

Stage 10 Term 1a: Number

What are we learning about?

In this term we will be increasing our number skills and working and learning about how to calculate with numbers in different forms including fractional and negative powers, roots, recurring decimals, fractions and percentages.



Why are we learning about it?

It is important to have the confidence and skill to use numbers and mathematical approaches in all aspects of life. We use numbers every day in all areas of our lives. Our confidence and ability with numbers impacts us financially, socially, and professionally. It even affects our health and wellbeing.



What new **KNOWLEDGE** will I gain?

You will learn how to convert between fractional and negative powers and numbers. You will learn how to calculate with standard form. You will be able to write a recurring decimal as a fraction and solve problems with these. You will also learn how to solve a range of complex percentage problems in a range of situations.



How does this build on the **SKILLS** I already have?

You developed your skills to select and use appropriate calculation strategies to solve problems. You have also started to interpret when the structure of a numerical problem requires additive or multiplicative reasoning. You developed your use of formal mathematical knowledge to interpret and solve problems, including in financial mathematics



What new **SKILLS** will I develop?

You will be able to move freely between different numerical representations. You will learn to reason mathematically with decimals, fractions, powers, roots and percentages. You will be able to select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.



How does this build on the **KNOWLEDGE** I already have?

You know how to convert between ordinary and standard form and why we use standard form. You know the difference between simple and compound interest and can solve problems involving these and repeated change. You also know how to work out what number you started with after a percentage change given the answer. You also know how to calculate/simplify with positive powers.

Stage 10 Term 1b: Number and Algebra

What are we learning about?

In this term we will be studying more advanced skills on Algebra techniques that involve linear, quadratic and/or cubic algebraic techniques.



Why are we learning about it?

Learning **algebra** helps to develop your critical thinking skills. That includes problem solving, logic, patterns, and reasoning. You **need** to know **algebra** for many professions, especially those in science and maths. ... When you solve that equation, you have **algebra** to thank!



What new **KNOWLEDGE** will I gain?

We will learn how to expand 3 brackets. We will also increase our knowledge on solving quadratic equations by factorising. We will also be able to work out the nth term of a quadratic sequence and recognise a geometric sequence.
We will be able to work out the equation of a perpendicular line and represent inequalities in 2 dimensions.



How does this build on the **SKILLS** I already have?

You already can substitute values in expressions, rearrange and simplify expressions, and solve certain quadratic equations.



What new **SKILLS** will I develop?

We will learn to develop fluency with algebra skills and develop your understanding on quadratic equations and sequences. We will also develop our skills in manipulating and using linear graphs.



How does this build on the **KNOWLEDGE** I already have?

We have expanded and simplified 2 brackets and solved quadratic equations of the form $x^2 + bx + c = 0$.
We have used nth term with linear sequences. By working out the gradient of a line we have been able to write the equation of a line. We have also represented inequalities on a number line.

How does this build on the **KNOWLEDGE** I already have?

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How does this build on the **KNOWLEDGE** I already have?

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We have used nth term with linear sequences. By working out the gradient of a line we have been able to write the equation of a line. We have also represented inequalities on a number line.

What are we learning about?

In this term we will learn to use more advanced techniques to compare several sets of data more accurately that take into account outliers and anomalies. We will also learn about calculating probabilities for different events that are dependent on each other with and without drawing a tree diagram.



Stage 10 Term 2a: Statistics and Probability

Why are we learning about it?

Statistics is the science and, arguably, also the art of **learning** from data. As a subject it is concerned with the collection, analysis, and interpretation of data, as well as the effective communication and presentation of results relying on data. Probability is vitally important so that we can understand the chance of nature and the relative risk.



What new **KNOWLEDGE** will I gain?

We will learn how to compare several sets of data and how to draw more detailed conclusions about this data. You will learn how to work out an estimate for the median by drawing a cumulative frequency graph.

You will see how you can present and calculate the probability when two or more events happen together and are dependent on each other. You will also learn how to calculate quickly the number of combinations you can have.



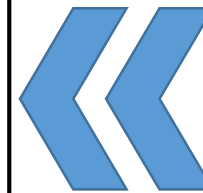
How does this build on the **SKILLS** I already have?

You reasoned mathematically by exploring what can and cannot be inferred in statistical and probabilistic settings, and began to express your arguments formally. You started to use language and properties precisely to analyse probability and statistics.



What new **SKILLS** will I develop?

You will further develop what can and cannot be inferred in statistical and probabilistic settings, and to express your arguments formally. You will regularly use language and properties precisely to analyse probability and statistics. You will model situations mathematically and express the results using a range of formal mathematical representations.



How does this build on the **KNOWLEDGE** I already have?

We learnt how to calculate and compare with averages in frequency tables. We know how to work out the interval the median is in when the data is in a grouped table. We know how you can present and calculate the probability when two or more events happen together and are independent on each other. You know how to work out the number of combinations by making a list.

What are we learning about?

You will learn about a set of theorems (rules) for angles in and around circles. You will learn which theorem to use to help you solve multistage problems and how to do this in a step by step way. You will also learn where these theorems come from and link the theorems to other areas of Maths like Trigonometry, congruency and writing expressions. You will also learn how to calculate and solve problems relating to arc lengths, perimeter, area of sectors, segments, radius and angles.



TOPIC: Stage 10 2b Geometry & measures

Why are we learning about it?

