

Year 9 Autumn T1 - Topic: Pythagoras' Theorem

Prior learning:

- Be able to square a number with or without a calculator
- To be able to square root a value with or without a calculator
- To be able to perform order of operations on a calculator
- To be able to perform simple rearrangement of formulae

Learning sequences							Endpoints
Main learning Steps	Grade 4/on track	MW	Grade 5/On Track	MW	Grade 7+ /extending	MW	<ul style="list-style-type: none"> ▪ Use Pythagoras' Theorem to find a missing side in a right-angled triangle.
	<ul style="list-style-type: none"> ○ Use Pythagoras' theorem to find missing sides Find the distance between two points using Pythagoras 	150a/b 150c	<ul style="list-style-type: none"> ○ Prove whether a triangle is right-angled by considering the lengths of its sides 	150	<ul style="list-style-type: none"> ○ Solve problems in 3D using Pythagoras ○ Apply Calculating with Surds and Pythagoras' Theorem 	217 207b	
Assessments		<ul style="list-style-type: none"> ○ End of Block Test ○ In class exit tickets and Homework ○ Mid and End of year tests 					

<p>Where will we use these ideas again:</p> <p>This topic will be revisited again in the Trigonometry chapter.</p> <p>In exams, Pythagoras' Theorem is often mixed with topics such as area to become a 5 or 6 mark problem solving exam question on both higher and foundation papers</p>	<p>Higher: Pythagoras' Theorem, both 2D and 3D tend to be mixed with trigonometry for problem solving questions.</p>
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Where will we use these ideas again:

These are fundamental algebra skills and will be implemented in problem solving questions, primarily in application with geometry. These skills are needed before attempting harder algebra topics such as simultaneous equations, quadratics, graphs and sequences

Higher: algebraic fractions will be revisited to incorporate quadratics

Year 9 Autumn T2 - Topic: Perimeters & Areas of 2D shapes (excluding circles)

Prior learning:

Be able to find the area and perimeter of a shape by counting squares, and calculate the area of a rectangle

Be able to apply multiplication and division

Identify isosceles, equilateral, scalene and right-angled triangles

Recognise and name shapes such as square, parallelogram, rhombus, trapezium and hexagon

Learning sequences						Endpoints
Main learning Steps	Grade 1-2/Acquiring	MW	Grade 3/Working Towards	MW	Grade 7+ /extending	MW
	<ul style="list-style-type: none"> ○ Understand the terms 'perpendicular lines' and 'parallel lines' ○ Work out the perimeter of a rectangle ○ Work out the perimeter of compound shapes ○ Know and use the formula for the area of a triangle ○ Know and use the formula for the area of a parallelogram ○ Know and use the formula for the area of a trapezium 		52	<ul style="list-style-type: none"> ○ To be able to convert between metric units such as m to cm, kg to g, litres to ml ○ Classify quadrilaterals by their geometric properties ○ Find the area of compound shapes ○ Derive and use the formula for the area of special compound shapes (kite, rhombus) ○ Solve tiling problems involving area calculations 	112	<ul style="list-style-type: none"> ○ As the previous objectives but incorporating previous topics such as equations, indices, Pythagoras' Theorem and Surds
Assessments <ul style="list-style-type: none"> ○ End of Block Test ○ In class exit tickets and Homework ○ Mid and End of year tests 						<ul style="list-style-type: none"> ▪ Calculate the areas of triangles, parallelograms, trapezia and composite shapes

<p>Where will we use these ideas again: Areas of 2D shapes will be revisited when looking at area of a circle. This will also be revisited when learning about surface area and volumes of 3D shapes.</p>	<p>Higher: Areas of triangles and compound shapes will be revisited when studying trigonometry and application to problems with area and volume scale factors when enlargement and similar shapes.</p>
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Year 9 Autumn T2 - Topic: Data Collection

Prior learning:

