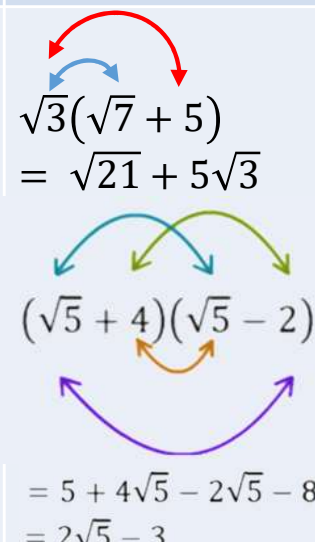


SURDS

Keywords:	Rational / Irrational / Root / Surd / Expand / Rationalise					
Definition / Description:	Rational – A number that can be expressed as either an integer, a terminating decimal or a fraction	Irrational - A number that cannot be expressed as either an integer, a terminating decimal or a fraction	Root – A root is a quantity that when multiplied by itself a certain number of times equals a given quantity	Surd – An expression that includes a square root	Expand – To multiply out a set of brackets.	Rationalise – To eliminate an irrational number from the denominator of a fraction.
Knowledge points:	Simplify Surds – Simplify by factoring out a square number	Multiply and Divide Surds $\sqrt{ab} = \sqrt{a} \times \sqrt{b}$ $\sqrt{a \div b} = \sqrt{a} \div \sqrt{b}$	Add and Subtract Surds - When adding and subtracting surds the root must be the same number.	Expand Brackets with Surds – Multiply each term inside the bracket by the term outside the bracket.	Rationalise the Denominator 1 – Create an equivalent fraction where the denominator is rational	Rationalise the Denominator 2 - Use a difference of two squares to rationalise
Knowledge point examples:	$\begin{aligned} \sqrt{75} &= \sqrt{25 \times 3} \\ &= \sqrt{25} \times \sqrt{3} \\ &= 5 \times \sqrt{3} \\ &= 5\sqrt{3} \end{aligned}$ $\begin{aligned} \sqrt{18} &= \sqrt{9 \times 2} \\ &= \sqrt{9} \times \sqrt{2} \\ &= 3 \times \sqrt{2} \\ &= 3\sqrt{2} \end{aligned}$	$\begin{aligned} \sqrt{6} \times \sqrt{7} &= \sqrt{6 \times 7} \\ &= \sqrt{42} \end{aligned}$ $\begin{aligned} \sqrt{50} \div \sqrt{10} &= \sqrt{50 \div 10} \\ &= \sqrt{5} \end{aligned}$ $\begin{aligned} 4\sqrt{6} \times 2\sqrt{5} &= 4 \times 2 \times \sqrt{6} \times \sqrt{5} \\ &= 8\sqrt{30} \end{aligned}$	$5\sqrt{2} + 2\sqrt{2} = 7\sqrt{2}$ $\begin{aligned} \sqrt{75} - \sqrt{27} &= 5\sqrt{3} - 3\sqrt{3} \\ &= 2\sqrt{3} \end{aligned}$ $\begin{aligned} \sqrt{98} - \sqrt{50} &= 7\sqrt{2} - 5\sqrt{2} \\ &= 2\sqrt{2} \end{aligned}$	 $\begin{aligned} \sqrt{3}(\sqrt{7} + 5) &= \sqrt{21} + 5\sqrt{3} \end{aligned}$ $\begin{aligned} (\sqrt{5} + 4)(\sqrt{5} - 2) &= 5 + 4\sqrt{5} - 2\sqrt{5} - 8 \\ &= 2\sqrt{5} - 3 \end{aligned}$	$\frac{2 \times \sqrt{3}}{\sqrt{3} \times \sqrt{3}} = \frac{2\sqrt{3}}{3}$ $\frac{3}{2\sqrt{5}} = \frac{3\sqrt{5}}{2 \times 5} = \frac{3\sqrt{5}}{10}$	$\frac{2}{4 + \sqrt{2}} = \frac{2(4 - \sqrt{2})}{(4 + \sqrt{2})(4 - \sqrt{2})} = \frac{8 - 2\sqrt{2}}{4^2 - (\sqrt{2})^2} = \frac{8 - 2\sqrt{2}}{12}$
Linked Knowledge Maps	Index numbers / Place value, decimals, rounding estimation and bounds / Fractions / Pythagoras and Trigonometry					