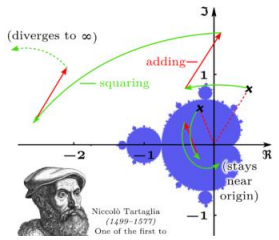
Week 04
Term 1
2024

HAWKER COLLEGE
Engage | Inspire | Achieve

Learning Brief

SM3

Goals



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:

Roots of complex numbers

- determine and examine the nth roots of unity and their location on the unit circle
- determine and examine the nth roots of complex numbers and their location in the complex plane.

Factorisation of polynomials:

- prove and apply the factor theorem and the remainder theorem for polynomials
- consider conjugate roots for polynomials with real coefficients
- solve simple polynomial equations.

Theoretical Components

Roots of complex numbers & Factorisation of polynomials:

- https://shorturl.at/loLO1

Videos:

Conjugate Pairs:
https://goo.gl/BUAt8F

Zeores of Polynomials:
https://goo.gl/oVQsoZ

Additional Info:

Conjugate Root Theorem Proof (only for reference):
https://goo.gl/kaC3ek

Practical Components

Check Google Classroom WK04 folder:

Ex 2F – Factorisation and Roots
Ex 3G – Solving equations

Attempt at least 10 questions from each of the listed exercises.

Attempt **all** questions from the Extension PDF.

Investigation

Find all the 5 fifth roots of unity and graph them on an Argand diagram.
Let α be the root with the smallest positive argument to show that the 5 roots are $1, \alpha, \alpha^2, \alpha^3$ and α^4.
Simplify $(1+\alpha+\alpha^2+\alpha^3+\alpha^4)(1-\alpha)$ and hence show that $1+\alpha+\alpha^2+\alpha^3+\alpha^4=0$.

(20 marks)

Q/F/O Quiz/Forum/Other	CambridgeGO: to be completed by 27/2.