Knowledge Organiser - Mathematics

Linear inequalities, Double brackets, Fractions, Algebraic fractions, Fractions and recurring decimals

	Topic	Information	Examples	Sparx Clip
1	Linear inequalities	$x > 2$ means **x is greater than 2** $x < 3$ means **x is less than 3** $x \geq 1$ means **x is greater than or equal to 1** $x \leq 6$ means **x is less than or equal to 6** Solving inequalities is where we calculate the values that an unknown variable can be in an inequality. Solving inequalities is like solving equations, but where an equation has one unique solution, an inequality has a range of solutions.	State the integers that satisfy $-2 < x \leq 4$ = -1, 0, 1, 2, 3, 4 Solve 2x+1<9 2x<8 x<4 **x can be any value that is less than 4**	M763, M707, M509, M384, M118
2	Double brackets	To expand double brackets, we multiply every term in the first bracket, by every term in the second bracket.	Expand and simplify: (x+2)(x+3) $x^2 + 3x + 2x + 6$ $= x^2 + 5x + 6$	M792, M960
3	Fractions	**Adding and subtracting** If the fractions within the question have **different denominators,** we must use **equivalent fractions** along with knowledge of calculating the **lowest common multiple** to change the fractions so that they have like denominators. **Multiplying** **Multiply** the **numerators** together and **multiply** the **denominators** together. **Dividing** Keep the first fraction the same Multiply by the reciprocal of the second fraction.	$\frac{3}{5} + \frac{1}{10} = \frac{3 \times 2}{5 \times 2} + \frac{1}{10} = \frac{6}{10} + \frac{1}{10} = \frac{6+1}{10} = \frac{7}{10}$ $\frac{3}{8} \times \frac{2}{9} = \frac{6}{72} = \frac{1}{12}$ $\frac{3}{4} \div \frac{5}{6} = \frac{3}{4} \times \frac{6}{5} = \frac{18}{20} = \frac{9}{10}$	M931, M157, M197, M110, M265, M645
4	Algebraic fractions	Algebraic fractions are fractions that contain at least one variable.	$\frac{2x-1}{3} + x = 3$ (×3, ×3) $2x - 1 + 3x = 9$ $5x - 1 = 9$ (+1, +1) $5x = 10$ (÷5, ÷5) $x = 2$	M645, M568, M100, M754, M336
5	Fractions and recurring decimals	Converting **recurring decimals to fractions** is representing a recurring decimal as a fraction without changing its value.	E.g. Example Express $0.\dot{8}$ as a fraction in its simplest form. $10x = 8.888\,888\ldots$ $-\ x = 0.888\,888\ldots$ $9x = 8$ $x = \frac{8}{9}$ Multiply by 10 because one digit is recurring Subtract one from the other Solve	M262, M264, M701, M922