The following task will prepare you for the A-Level Mathematics course. These algebra, surds and indices skills are essential knowledge. You will be tested on these skills in the first two weeks of the course. This test will assess your suitability for A-Level Mathematics. The exercises below are excellent practice.

For each question you need to show full working. The ability to show clear steps in your method is crucial in A-Level Mathematics and you will be assessed on showing clear working.

You will check the solutions yourself. Work on any areas in which you struggle. In the test you will do at the start of the course it will be expected that you can perform these skills in test conditions.

1. Expand and simplify

 (a) (2*x* + 3)(2*x* – 1) **(2)** (b) (*a* + 3)2 **(2)** (c) 4*x*(3*x* – 2) – *x*(2*x* + 5) **(2)**

2. Factorise

 (a) *x*2 – 7*x* **(2)** (b) *y*2 – 64 **(2)** (c) 2*x*2 + 5*x* – 3 **(2)** (d) 6*t*2 – 13*t* + 5 **(2)**

3. Simplify

 (a)   **(2)** (b) +  **(2)**

4. Solve the following equations

 (a) +  = 4 **(3)** (b) *x*2 – 8*x* = 0 **(3)** (c) *p*2 + 4*p* = 12 **(3)**

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

 (a)  **(1)** (b) (*x*2*y*)3 **(1)** (c)  **(1)**

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

 (a) 4-2 **(1)** (b) 100 **(1)** (c)  **(2)**

7. Solve the simultaneous equations 3*x* – 5y = -11

 5*x* – 2y = 7 **(3)**

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

 (a) *v*2 = u2 + 2a*x* **(2)** (b) V = π*x*2h **(2)** (c) y =  **(3)**

9. Solve 5*x*2 – *x* – 1 = 0 giving your solutions in surd form **(3)**

10. (a)     Rationalise the denominator and simplify       **(4)**

(b)     Expand and simplify     

Give your answer in the form       **(4)**