The study of **shapes and space** is called "Geometry". This word comes from the ancient Greek and means "measuring the Earth". ... At school you start learning about simple **shapes**, like triangles, quadrilaterals and circles, and the way they relate to each other and the **space** in and around them. The knowledge and skills that are gained throughout this topic will help us to solve a range of real life problems.



What new **KNOWLEDGE** will I gain?

You will learn about how to solve angle problems for angles in and around circles. You will also learn where these theorems come from and link the theorems to other areas of Maths like Trigonometry, congruency and writing expressions. You will also learn how to calculate and solve problems relating to arc lengths, perimeter, area of sectors, segments, radius and angles.



How does this build on the **SKILLS** I already have?

You have used language and properties to look at 2-D and 3-D shapes. You developed your mathematical knowledge, in part through solving simple problems. You began to reason deductively in geometry, number and algebra, including using geometrical constructions.



What new **SKILLS** will I develop?

You will use language and properties precisely to analyse 2-D and 3-D shapes and angles. You will develop and use your mathematical knowledge to solve problems and evaluating the outcomes, including multi-step problems. You will be able to select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems



How does this build on the **KNOWLEDGE** I already have?

You learnt how to solve multistage problems involving perimeter and area of circles and parts of circles joined to other shapes. We also learnt about the conditions that make shapes congruent or similar. We learnt about how we can use and apply Pythagoras Theorem to problems in working out missing lengths.

What are we learning about?

In the next couple of topics you will be learning how to use an algebra method to solve direct and inverse proportion problems. This will involve working out the constant of proportionality, writing a formula and then using it to solve problems.

You will also learn more about similar shapes and how the scale factor has an effect on how the area and volumes are related.



How does this build on the SKILLS I already have?

You were able to select and use appropriate calculation strategies to solve increasingly complex problems.

You used algebra to generalise the structure of arithmetic, including to formulate mathematical relationships.

You can substitute values in expressions, rearrange and simplify expressions, and solve equations. You moved freely between different numerical, algebraic, graphical and diagrammatic representations.

TOPIC: Stage 10 3a Ratio, rate and proportion

Why are we learning about it?

Ratios are used to compare values. They tell us how much of one thing there is compared to another. For example, **ratios** can be used to compare the number of girl puppies to boy puppies that were born.

A **proportion** is simply a statement that two ratios are equal. **Ratios** allow us to measure and express quantities by making them easier to understand. You will learn about different methods to solve everyday proportion problems.



What new SKILLS will I develop?

You will be able to select and use appropriate calculation strategies to solve increasingly complex problems.

You will use algebra to generalise the structure of arithmetic, including to formulate mathematical relationships

You will substitute values in expressions, rearrange and simplify expressions, and solve equations. You will move freely between different numerical, algebraic, graphical and diagrammatic representations. You will formulate proportional relations algebraically.

What new KNOWLEDGE will I gain?

You will know how to write a formula connecting two variables that are in direct or inverse proportion. To do this you will be taught how to work out the constant of proportionality.

You will also learn how to work out the scale factor between two lengths, areas or volumes of similar shapes and then how to work out the corresponding required lengths, areas or volumes. The scale factor can be given as a number, fraction, percentage or ratio.



How does this build on the KNOWLEDGE I already have?

You learnt how to solve number problems that involve direct and inverse proportion and be able to work out if two variables are connected by direct or inverse proportion. You learnt how to enlarge objects with and without a centre with a positive, fractional and negative scale factor. You also were able to work out missing lengths and angles in similar shapes.

What are we learning about?

You will learn to be able to work out the surface area and volume of more complicated 3D shapes including pyramids and spheres.

You will learn how to work out the surface area and volume of composite 3D shapes. You will be able to work in terms of π and use Pythagoras and trigonometry to solve more complicated multistage problems that will need substitution and rearranging of formula.



TOPIC: Stage 10 3b Algebra and shape

Why are we learning about it?

Lots of shapes in everyday life are 3D and we need to do various calculations when planning designs of objects and buildings. In a range of businesses it is really important that these calculations are accurate to ensure costs are carefully planned for.



What new **KNOWLEDGE** will I gain?

You will learn to be able to work out the surface area and volume of 3D shapes including square based pyramids, cones and spheres.

You will be able to work in terms of π if appropriate and use Pythagoras and trigonometry to calculate required lengths or heights. You will also learn when it is necessary to manipulate algebraic formulae and solve multistage problems involving other maths areas.



How does this build on the **SKILLS** I already have?

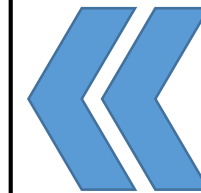
You learnt how to substitute values in expressions, rearrange and simplify expressions, and solve equations.

You used language and properties precisely to analyse numbers, algebraic expressions and 2-D and 3-D shapes.



What new **SKILLS** will I develop?

You will select and use appropriate calculation strategies to solve increasingly complex problems. You will develop and extend and formalise your knowledge of ratio and proportion in working with measures and geometry. You will continue to model situations mathematically and express the results using a range of formal mathematical representations. You will select appropriate concepts, methods and techniques to apply to unfamiliar and non-routine problems.



How does this build on the **KNOWLEDGE** I already have?

You learnt how to solve multistage problems involving perimeter and area of circles and parts of circles joined to other shapes. You also learnt how to calculate and solve problems relating to arc lengths, perimeter, area of sectors, segments, radius and angles. We also learnt about how we can use and apply Pythagoras Theorem and Trigonometry to solve problems in working out missing lengths and angles.