Identify and find equivalent fractions

Learning sequences				Endpoints
Main learning Steps	Grade 1-2/Acquiring	MW	Grade 4-5 /On Target	MW
	<ul style="list-style-type: none"> ○ Know the difference between sample and population ○ Know and recognise primary and secondary data ○ Know and recognise qualitative and quantitative data ○ Know and recognise discrete and continuous data 	63	<ul style="list-style-type: none"> ○ Use probabilities given to calculate expected values (capture/recapture) ○ Understand what is meant by sampling ○ Discuss the reliability of different types of sample ○ Identify possible sources of bias in sampling methods ○ Use a variety of different sampling methods such as random and systematic ○ Use results from a sample to estimate outcomes for a population ○ Identify possible sources of bias in the design and use of questionnaires ○ Arrangements ○ Use stratified sampling methods 	 152 152 152 152 69 176
Assessments	<ul style="list-style-type: none"> ○ End of Block Test ○ In class exit tickets and Homework ○ Mid and End of year tests 			

<p>Where will we use these ideas again: Data collection will be revisited when looking at data handling – calculating averages and creating graphs. The methods of sampling will later be linked to ratios and probability.</p>	
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Year 9 Spring T1 - Topic: Fractions, Decimals and Percentages

Prior learning:

Be able to add, subtract, multiply and divide with integers

Recognising factors and common factors

Understand and apply powers

Learning sequences						Endpoints	
Main learning Steps	Grade 2/Acquiring	MW	Grade 3/Working Towards	MW	Grade 6 /Advancing	MW	<ul style="list-style-type: none"> • Find fractions and percentages of amounts • Add, subtract, multiply and divide with fractions and mixed numbers • Convert between fractions, decimals, and percentages • Order fractions, decimals and percentages. • Convert recurring fractions to decimals (H)
	<ul style="list-style-type: none"> • Use simple fractions to describe proportions of a whole • Shade in a fraction of a picture • Use shading to determine which fraction is bigger • Convert between improper and mixed fractions • Identify and find equivalent fractions • Simplify fractions • Compare two fractions with the same denominator • Understand that percentage means "out of 100" • Add and subtract vulgar (non-mixed) fractions with the same denominator 	24 24 24 25 26 70 40/85 71ab	<ul style="list-style-type: none"> • Compare two fractions with different denominators using common denominators • Order a set of fractions • Express fractions as decimals • Express decimals as fractions in their simplest form • Express percentages as fractions in their simplest form • Find fraction of an amount • Multiply vulgar (non-mixed) fractions • Divide vulgar (non-mixed) fractions • Perform multiplication and division calculations involving mixed numbers • Find the reciprocal of a number • Add and subtract vulgar (non-mixed) fractions with different denominators • Perform addition and subtraction calculations involving mixed numbers • Convert between decimals and percentages 	70 70 84 84 85 72 73 74 76 71ab 85	<ul style="list-style-type: none"> • Identify recurring and terminating decimals • Convert recurring decimals to fractions and vice versa using denominators of 9, 99, 999, etc. 	177 177	
	Grade 3/Working Towards	MW			Grade 7+/Extending	MW	
	<ul style="list-style-type: none"> • Express fractions as percentages • Compare percentages, fractions and decimals • Calculate percentage of an amount using calculator methods • Calculate percentage of an amount using non-calculator methods 	85 85 86 87			<ul style="list-style-type: none"> • Convert recurring decimals to fractions and vice versa using algebraic methods • Solve equations involving algebraic fractions that lead to linear equations $(2x-1)/6 + (x+3)/3 = 5/2$ • Fraction calculations with surds as numerators and/or denominators 	189 210ab	
Assessments	<ul style="list-style-type: none"> ○ End of Block Test ○ In class exit tickets and Homework ○ Mid and End of year tests 						

A core numeracy topic that will be revisited in all units

Year 9 Spring T2 – Accuracy and Calculation

Prior learning:

