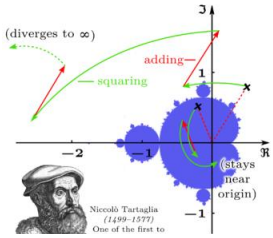
Week 3
Term 1
2022

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:

The complex plane (the Argand plane):

- examine and use addition of complex numbers as vector addition in the complex plane (SPMT08)
- examine and use multiplication as a linear transformation in the complex plane (SPMT09)
- identify subsets of the complex plane determined by relations such as $|z - 3i| \leq 4$, $\frac{\pi}{4} \leq \text{Arg}(z) \leq \frac{3\pi}{4}$, $\text{Re}(z) > Im(z)$, and $|z - 1| = 2|z - i|$

Theoretical Components

Rays and lines:
http://www.youtube.com/watch?v=e2hw4501ajA

Have a look at the link for Graphing regions below:
http://www.youtube.com/watch?v=8gtnZ5xSLuE

Mathspace Lesson on Rays and Lines:

- https://bit.ly/3rLQdPy

Mathspace Lesson on Circles and Eclipses:

- https://bit.ly/3acoMbx

Mathspace Lesson on Regions and Areas:

- https://bit.ly/376ScWv

Classpad to find the roots:

- https://youtu.be/ki

Practical Components

Check Google Classroom WK03 folder:

Ex 4A – Graphing Rays and lines on the Argand diagram
Ex 4B – Circles and Ellipses
Ex 4C – Combination Regions

Attempt at least 8 questions from each of the listed exercises.

Investigation

A: If $z = \cos\theta + i\sin\theta$, show that $1 + z = 2\cos\frac{\theta}{2}\left(\cos\frac{\theta}{2} + i\sin\frac{\theta}{2}\right)$.

B: Sketch the region where $\{z: |z + 3| > 2\} \cap \{z: \frac{\pi}{6} < \arg(z + 3) \leq \frac{2\pi}{3}\}$.

C: Use diagram(s) to clarify and show that the following inequality holds for any complex numbers z and w:

$$|z - w| \geq |z| - |w|$$

(20 marks)

Q/F/O
Quiz/Forum/Other

Mathspace Quiz: to be completed by 21st Feb.