MATHS – Number - Performance Descriptors

	Number and place value	Calculation		Fractions, decimals and percentages
YEAR 9 41 40 39 (38)	• Understand and use compound measures: density; pressure; speed • Round numbers and measures to an appropriate degree of accuracy (dp or sig fig) • Find HCF and LCM using Prime Factors • Use prime factorisation to represent a number as a product of its primes using index notation • Recognise that prime factor decomposition of a positive integer is unique • Use the index laws to include negative power answers and understand that these answers are smaller than 1 • Use the laws of indices to multiply and divide numbers written in index notation • Convert between currencies • Estimate answers to calculations by rounding numbers to 1 sig. fig • Check reasonableness of answers • Estimate answers to one- or two-step calculations • Write numbers greater than 10 in standard index form		• Multiply both sides of an inequality by a negative number • To understand the difference between squaring a negative number and subtracting a squared number within a more complex calculation • Find the reciprocal of simple numbers/fractions mentally, e.g. 10 and 1/10, 1/3 and 3 etc. • Understand the order in which to calculate expressions that contain powers and brackets in both the numerator and denominator of a fraction • Know that a number multiplied by its reciprocal is 1 • Know that the reciprocal of a reciprocal is the original number • Use conventional notation for priority of operations, including roots and reciprocals	
YEAR 8 38 37 36 (35)	• Identify upper and lower bounds for rounding of discrete and continuous data and of a measurement • Recognise that measurements may be inaccurate by up to one half in either direction. Use error intervals. • Calculate average speed, distance, time - in mph as well as metric measures and convert between metric speed measures • Understand the effect of multiplying or dividing any number between 0 and 1 • Be able to find square and cube roots by factorising, • Mentally be able to calculate the squares of numbers less than 16 multiplied by a multiple of ten, • Combine laws of arithmetic for brackets with mental calc. of squares, cubes, square and cube roots, • Be able to use mental strategies to solve word problems in context using sq roots and cube roots • Establish index laws for positive powers where the answer is a positive power • Extend the patterns by using the index law for division established for positive power answers, to show that any number to the power of 0 is 1 • Use an extended range of calculator functions, including +, -, x, , x^2, √x, memory, xy, x1/y, brackets • Use one calculation to find the answer to another • Express a multiplicative relationship between two quantities as a ratio or a fraction • Use numbers of any size rounded to 1 significant figure to make standardized estimates for calculations with one step • Know there are different ways of finding an approximate answer • Interpret a calculator display using standard form • Use standard form display and know how to enter numbers in standard form		• Understand that each of the headings in the place value system, to the right of the tens column, can be written as a power of ten • Write numbers as a decimal number of millions or thousands, e.g. 23 600 000 as 23.6 million • Use knowledge of place value to calculate the product or division of two decimals where one or both are less than 1 and at least one has two digits other than zero. • Divide integers and decimals, including by decimals such as 0.6 and 0.06 (divisions related to 0.t × 0.t or 0.t × 0.0h, 0.0h × 0.t and 0.0h × 0.0h) • Use standard column procedures to add and subtract integers and decimals of any size, including a mixture of large and small numbers with different numbers of decimal places • Multiply and divide by decimals, dividing by transforming to division by an integer • Be able to simplify expressions containing powers to complete the calculation • Understand which part of an expression is raised to a power by knowing the difference between $3 \times (7 + 8)^2$ and $3^2 \times (7 + 8)$ and $(3 \times (7 + 8))^2$ • Recognise and use relationships between operations, including inverse operations	• Divide an integer by a fraction • Multiply and divide simple fractions (proper and improper) - positive and negative • Add and subtract fractions (proper and improper) -positive and negative • Use halving and doubling strategies on fractions to find decimal equivalents of other fractions, • Convert a fraction to a decimal • Order fractions by converting them to decimals