Write down the place value of an integer digit, e.g. the 4 in 24,201

Add, subtract, multiply and divide with integers

Compare and order numbers including negatives

Learning sequences							Endpoints
Main learning Steps	Grade 1-2/Acquiring	MW	Grade 3/Working Towards	MW	Grade 4 -5/On Track	MW	
	• Write down the place value of an integer digit, e.g. the 4 in 24,201	1	• Multiply integers with decimals	66	• Find and use the upper and lower bounds of rounded numbers	132	• Use place value when calculating with decimals
	• Order integers up to the ten thousands place	2	• Divide a decimal by an integer	67	• Find the error interval of a rounded number	155	• Order positive and negative integers using the symbols =, ≠, <, >, ≤, ≥ .
	• Recognise place value beyond 10000	2	• Perform addition and subtraction calculations involving negatives	68a	• Find the error interval of truncated numbers		• Round to a number of decimal places or significant figures
	• Add integers	17	• Perform multiplication and division calculations involving negatives	68b	• Understand the difference between the bounds of discrete and continuous quantities		• Add and subtract positive and negative integers and decimals
	• Add integers and decimals	17	• Perform a mixture of operations on negative numbers				• Multiply and divide positive and negative integers and decimals
	• Add decimals	17	• Round numbers to a given number of significant figures	90			• Use order of operations in multi-stage calculations.
	• Subtract integers	18	• Multiply a decimal by a decimal	66	Grade 6/Advancing		
	• Subtract involving decimals and integers	18	• Divide an integer by a decimal	67	• Understand the difference between the bounds of discrete and continuous quantities		• Round numbers and measures to an appropriate degree of accuracy.
	• Subtract decimals	19	• Divide a decimal by a decimal	67			
• Multiply integers	20	• Use order of operations accurately	75				• Use inequality notation to state error intervals and interpret limits of accuracy.
• Divide integers	20	• Use a calculator to perform complex calculations	77			• Find the upper and lower bounds on the value of a quantity that has been rounded.	
• Find the half-way value between two integers	27	• Using place value knowledge to manipulate a given calculation					
• Write down the place value of a decimal digit, e.g. the 4 in 0.24	1	• Estimate answers to calculations	91	Grade 7+/Extending			
• Order decimals up to 3 decimal places	3	• State whether an estimation is an over- or underestimate	91	• Find the upper and lower bounds of calculations and round to an appropriate degree of accuracy			
• Find the half-way value between two numbers (including decimals)	27						
• Round an integer to the nearest power of 10	31					206	
• Round decimals to the nearest decimal place	32						
• Solve questions involving negative numbers in real life (e.g. temperature, golf scores, sea level)	23						

							<ul style="list-style-type: none"> Find the upper and lower bounds of calculations and represent this to an appropriate degree of accuracy.
Assessments	<ul style="list-style-type: none"> End of Block Test In class exit tickets and Homework Mid and End of year tests 						

<p>Where will we use these ideas again:</p> <p>Rounding will appear throughout topics on the calculator paper such as areas of circles and trigonometry</p>	<p>Higher:</p> <p>Calculations with decimals lends itself to use of multipliers in percentages, leading to compound interest/depreciation.</p> <p>Complex calculations using a calculator will be needed for topics such a solving quadratics and iteration</p>
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Year 9 Summer T1 – Topic: Quadratics

Prior learning:

- Perform addition and subtraction calculations involving negatives
- Perform multiplication and division calculations involving negatives
- Solve one step equations such as $3x = 12$ or $x + 5 = 9$
- Solve two step equations such as $3x - 1 = 9$ and $3(x+4) = 15$
- Rearrange linear formulae such as $p = 3q + 5$
- Substitute positive and negative numbers into a formula such as $P = 2l + 2w$ Find the HCF of two numbers using appropriate methods
- Apply the multiplication and division law of indices to simplify algebraic expressions such as $3wx^2y^3 \times 6w^3x^4y^2$
- Expand a single set of brackets such as $3(x + 2)$ and $4x(x-3y)$
- Expand and simplify expressions such as $x(x^2 - 5)$ and $3(x+2) - 5(2x-1)$
- Factorise expressions such as $6a + 8$ and $x^2 - 3x$
- Use a calculator to perform complex calculations

