A level Maths Induction Work

The A level Maths transition work is set on an online learning platform called Integral. This is an online resource that you will use a lot during your A level Maths studies. The videos, activities and assessments in this work will review key ideas from GCSE Maths whilst also starting to look at things from an A level Maths viewpoint.

We are asking you to complete the **Surds & Indices** and **Algebraic Manipulation** sections, but we highly recommend that you work through some of the other sections as well to give yourself the best preparation for A level Maths. As part of the induction process there will be a short test in one of your maths lessons in the first week of term, your teachers will confirm the exact date on the enrolment day in September. This test is based on key skills from GCSE Maths. A practice test is included at the end of this document – the real test is very similar.

Please bring your marked practice test to your induction lesson on the enrolment day in September. Your teachers can offer support on any aspects you have struggled with ahead of the actual test the following week.

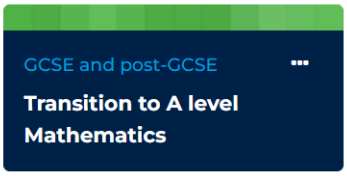
We expect students to get at least 70% in the induction test (80% for those doing Further Maths)

Accessing the resources

To access the resources go to https://integralmaths.org/.

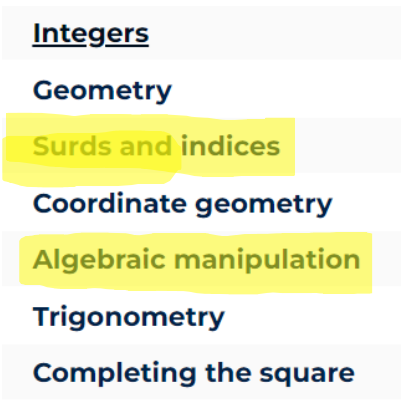
Your login will be 897T- followed by your first initial and surname. For example, someone called Sam Jones would have the login 897T-sjones. Your password is initially the same as your username. Accounts have been created based on the names from the July induction day. If your account does not exist yet please email Mr Cobb pxc@hardenhuish.wilts.sch.uk to have one created. *Note - if your surname has a space or hyphen in it, please omit this – for example Alex Rain-Wind would become 897T-arainwind*

Once logged in select "Transition to A level Mathematics"

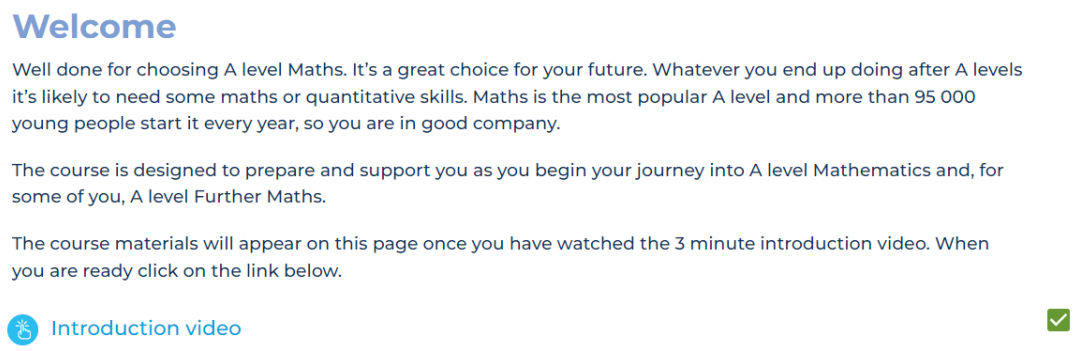


You will then see a welcome message, and an introduction video which you need to watch before the materials become available.

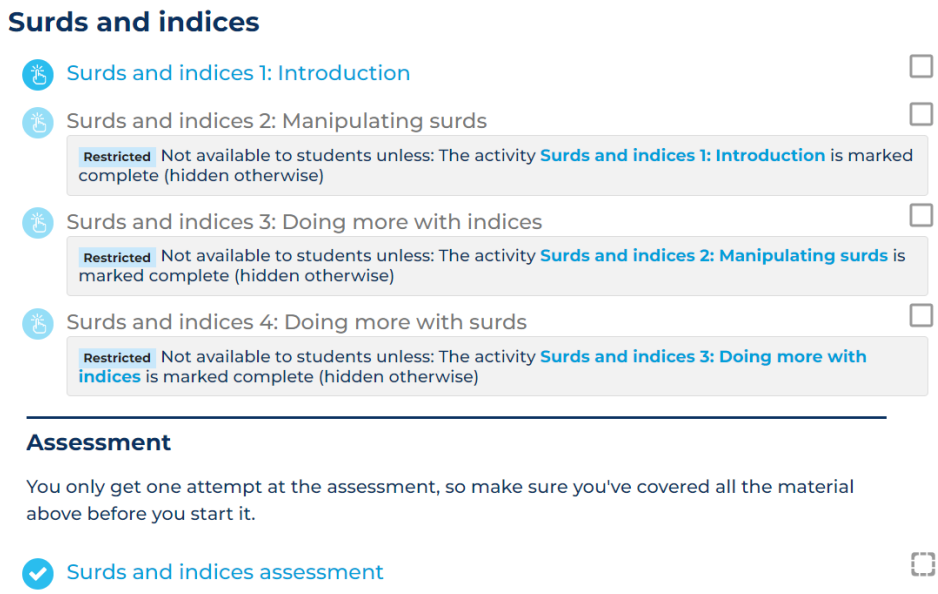
There are seven sections of the course, but we are only asking you to complete **Surds & Indices** and **Algebraic Manipulation** sections. Please work through the interactive videos before attempting the assessment. If you wish you can explore the "Going Deeper" materials or work through some of the other sections.



