**Y12 AS Mathematics**

**2 Surds and Indices 1 week**

## Teaching objectives

**a** Recap laws of indices from GCSE.

**b** Understand and use the laws of indices for all rational exponents.

**c** Recap laws of surds from GCSE, including multiplication of surds and rationalising the denominator with a single surd term.

**d** Use and manipulate surds, including rationalising the denominator.

**e** Rationalising the denominator with a surd and a non surd term as the denominator.

**Resources for advance preparation:**

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | **Starter** | **Main teaching**  Including key questions, key teaching points, models and resources | **Notes**  Including Support and Extension | **Consolidation/Plenary**  Including key questions and homework |
| **1** | [Indices and roots maze](http://furthermaths.org.uk/manager_area/files/IndicesandRootsmaze.pdf)   * Paired task | Reminder of the rules for indices which they should know from GCSE.  Encourage students to copy key examples and notes into books/folder | Key skills   * Using negative indices * “Anything to the power of 0 is 1” | [Review question: Can we simplify these expressions involving indices?](https://undergroundmathematics.org/thinking-about-algebra/r8779)  Homework, routine practice questions from text book or integral worksheet if available |
| **2** | Maths box or integral short question set, using index rules. Mini whiteboard activity. | [Index issues](https://undergroundmathematics.org/thinking-about-algebra/index-issues)  Group task  Key questions for students to ask themselves. “are there any values I can substitute in to each equation so that they are not equal” | Key skills   * Using fractional indices * Using laws of indices | Homework, routine practice questions from text book or integral worksheet if available |
| **3** | [Nested surds](https://undergroundmathematics.org/thinking-about-algebra/nested-surds)  Suggested use: paired task with cards being organised on A3 paper. Conditions for statements t be true written underneath. | Us the task as an opportunity for students to develop notes in book/folder.  Encourage students to explain their reasoning to the for each of the cards, encourage whole class debate and discussion. | Key skills   * Using laws of surds * Simplifying surd expressions | [Review question: Can we write √2016+√56 as a power of 14?](https://undergroundmathematics.org/thinking-about-numbers/r7658)  Homework, routine practice questions from text book or integral worksheet if available |
| **4** | Maths box or integral short question set, using surd rules. Mini whiteboard activity. | [Ab Surd!](https://undergroundmathematics.org/thinking-about-numbers/absurd)  Start as an individual task, with little instruction, students should be able to complete the first couple of rows. Allow students to pair up as they work through the task, weaker students with stronger students. | Key skills   * Rationalising the denominator | [Ab-surder!](https://undergroundmathematics.org/polynomials/absurder)  Homework, revision for surds and indices assessment. |
|  | **Starter** | **Main teaching**  Including key questions, key teaching points, models and resources | **Notes**  Including Support and Extension | **Consolidation/Plenary**  Including key questions and homework |
| **(5)** | [Scary sum](https://undergroundmathematics.org/thinking-about-numbers/scary-sum)  Could always use this task as a small assessment, encourage students to attempt it in silence. | Either “scary sum” or an assessment on the unit | Key skills   * Rationalising the denominator * Generalising and specialising | [Irrational vs rational: does it matter](https://undergroundmathematics.org/thinking-about-numbers/irrational-vs-rational-does-it-matter)  THEN  [Near miss](https://undergroundmathematics.org/geometry-of-equations/near-miss)  Homework, revision for surds and indices assessment. |