

The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules

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| 4 | Shape & Construction |
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| 9 | Statistics |
| 10 | Calculating & Place Value |
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| **Unit 7 – Angles, Measure & Pythagoras** | **MathsWatch** |
|---|---|
| Angle rule: vertically opposite angles are equal | |
| Angle rule: angles around a point add to 360 | 45 |
| Angle rule: angles at a point on a straight line add to 180 | 45 |
| Angles in parallel lines: alternate, corresponding and interior angles | 120 |
| Combining angle facts | |
| Angle sum of a triangle is 180, and use of equilateral and isosceles | 121a, 121b |
| Angle sum of quadrilateral is 360, and use of special quadrilaterals | 122 |
| Names and properties of triangles, quadrilaterals and polygons | 9, 10, 11 |
| Angle sum of any polygon & interior or exterior angles in regular polygons | 123 |
| Draw and measure line segments and angles accurately | 46a, 46b |
| Bearings (8 compass bearings, and 3-figure bearings) | 124 |
| Scale factors, scale diagrams and maps | 38 |
| **The following skills are extension work** | |
| Pythagoras' Theorem | 150a, 150b |
| Use trigonometry to find unknown sides in triangles | 168 |
| Use trigonometry to find unknown angles in triangles | 168 |
| Use exact trigonometric values | 173 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Acute | Trapezium | • Architect including Interior Design |
| Right Angle | Kite | • Construction work |
| Obtuse | Rhombus | • Games programmer and Visual Design |
| Reflex | Equal | • Sports |
| Vertically Opposite | Opposite | • Fashion |
| Parallel | Adjacent | |
| Transversal | Polygon |  |
| Corresponding Angles | Regular | |
| Alternate Angles | Interior angle | |
| Co-interior Angles | Exterior angle | |
| Supplementary | Line segment | |
| Equilateral triangle | Compass | |
| Isosceles triangle | Bearing (3-figure bearing) | |
| Scalene triangle | Clockwise & Anticlockwise | |
| Quadrilateral | Scale factor | |
| Square | Scale | |
| Rectangle | Hypotenuse | |
| Parallelogram | Pythagoras' Theorem | |

**Career Transferable Skill**

**Problem Solving Skills**

Be flexible and approach the same problem from different points of view.

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| 1 | Probability |
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| 5 | Equations & Inequalities |
| 6 | Ratio & Proportion |
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| 8 | Number & Accuracy |
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| **Unit 8 – Number & Accuracy** | **MathsWatch** |
|---|---|
| Read, write and evaluate negative integer powers | 154 |
| Calculate with roots and integer indices | 29, 81, 82, 131 |
| **The rest of the unit is a review of Unit 10.2 & Unit 10.6** | |
| Factors, HCF, Multiples, LCM | 28, 79, 80 |
| Primes and prime factors | 28, 78 |
| Round to the nearest 1000, 100, 10 or whole number | 31 |
| Round to a specified number of decimal places | 32 |
| Round to a specified number of significant figures | 90 |
| Round to an appropriate degree of accuracy | |
| Estimate calculations by rounding to one significant figure | 91 |
| Estimate and check if solutions to problems are of the correct size & determine if an estimate is an overestimate or underestimate | 91 |
| **The following skills are extension work** | |
| Calculate HCF and LCM using prime factors and Venn diagrams | 78, 79, 80 |
| Error intervals - express rounding and truncation errors using inequality notation $a < x \leq b$ | 155a, 155b |
| Limits of accuracy – know rounded measurements are inaccurate by up to half a unit each way | 132 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Multiple | Square Root | • Cyber Security |
| Lowest Common Multiple (LCM) | Cube Root | • Computer Programming |
| Factor | Root | • Production & Construction |
| Highest Common Factor (HCF) | Round (up/down) | • Distribution and Resource Management |
| Divisible | Nearest | • Scientists |
| Prime | Decimal place | • Engineering |
| Prime Factor | Significant figure |  |
| Decomposition | Estimate, approximate | |
| Product | Rounding error | |
| Factor Tree | Error interval | |
| Venn diagram | Midpoint | |
| Square Number | | |
| Cube Number | | |
| Index (Power) | | |
| Base | | |
| Exponent (Power) | | |
| Indices (Powers) | | |

**Career Transferable Skill**

**Problem Solving Skills.**

Be flexible and approach the same problem from different points of view.