Learning sequences							Endpoints
Main learning Steps	Grade 4/ On track	MW	Grade 7/ Extending	MW	Grade 8 & 9/ Extending	MW	<ul style="list-style-type: none"> ▪ Expand binomial expressions ▪ Factorise and Solve Quadratic Equations ▪ Using the quadratic formula (H)
	<ul style="list-style-type: none"> • Expand and simplify a double set of brackets to form a quadratic 	134b	<ul style="list-style-type: none"> • Factorise harder quadratics where $a \neq 1$ or $(x+y)^2 - 4(x+y)$ • Solve equations involving harder quadratics ($a \neq 1$) • Solve quadratic equations by using the quadratic formula 	192 192 191	<ul style="list-style-type: none"> • Complete the square by rewriting quadratics • Use completing the square to solve equations • Solve equations involving algebraic fractions that lead to quadratic equations • Simplify algebraic fractions • 4 operations with algebraic fractions • Rationalise fractions where the denominator is a binomial expression including a surd (e.g. $1 + \sqrt{5}$) • Application of quadratics to problem solving questions e.g. proving the area of a shape. 	209a 209b 210b 210a 210a 207c	
	<p style="text-align: center;">Grade 5/ On track</p> <ul style="list-style-type: none"> • Find and simplify the product of three binomials • Factorise basic quadratic expressions ($a = 1$) • Factorise quadratics that are the difference of two squares • Solve basic quadratic equations by factorising ($a = 1$) 	178 157 158 158					
Assessments	<ul style="list-style-type: none"> ○ End of Block Test ○ In class exit tickets and Homework ○ Mid and End of year tests 						

Where will we use these ideas again:

Quadratics can be combined with topics such as Pythagoras and calculating areas to form problem solving questions.

Higher:

Quadratics will be revisited in more complex graphs, functions and will be combined with other topics as part of problem solving such as probability, volumes simultaneous equations

Year 9 Summer T2– Topic: Angles and Polygons

Prior learning:

Understand the terms 'perpendicular lines' and 'parallel lines'

Know the definition of angle

Know and use the correct notation for an angle

Recognise and name the different types of angles

Name different types of polygons using the number of sides

Recognise and use the fact that a shape is regular

Learning sequences							Endpoints
Main learning Steps	Grade 2/Acquiring	MW	Grade 3/Working Towards	MW	Grade 4/On Track	MW	
	<ul style="list-style-type: none"> • Estimate angles and measure them accurately • Draw angles accurately • Use properties of angles at a point and angles on a straight line 	46a	46b 45	<ul style="list-style-type: none"> • Recognise corresponding, alternate and co-interior angles • Recognise vertically opposite angles and know that they are equal • Understand why some shapes tessellate and others do not • Use the fact that the angles of a triangle add up to 180° to find angles • Use angle properties of isosceles, equilateral and right-angled triangles • Calculate interior and exterior angles of a quadrilateral • Calculate the sum of angles in any polygon • Calculate exterior and interior angles of a regular polygon 	120 12a 122 122 123 123	<ul style="list-style-type: none"> • Prove that the angles of a triangle add up to 180° and use this to find angles • Prove the exterior angle of a triangle is equal to the sum of the two interior angle • Prove that the angles in a quadrilateral add up to 360° 	
Assessments	<ul style="list-style-type: none"> ○ End of Block Test ○ In class exit tickets and Homework ○ Mid and End of year tests 						

<p>Where will we use these ideas again: Constructions and Loci Forming and solving equations with angles</p>	<p>Higher: These will be integrated with circle theorems and vectors</p>
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Year 9 Summer T2 – Topic: Standard Form

Prior learning:

Be able to use place value to multiply and divide numbers by powers of 10

Understand the effect of place value when multiplying and dividing

Learning sequences			Endpoints
Main learning Steps	Grade 3/Working Towards		MW
	○ Understand the rules of standard form		83
	○ Convert between numbers in ordinary and standard form		83
	○ Calculate in standard form with and without a calc		83
Assessments	<ul style="list-style-type: none"> ○ End of Block Test ○ In class exit tickets and Homework ○ Mid and End of year tests 		<ul style="list-style-type: none"> • Calculate and interpret numbers written in standard form.

Where will we use these ideas again:

This topic will be implemented within geometry and data handling topics.

Higher: Standard form often gets included in Bounds and Limits calculations as well as applying to geometry questions. Converting between metric units and can be needed when looking at frequency densities in histograms