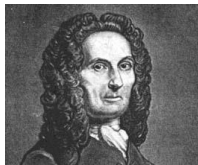


## 1. Goals

Who am **i**?



By the end of this unit, students will:

- understand the concepts and techniques in vectors, complex numbers, functions and graph sketching
- apply reasoning skills and solve problems in vectors, complex numbers, functions and graph sketching
- communicate their arguments and strategies when solving problems
- construct proofs of results
- interpret mathematical information and ascertain the reasonableness of their solutions to problems.

This week:

- review complex numbers
- use the modulus  $|z|$  of a complex number  $z$  and the argument  $\text{Arg}(z)$  of a non-zero complex number  $z$  and prove basic identities involving modulus and argument
- convert between Cartesian and polar form
- define and use multiplication, division, and powers of complex numbers in polar form and the geometric interpretation of these
- prove and use De Moivre's theorem for integral powers.

## 2. Theoretical Components

Refer to Google Drive:

- StewartCalc ComplexNumbers pdf
- AQA ComplexNumbers pdf

Mathspace lessons:

Polar Forms: <https://bit.ly/3aEOMeT>

Multiplying Complex Numbers in Polar Form:

<https://bit.ly/36xrEh5>

Polar and Rectangular Forms:

<https://bit.ly/2MqxnOL>

De Moivre's Theorem: <https://bit.ly/3ak7po4>

## 3. Practical Components

Refer to Google Drive:

- StewartCalc ComplexNumbers pdf
- Mathspace\_Powers of Complex Numbers in Polar Form

Answer all of the questions.

## 4. Investigation

If  $x + iy = \sqrt{\frac{a+ib}{c+id}}$ , prove that

$$(x^2 + y^2)^2 = \frac{a^2 + b^2}{c^2 + d^2}$$

Show full working for maximum marks.

20 marks

## 5.QFO

Quiz/Forum/Other

Mathspace Quiz: to be completed by 13<sup>th</sup> Feb.