MATHS – Number - Performance Descriptors

	Number and place value	Calculation	Fractions, decimals and percentages
YEAR 7 35 34 33 (32)	• Round numbers to significant figures • Find the prime factor decomposition of a number less than 100 • Know the prime factorisation of numbers up to 30. They must give their answers as powers • Apply systematic listing strategies • Find lowest common multiple by listing • Recognise rules relating to odd and even numbers • Know the denominators of simple fractions that produce recurring decimals, and those that do not • Give the +ve and -ive sq root of a square number • Know all the squares of numbers less than 16 and be able to know the square root given the square number • Use index notation for small integer powers • Find and interpret roots of non square numbers using square root key • Extend mental calculations to squares and square roots • Extend mental calculations to cubes and cube roots • Be able to estimate square roots of non square numbers less than 100 • Use positive integer powers and associated real roots (square, cube and higher) • Recall the cubes of 2, 3, 4, 5 and 10	• Multiply and divide negative integers by a positive number • Multiply and divide negative integers by a negative number • Be able to multiply any number by 0.1 and 0.01 • Be able to divide any number by 0.1 and 0.01 • Understand the effect of multiplying by any integer power of 10 • Understand the effect of dividing by any integer power of 10 • Add and subtract negative integers from positive and negative numbers • Use mental strategies for multiplication - doubling and halving strategies • Use mental strategies for multiplication - partitioning two 2 digit numbers where one number includes a decimal (both numbers have two significant figures) • Use mental strategies for multiplication of decimals - doubling and halving strategies • Have strategies for calculating fractions and decimals of a given number • Be able to work with calculations where the brackets are squared or square rooted • Be able to estimate answers to calculations involving 2 or more operations and BODMAS • Apply systematic listing strategies	• Multiply and divide decimals - +ve and negative • Use division to convert a fraction to a decimal • Convert a terminating decimal to a fraction and simplify the fraction • Use the equivalence of fractions, decimals and percentages to compare proportions (i.e. compare a fraction and a percentage) • Calculate fractions of quantities and measurements (fraction answers) • Interpret percentage as the operator 'so many hundredths of' • Learn fractional equivalents to key recurring decimals • Work interchangeably with terminating decimals and their corresponding fractions • Divide decimals with one or two places by single-digit whole numbers • Add and subtract up to 3 fractions mixing both addition and subtraction into the calculation, with denominators less than or equal to 12 and using the LCM denominator in the calculation - the answer can be a mixed number • Add mixed number fractions without common denominators, where the fraction parts add up to more than 1
YEAR 6 32 31 30 (29)	• *Demonstrate an understanding of place value, including large numbers* • Find common factors and primes • Find the HCF or LCM of two numbers • Recognise all prime numbers up to 100 • Use index notation for squares and cubes and for positive integer powers of 10 • Make estimates and approximations of calculations - use a range of ways to find an approximate answer • Check a result by considering if it is of the right order of magnitude • read, write, order and compare numbers up to 10 000 000 and determine the value of each digit • *Round any whole number to a required degree of accuracy and use this skill to estimate and calculate* • *Use negative numbers in context, and calculate intervals across zero* • *Solve number and practical problems* • Recognise the first few triangular numbers	• use symbols = , ≠, <, >, ≤, ≥ • Multiply three-digit by two-digit whole numbers • Divide three-digit by two-digit whole numbers • Extend written methods to U.t × U • Multiply decimals with one or two places by single-digit whole numbers • Add and subtract positive integers from negative integers • Be able to subtract integers and decimal with up to two decimal places • Be able to add and subtract integers and decimal with varying numbers of decimal places • Be able to add and subtract more than two integers or decimals with up to two decimal places, but with varying numbers of significant figures and using a mixture of operation within the calculation • Use the order of operations with brackets, including in more complex calculations • Use inverse operations • *Can calculate mentally, using efficient strategies.* • *Can use formal methods to solve multi-step problems*	• Add and subtract decimals - positive and negative • Calculate simple fractions of quantities and measurements (whole-number answers) • Extend the percentage calculation strategies with jottings to find any percentage, • Be able to order negative decimals with the smallest on the left and be able to use > or < correctly between two negative decimals. Decimals should be to 2 or 3 significant figures • Begin to add and subtract simple fractions and those with simple common denominators • Simplify fractions by cancelling all common factors • Can recognise the relationship between fractions, decimals and percentages and can express them as equivalent quantities • Order fractions, decimals and percentages • Divide fractions by an integer • Multiply a fraction by an integer • Multiply pairs of fractions and write the answer in its simplest form. • Add and subtract simple fractions with denominators of any size

