3.1 Equations, formulae, expressions and identities

Outcome	3a G	4c F	4b F	4a F	5c E	5b E	5a E	6c D	6b D
3.1a Use of symbols				use letter symbols to represent unknown numbers or variables; know the meanings of the words *term, expression* and *equation*			recognise that letter symbols play different roles in equations, formulae and functions	know the meanings of the words *formula* and *function*	distinguish the different roles played by letter symbols in equations, identities, formulae and functions
3.1b Algebraic operations					understand that algebraic operations follow the rules of arithmetic			understand that algebraic operations, including the use of brackets, follow the rules of arithmetic	use index notation for small positive integer powers
3.1c Simplifying expressions						simplify simple linear expressions by collecting like terms	simplify or transform linear expressions by collecting like terms	multiply a single integer term over a bracket	multiply a single term over a bracket
3.1d Simplifying algebraic fractions									
3.1e Constructing and solving linear equations						construct and solve simple linear equations with integer coefficients (unknown on one side only) using an appropriate method		construct and solve linear equations with integer coefficients (unknown on either side), with or without brackets, using appropriate methods	
3.1f Using graphs and equations									use graphs and set up equations to solve simple problems involving direct proportion
3.1g Solving simultaneous equations									
3.1h Solving inequalities									
3.1i Solving quadratic equations									use systematic trial and improvements methods and ICT tools to find approximate solutions to equations such as $x^2+x=20$
3.1j Real-life situations									explore ways of constructing models of real-life situations by drawing graphs and constructing algebraic equations and inequalities
3.1k Using formulae						substitue positive integers into linear expressions and formulae	use simple formulae from mathematics and other subjects and, in simple cases, derive a formula	use formulae from mathematics and other subjects; substitute integers into simple formulae, including examples that lead to an equation to solve; substitute positive integers into expressions involving small powers; derive simple formulae	

3.1 Equations, formulae, expressions and identities

6a D	7c C	7b C	7a B	8c B	8b A	8a A	EP A*
use index notation for integer powers and simple instances of the index laws				know and use the general index laws for multiplication and division of integer powers			
add simple algebraic fractions	simplify or transform algebraic expressions by taking out single-term common factors	expand the product of two linear expressions of the form x±n and simplify the corresponding quadratic expression.	establish identities such as $a^2-b^2=(a+b)(a-b)$		square a linear expression	factorise quadratic expressions, including the difference of two squares and cancel common factors in rational expressions	
							simplify simple algebraic fractions to produce linear expressions; use factorisation to simplify compound algebraic fractions
construct and solve linear equations with integer coefficients with/out brackets, negative signs or a negative solution	solve linear equations in one unknown with integer and fractional coefficients	solve linear equations that require prior simplification of brackets, including those with negative signs anywhere	solve equations involving algebraic fractions with compound expressions as the numerators and/or denominators				
	use algebraic methods to solve problems involving direct proportion	relate algebraic solutions to graphs of the equations, using ICT as appropriate					
		solve a pair of simultaneous equations by eliminating one variable	link a graph of an equation or a pair of equations to the algebraic solution	consider cases that have no solution, or an infinite number of solutions	explore 'optimum' methods of solving simultaneous equations in different forms		solve exactly, by elimination of an unknown, two simultaneous equations in two unknowns, where one is quadratic in one unknown
	represent inequalities on a number line		solve linear inequalities in one variable; represent the solution set on a number line		solve linear inequalities in one and two variables, find and represent the solution set		
						solve quadratic equations by factorisation	solve quadratic equations by factorisation, completing the square and using the quadratic formula, including those in which the coefficient of the quadratic term is greater than 1
	use formulae from mathematics and other subjects; substitute numbers into expressions and formulae; derive a formula and, in simple cases, change its subject		derive and use more complex formulae; change the subject of a formula, including cases where a power of the subject appears in the questions or solution		derive and use more complex formulae; change the subject of a formulae, including cases where the subject occurs twice		derive relationships between formulae that produce equal or related results