Think clearly

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| | |
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| 4 | Shape & Construction |
| 5 | Equations & Inequalities |
| 6 | Ratio & Proportion |
| 7 | Angles, Measure & Pythagoras |
| 8 | Number & Accuracy |
| 9 | Statistics |
| 10 | Calculating & Place Value |
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| **Unit 9 – Statistics** | **MathsWatch** |
|---|---|
| Interpret and construct tables and line graphs for time series data | 153 |
| **The rest of the unit is a review of Unit 10.5 & Unit 10.14** | |
| Construct and interpret bar charts, comparative bar charts and vertical line charts | 15, 64 65a, 65b |
| Construct and interpret pictograms | 16 |
| Construct and interpret pie charts | 128a |
| Compare data using appropriate representations | |
| Plot scatter graphs; understand positive and negative correlation; draw and use a line of best fit | 129 |
| Calculate the range | 62 |
| Calculate the median | 62 |
| Find the mode | 62 |
| Calculate the mean | 62 |
| Averages from a frequency table | 130a |
| Averages from grouped data | 130b |
| Averages from diagrams | |
| Choose suitable averages and solve problems | |
| **The following skills are extension work** | |
| Find the group the median lies in from grouped data | |
| Interpret, analyse and compare distributions using graphical representations or averages/spread | |
| Understand sampling | 176a |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Time series | Mode | • Marketing |
| Trend | Modal value | • Business and Finance |
| Frequency | Median | • Social Science |
| Frequency table | Ordered | • Sports |
| Tally chart | Middle value | • Media including journalism |
| Pictogram | Mean | |
| Key | Total, sum |  |
| Bar chart | Midpoint | |
| Pie chart | Range | **Career Transferable Skill** |
| Scatter graph | Spread | **Analytical Skills** |
| Correlation | Consistent | Construct logical arguments and expose illogical ones. |
| Line of best fit | Consistency | |
| Data | Maximum, Minimum | |
| Sample | Difference | |
| Population | Compare | |
| Random | Outlier | |

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| 2 | Quadratics |
| 3 | Units & Graphs |
| 4 | Shape & Construction |
| 5 | Equations & Inequalities |
| 6 | Ratio & Proportion |
| 7 | Angles, Measure & Pythagoras |
| 8 | Number & Accuracy |
| 9 | Statistics |
| 10 | Calculating & Place Value |
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| **Unit 10 – Calculating & Place Value** | **MathsWatch** |
|---|---|
| **This is a review of Unit 10.4** | |
| Understand place value | 2 |
| Use the signs <, ≤, >, ≥, =, ≠ to compare numbers, including compound inequalities (e.g. -1 < 0.5 < 4) | 5 |
| Order a set of integers and decimals | 3a, 3b |
| Add, subtract, multiply and divide with negative numbers | 67a, 67b |
| Add and subtract with integers and decimals | 17, 18 |
| Multiply with integers, and multiply integers and decimals by a decimal | 19, 66a |
| Divide with integers, divide a decimal by an integer, an integer by a decimal, and a decimal by a decimal | 20, 66b |
| Multiply and divide with place value | 92 |
| Use a scientific calculator | |
| Apply order of operations to multi-step calculations | 68 |
| **The following skills are extension work** | |
| Recognise that numbers of the form A x $10^n$ where $1 \leq A < 10$, and n is an integer are in standard form | 83 |
| Interpret, write and compare numbers in standard form | 30, 83 |
| Enter numbers in standard form on a calculator | |
| Calculate with standard form | 83 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Place value | Order | • Finance and Human Resources |
| Units or ones | Ascending | • Computer Programming |
| Ten, Hundred, Thousand, Million | Descending | • Data Entry |
| Tenths, Hundredths, Thousandths | Add, sum, total | • Healthcare |
| Integer | Subtract, difference | • Management |
| Decimal | Multiply, product | • Data Science |
| Decimal point | Divide, quotient | |
| Inequality | Inverse operation |  |
| Compound inequality | Order of operations | |
| Greater than (>) | Brackets | **Career Transferable Skill** |
| Less than (<) | Indices | **Good Working Habits.** |
| Greater than or equal to (≥) | Evaluate | Be thorough and painstaking in your work. |
| Less than or equal to (≤) | Negative, positive | **Analytical Skills.** |
| Not equal to (≠) | Standard form | Pay attention to detail |
| Between | | |