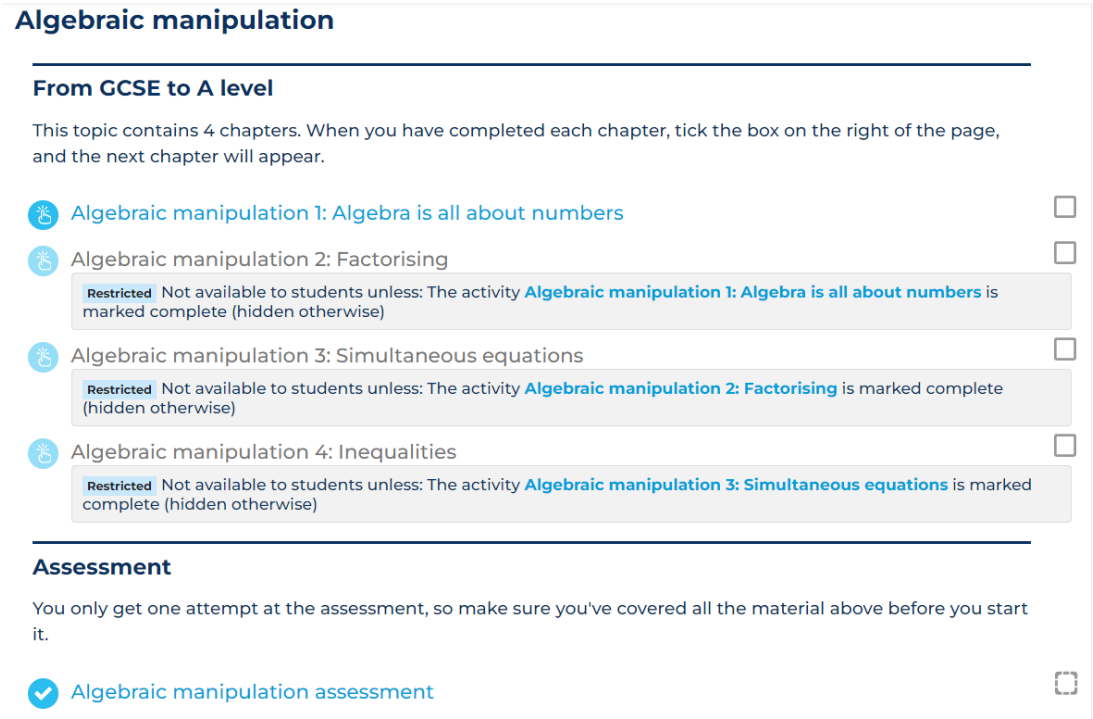
Screenshots of the course pages



Outline of Surds and Indices section



Outline of Algebraic Manipulation section



Practice Test

Your test will ask similar questions to this one. Answers are on the following page.

You may NOT use a calculator

1. Expand and simplify

   (a) $4x(3x - 2) - x(2x + 5)$ (b) $(2x + 3)(2x - 1)$ (c) $(a - 12)^2$

2. Factorise

   (a) $x^2 - 7x$ (b) $x^2 + 9x - 36$ (c) $y^2 - 64$ (d) $25y^3 - 9y$

3. Simplify

   (a) $\frac{4x^3y}{8x^2y^3}$ (b) $\frac{3x+2}{3} + \frac{4x-1}{6}$

4. Solve the following equations

(a) $\frac{h-1}{4} + \frac{3h}{5} = 4$ (b) $x^2 - 8x = 0$ (c) $k^2 - 7k - 18 = 0$ (d) $p^2 + 4p = 12$

5. Write each of the following as single powers of *x* and/or y

   (a) $\frac{1}{x^4}$ (b) $(x^2y)^3$ (c) $\frac{x^5}{x^{-2}}$

6. Work out the values of the following, giving your answers as fractions where appropriate

   (a) 4^{-2} (b) 10^0 (c) $\left(\frac{8}{27}\right)^{\frac{1}{3}}$

7. Solve the simultaneous equations $3x - 5y = -11$
   $5x - 2y = 7$

8. Rearrange the following equations to make *x* the subject

   (a) $v^2 = u^2 + 2ax$ (b) $V = \frac{1}{3}\pi x^2 h$ (c) $y = \frac{x+2}{x+1}$

9. Solve $x^2 + 4x + 1 = 0$, giving your solutions in surd form

10. Solve $5x^2 - x - 1 = 0$, giving your solutions in surd form

ANSWERS TO PRACTICE TEST

1) a) $10x^2 - 13x$ b) $4x^2 + 4x - 3$ c) $a^2 - 24a + 144$

2) a) $x(x - 7)$ b) $(x + 12)(x - 3)$ c) $(y + 8)(y - 8)$ d) $y(5y - 3)(5y + 3)$

3) a) $\frac{x}{2y^2}$ b) $\frac{10x+3}{6}$

4) a) $h = 5$ b) $x = 0$ or $x = 8$ c) $k = 9$ or $k = -2$ d) $p = -6$ or $p = 2$

5) a) x^{-4} b) x^6y^3 c) x^7

6) a) $\frac{1}{16}$ b) 1 c) $\frac{2}{3}$

7) $x = 3, y = 4$

8) a) $x = \frac{v^2 - u^2}{2a}$ b) $x = \pm\sqrt{\frac{3V}{\pi h}}$ c) $x = \frac{2-y}{y-1}$

9) $x = \frac{-4 \pm \sqrt{12}}{2}$ $\left(= -2 \pm \sqrt{3}\right)$

10) $x = \frac{1 \pm \sqrt{21}}{10}$