Introducing Further Maths:
Complex numbers

Complex numbers are among the key ideas in Further Maths.

There are some questions at the end about them.

Use the links below (or any others you can find) to find out more about the square root of -1, imaginary numbers, complex numbers and how to add, subtract, multiply and divide them.

Mathsisfun: https://www.mathsisfun.com/numbers/complex-numbers.html

Khan Academy: https://www.khanacademy.org/math/algebra-home/alg-complex-numbers

Videos on YouTube from the Advanced Maths Support Programme:

1.1 Solving quadratic equations with no real roots
1.2 Adding and subtracting complex numbers
1.3 Multiplying complex numbers
1.4 Dividing complex numbers
1.5 Terminology (real and imaginary part, conjugate)

Questions:

1. Find the roots of the following equations:
   (i) $z^2 + 25 = 0$ (ii) $4z^2 + 9 = 0$
   (iii) $z^2 - 2z + 2 = 0$ (iv) $4z^2 + 4z + 5 = 0$

2. Two complex numbers are $z = 4 - 3\mathrm{i}$ and $w = 2 + \mathrm{i}$.
   Find the following, giving your answers in the form $x + y\mathrm{i}$.
   (i) $2z - 3w$ (ii) zw (iii) $(\mathrm{i}z)^2$

3. Express the following complex numbers in the form $x + y\mathrm{i}$.
   (i) $\frac{2}{3+i}$ (ii) $\frac{2-i}{1+2i}$

Taster lessons to give you a flavour of studying Maths beyond GCSE:
https://amsp.org.uk/resource/level-3-taster-lessons

Helping you prepare to start A level Maths and Further Maths
http://tinyurl.com/ybcr5voh
(http://ocr.org.uk/Images/373371-bridging-the-gap-between-gcse-and-as-a-level-mathematics-a-student-guide.docx)