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| 8 | Number & Accuracy |
| 9 | Statistics |
| 10 | Calculating & Place Value |
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| 13 | Graphs |
| 14 | Percentages |
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| **Unit 11 – Perimeter, Area & Volume** | **MathsWatch** |
|---|---|
| **This is a review of Unit 10.11** | |
| Find area and perimeter of simple shapes | 52 |
| Area of a rectangle (Area = length x width)<br>Area and perimeter of compound shapes | 52, 53 |
| Area of a triangle (Area = ½ x base x height) | 54 |
| Area of a parallelogram (Area = base x height) | 55 |
| Area of a trapezium (Area = ½(a + b) x height) | 56 |
| Circumference of a circle C = 2πr = πd | 118 |
| Area of a circle A = $\pi r^2$ | 117 |
| Volume of cuboids (V = length x width x height) | 115 |
| Volume of a prism (V = area of cross-section x height)<br>Volume of a cylinder (V = $\pi r^2$ x height) | 119 |
| Sketch the net of a solid | 44 |
| Circle definitions and properties, including: centre, radius, chord, diameter and circumference, tangent, arc, sector and segment | 116 |
| **The following skills are extension work** | |
| Arc length & perimeter of sectors of circles<br>Area of sectors of circles | 167 |
| Volume and surface area of spheres, pyramids and cones | 169, 170, 171 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Circumference<br>Radius<br>Diameter<br>Sector<br>Chord<br>Segment<br>Tangent<br>Arc<br>Perimeter<br>Dimensions<br>Area<br>Square units<br>Perpendicular<br>Compound shape<br>Volume<br>Surface area<br>Cubic units<br>Cross-section<br>Net | Rectangle<br>Square<br>Parallelogram<br>Triangle<br>Trapezium<br>Circle<br>Circumference<br>Radius<br>Diameter<br>Sector<br>Cube<br>Cuboid<br>Prism<br>Cylinder<br>Sphere<br>Pyramid<br>Cone | • Construction<br>• Dentist<br>• Surveyor<br>• Architect<br>• Animation and art-based careers<br><br>**Career Transferable Skill**<br>**Critical thinking**<br>Observation, analysis and inference |

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| **Unit 12 – Fractions & Decimals** | **MathsWatch** |
|---|---|
| **This unit is a review of Unit 10.8 and Unit 10.10** | |
| Shade fraction diagrams or say what fraction of a diagram is shaded | 24 |
| Convert between improper and mixed numbers | 26 |
| Equivalent fractions | 25a |
| Simplify fractions | 26b |
| Order fractions and decimals | 70 |
| Find a number between two fractions or integers | 27 |
| Convert between fractions and decimals, with or without a calculator, including recurring decimals | 84 |
| Find fractions of amounts, with or without a calculator | 72 |
| Given a fraction, and the result, find the original amount or answer word problems related to fractions | |
| Express one quantity as a fraction of another | 69 |
| Add and subtract fractions<br>Add and subtract mixed numbers | 71 |
| Multiply with fractions<br>Multiply mixed numbers | 73 |
| Divide with fractions<br>Divide with mixed numbers | 74 |
| Solve problems involving fractions and mixed numbers | |
| Complete fraction calculations on a calculator | |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Numerator<br>Denominator<br>Improper fraction<br>Mixed number<br>Equivalent<br>Simplify<br>Cancel<br>Lowest terms<br>Common denominator<br>Decimal<br>Terminating decimal<br>Recurring decimal<br>Product<br>Reciprocal | | • Healthcare<br>• Food related careers<br>• Agriculture<br>• Construction and Vehicle Maintenance<br>• Business<br>• Sales<br><br>**Career Transferable Skill**<br>**Analytical Skills.**<br>Manipulate precise and intricate ideas.<br>**Problem Solving Skills**<br>Tackle a problem with confidence, even when the solution is not obvious |

**Year 11 Maths: Personalised Learning Checklist (PLC) – Support**

**Learning Journey**

| | |
|---|---|
| 1 | Probability |
| 2 | Quadratics |
| 3 | Units & Graphs |
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| 6 | Ratio & Proportion |
| 7 | Angles, Measure & Pythagoras |
| 8 | Number & Accuracy |
| 9 | Statistics |
| 10 | Calculating & Place Value |
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| **Unit 13 – Graphs** | **MathsWatch** |
|---|---|
| **This is a review of Unit 10.12** | |
| Work with coordinates in all four quadrants | 8 |
| Plot graphs of linear functions written in the form: y = ax + b or ax + by + c = 0 | 96 |
| Use linear graphs to estimate values of y for given values of x and vice versa | 96 |
| Understand intercept and rate of change (gradient) of a graph | 97 |
| Use the form y = mx + c to identify gradient and intercept algebraically | |
| Find the equation of a straight line graph | 159a |
| **The following skills are extension work** | |
| Use the form y = mx + c to identify parallel lines | |
| Find the equation of a line through one point with a given gradient | 159b |
| Find the equation of a line through two given points | 159b |
| Recognise, sketch and interpret graphs of linear functions and quadratic functions | 133b |
| Recognise, sketch and interpret graphs of simple cubic functions and the reciprocal function, $y = \frac{1}{x}$ with x ≠0 | 161a, 161b |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Coordinate<br>Quadrant<br>Plot<br>Axes<br>x-axis<br>y-axis<br>Intersection<br>Linear<br>Equation<br>Function<br>Substitute | Intercept<br>Gradient<br>Slope<br>Positive gradient<br>Negative gradient<br>Rate of change<br>Parallel<br>Linear<br>Quadratic<br>Cubic<br>Reciprocal | • Business including advertising, real estate and purchasing<br>• Finance and Economics<br>• Research including science, engineering and computing<br>• Healthcare<br><br>**Career Transferable Skill**<br>**Deductive Reasoning**<br>The ability to apply general rules to specific problems to produce answers that make sense. |

