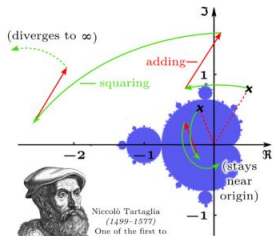
Week 04
Term 1
2022

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 n^{th} roots of unity and their location on the unit circle
- determine and examine the n^{th} 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

Mathspace Lessons:

Roots of complex numbers & Factorisation of polynomials:

- https://goo.gl/oU793L
- https://goo.gl/w7DKyJ
- https://goo.gl/xfkjA0

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 8 questions from each of the listed exercises.

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

Mathspace Quiz: to be completed by 27/2.