MATHS – Number - Performance Descriptors

	Number and place value	Calculation	Fractions, decimals and percentages
YEAR 5 29 28 27 (26)	• Recognise and use multiples and factors (divisors) and use simple tests of divisibility • Identify numbers with exactly 2 factors (primes) • Understand the difference between factor, multiple and prime numbers • Find all the factor pairs for any whole number without any support • Able to determine factors and multiples of numbers by listing • Understand the vocabulary of prime numbers, factors (divisors), multiples, common factors, common multiples. • Recognise that every number can be written as a product of two factors • Know square numbers beyond 10 × 10 and find roots of square numbers upto 100 (i.e. roots upto 10) • Understand and use decimal notation and place value • Approximate before carrying out an addition or subtraction	• Multiply and divide decimals by 10, 100, 1000, and explain the effect • Multiply by 0 • Understand multiplication as it applies to whole numbers and decimals • Understand division as it applies to whole numbers and decimals • Extend written methods to HTU ÷ U • Use standard column procedures to add and subtract decimals with up to two places • Extend written methods to TU × TU • Know and use the order of operations • Quickly derive associated division facts • Check a result by working it backwards	• Round decimals to the nearest whole number • Round numbers to decimal places • Convert terminating decimals to fractions, e.g. 0.23 = 23/100 • Calculate simple percentages • Compare decimals in different contexts • Recall known facts including fraction to decimal conversions • Extend mental methods of calculation to include percentages
YEAR 4 26 25 24 (23)	• *Count in multiples of 6, 7, 9, 25 and 1000* • *Find 1000 more or less than a given number* • *Count backwards through zero to include negative numbers* • *Recognise the place value of each digit in a four-digit number (thousands, hundreds, tens, and ones)* • *Order and compare numbers beyond 1000* • *Identify, represent and estimate numbers using different representations* • *Round any number to the nearest 10, 100 or 1000* • *Solve number and practical problems that involve all of the above and with increasingly large positive numbers* • *Read Roman numerals to 100 (I to C)* • Apply simple tests of divisibility (3, 6, 4, 25) • Know square numbers 6 × 6 to 9 × 9 • Be able to order positive decimals as a list with the smallest on the left. Decimals to 4 or 5 significant figures • Be able to order positive decimals with the largest on the left. Decimals should be to 4 or 5 significant figures	• Understand addition and subtraction as they apply to whole numbers and decimals • *Add and subtract numbers with up to 4 digits using the formal written methods of columnar addition and subtraction where appropriate* • *Estimate and use inverse operations to check answers to a calculation* • *Solve addition and subtraction two-step problems in contexts, deciding which operations and methods to use and why.* • *Understand that halving is the reverse of doubling* • *Recall multiplication and division facts for multiplication tables up to 12 × 12* • *Use place value, known and derived facts to multiply and divide mentally, including: multiplying by 0 and 1; dividing by 1; multiplying together three numbers* • *Recognise and use factor pairs and commutativity in mental calculations* • *Multiply two-digit and three-digit numbers by a one-digit number using formal written layout* • *Solve problems involving multiplying and adding, including using the distributive law to multiply two digit numbers by one digit, integer scaling problems and harder correspondence problems such as n objects are connected to m objects*.	• *Recognise and show, using diagrams, families of common equivalent fractions* • *Count up and down in hundredths; recognise that hundredths arise when dividing an object by one hundred and dividing tenths by ten.* • *Solve problems involving increasingly harder fractions to calculate quantities, and fractions to divide quantities, including non-unit fractions where the answer is a whole number* • *Add and subtract fractions with the same denominator* • *Recognise and write decimal equivalents of any number of tenths or hundredths* • *Recognise and write decimal equivalents to quarter/half/three-quarters* • *Compare numbers with the same number of decimal places up to two decimal places* • *Round decimals with one decimal place to the nearest whole number*

MATHS – Number - Performance Descriptors

	Number and place value	Calculation	Fractions, decimals and percentages
	• Be able to use > or < correctly between two positive decimals. Decimals should be to 4 or 5 significant figures • Put digits in the correct place in a calculation • *Find the effect of dividing a one- or two-digit number by 10 and 100, identifying the value of the digits in the answer as ones, tenths and hundredths* • *Solve simple measure and money problems involving fractions and decimals to two decimal places.*	• Multiply and divide integers by 10 and 100, and explain the effect • Extend written methods to HTU × U • Apply four operations in correct order to integers and proper fractions	
YEAR 3 23 22 21 (20)	• Count in from 0 in multiples of 4, 8, 50 and 100 • Find 100 more or less than a given number • Compare and order integers up to 1000 • Identify, represent and estimate numbers using different representations • Read and write numbers upto 1000 in numerals and words • Solve number problems and practical problems	• Add and subtract numbers mentally including 3 digit numbers + 1s, 10s and 100s • Add and subtract numbers with 3 digits using column addition and column subtraction • Estimate the answer to a calculation and use inverse operations to check answers • Solve missing number problems using number facts, place value and addition and subtraction • Recall and use multiplication and division facts for the 3, 4, and 8 timestable • Write and calculate multiplication and division sums using the times tables including 2 digits x 1digit mentally and progressing to formal written methods • Solve scaling problems and multiplication and division problems	• Count up and down in tenths • Recognise that tenths arise from dividing and object into 10 equal parts • Recognise, find and write fractions of a set of objects • Recognise and use fractions of numbers • Recognise and show equivalent fractions with small denominators • Add and subtract fractions with the same denominator • Compare and order fractions with the same denominator • Solve problems involving all the above.