

9H Medium Term Plan Number 3 Surds and Recurring Decimals

Key Knowledge/Prior Learning KS2/3 and Retrieval and Suggested Starters

- Square roots
- Fluent knowledge of square numbers
- Indices
- Simplifying algebraic expressions
- Expanding brackets
- The difference of two squares
- Understanding of fractions
- Converting between fractions, decimals and percentages
- Manipulating and solving equations
- Inverse Operations
- Square numbers practice
- Solving equations
- Simplifying algebra

KS3 National Curriculum – what students will be practicing

- Recurring notation
- Converting fractions into recurring decimals
- Converting recurring decimals into fractions
- Multiplication, division, addition and subtraction of surds
- Simplifying surds
- Expand brackets involving surds including the difference of two squares
- Rationalising the denominator of fractions including the difference of two squares

Specific Ambitious Knowledge

- Application of surds into other contexts including area and perimeter

Key Vocabulary/Literacy Opportunities

- Indices, order, power
- Squared, cubed, square root, cube root
- Commutative
- Recurring/ Terminating
- Prove
- Solve
- Surd
- Root
- Rationalize
- Expand
- Simplify

Key Formulae/Knowledge

The balancing method for solving equations

$$\begin{aligned}
 &0.4444\dots \\
 x &= 0.444\dots \\
 10x &= 4.444\dots \\
 9x &= 4 \\
 x &= \frac{4}{9}
 \end{aligned}$$

$$\begin{aligned}
 &0.818181\dots \\
 x &= 0.818181\dots \\
 100x &= 81.8181\dots \\
 99x &= 81 \\
 x &= \frac{81}{99} = \frac{9}{11}
 \end{aligned}$$

$$\begin{aligned}
 &0.2585858\dots \quad 0.25\dot{8} \\
 x &= 0.25858\dots \\
 10x &= 2.5858\dots \\
 1000x &= 258.5858\dots \\
 990x &= 256 \\
 x &= \frac{256}{990}
 \end{aligned}$$

Projects/Enrichment/Investigations

- <https://nrich.maths.org/12944>
- <https://nrich.maths.org/8394>

Maths In Context

If $\frac{1}{3}$ is equal to 0.33333, and $\frac{2}{3}$ is equal to 0.66666, then why isn't $\frac{3}{3}$ equal to 0.99999?

Career Links

Engineering – surds are more accurate than decimal numbers and people in engineering must use the most accurate numbers possible to ensure parts fit together correctly.

Computer game design – the makings of computer games and software requires people to have a strong knowledge of powers / indices. There are many links between this part of maths and the modern technological world.

Hook questions / ideas

Are there any square numbers that are also cube numbers?

How many cube numbers can you write?

Write the first 20 cube numbers. What do you notice about the unit digit?

<https://www.youtube.com/watch?v=DmfxIhmGPP4> Video on reciprocals of primes