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| **Unit 14 – Percentages** | **MathsWatch** |
|---|---|
| **This is a review of Unit 10.13** | |
| Write numbers as percentages of other numbers<br>Express one quantity as a fraction of another | 88, 89 |
| Find percentages of amounts | 86, 87 |
| Percentage increase and decrease | 108a |
| Simple interest | 110 |
| **The following skills are extension work** | |
| Compound interest | 164 |
| Exponential growth or decay | 164 |
| Find the percentage an amount has changed by | 108b |
| Find original values in percentage problems | 109 |
| Solve percentage change problems | 109 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Percentage<br>Multiplier<br>Increase<br>Decrease<br>Original<br>Profit<br>Loss<br>Discount<br>Sale<br>Interest<br>Simple interest<br>Compound interest<br>Growth<br>Decay<br>Exponential | | • Finance including bank accounts!<br>• Fashion and Sports<br>• Sales including retail, real estate and travel<br>• Administration – Data, Human Resources and office work<br><br>**Career Transferable Skill**<br>**Communication Skills.**<br>Develop your capacity to assimilate and communicate highly technical information. |

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| **Unit 15 – Sequences** | **MathsWatch** |
|---|---|
| **This is a review of Unit 10.9** | |
| Term-to-term rules: generate a sequence or identify a rule and continue a sequence | 37 |
| Understand position-to-term rules (nth term) and substitute numbers in | 102a |
| Know the features of an arithmetic sequence (terms have a common difference) | |
| Arithmetic sequences – nth term (use or find)<br>Determine if a number is a term of a sequence | 103 |
| Sequences of patterns – nth term | |
| Special sequences – know features of, & recognise (eg)<br>Square numbers (1, 4, 9, 16, 25, 36, 49, 64, 81, 100…)<br>Cube numbers (1, 8, 27, 64, 125, …)<br>Triangle numbers (1, 3, 6, 10, 15, 21, 28, 36, 45, …) | 104 |
| **The following skills are extension work** | |
| Know the features of a quadratic sequence (differences have equal gaps) | |
| Quadratic sequences – nth term (use) | 102b |
| Knows the features of a geometric sequence (terms have a common ratio) | 163 |
| Geometric sequences – recognise, find common ratio, continue and use nth term | 163 |
| Know the features of a Fibonacci sequence (each term is the sum of the previous two terms) | 141 |
| Fibonacci sequences – recognise and continue the sequence | 141 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Sequence<br>Term<br>Pattern<br>Rule<br>Generate<br>Continue<br>Ascending<br>Descending<br>Rule<br>Term-to-term rule<br>Position<br>Position-to-term rule<br>$n^{th}$ term<br>Substitute<br>Evaluate | Arithmetic<br>Difference<br>Common difference<br>Quadratic<br>Square numbers<br>Cube numbers<br>Triangle numbers<br>Geometric<br>Ratio<br>Common ratio<br>Multiplier<br>Fibonacci | • Finance and Business<br>• Scientists<br>• Production<br>• Agriculture<br><br>**Career Transferable Skill**<br>**Information Ordering**<br>The ability to arrange things or actions in a certain order or pattern according to a specific rule or set of rules |

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| **Unit 16 – Reasoning & Proof** | **MathsWatch** |
|---|---|
| Know the difference between an equation (true for a specific value) and an identity (true for all values) | 158 |
| Show algebraic expressions are equivalent, and construct algebraic proofs | |
| Construct geometric proofs using angle facts | |
| Understand the proof of the angle sum of a triangle using alternate angles | |
| Construct geometric proofs using congruence & similarity | |
| Reasoning | 156 |

| **Key Vocabulary** | | **Careers** |
|---|---|---|
| Equation<br>Identity<br>Equivalent<br>Proof<br>Prove<br>Justify<br>Explain | | • Scientist<br>• Operational Research<br>• Finance and Accounting<br>• Lawyer<br><br>**Career Transferable Skill**<br>**Problem Solving Skills**<br>Present a solution clearly, making your assumptions explicit.<br>**Analytical Skills.**<br>Follow complex reasoning. |