Analysis & Approaches DP Topic 1 Planner

Teacher(s)	Joanna Smith	**Subject group and course**	IB Analysis & Approaches		
Course part and topic	Topic 1: Numbers and Algebra SL 1.1 - 1.9 HL 1.10 - 1.16	**SL or HL/Year 1 or 2**	HL, Year 1	**Dates**	August/September
Unit description and texts		**DP assessment(s) for unit**			
Numbers and algebra allows us to represent patterns, show equivalencies and make generalizations which enable us to model real-world situations.		Formative Quiz Topic 1 Summative Test All assessments will use previous IB exam questions from the Questionbank.			

INQUIRY: establishing the purpose of the unit

Transfer goals

List here one to three big, overarching, long-term goals for this unit. Transfer goals are the major goals that ask students to "transfer" or apply their knowledge, skills, and concepts at the end of the unit under new/different circumstances, and on their own without scaffolding from the teacher.

Students should be able to:

- Students should be able to model real-life situations with the structure of arithmetic & geometric sequences & series.
- Students should be able to use logarithm laws to find inverses of exponential functions which model real-life situations.
- Students should understand and make connections regarding the binomial theorem and its relationship to Pascal's triangle and that it is an efficient method for expanding binomial expressions.
- Students should be able to prove mathematical formulae and the equivalence of identities.
- Students should be able to represent partial fractions and complex numbers in different forms to easily carry out difficult calculations.
- Students should be able find the solutions for systems of equations both graphically and equivalent algebraic methods.

ACTION: teaching and learning through inquiry

Content/skills/concepts—essential understandings	**Learning process -** *Check the boxes for any pedagogical approaches used during the unit. Aim for a variety of approaches to help facilitate learning.*
<u>Students will know the following content:</u> Sigma Notation Algebraic Proofs Arithmetic & Geometric sequences & series Laws of integer and rational exponents Laws of Logarithms Binomial Theorem Formats for complex numbers (Cartesian, polar, Euler) Graphing on the complex plane (Argan diagram) <u>Students will develop the following skills:</u> Convert calculator notation to scientific notation Solve exponential equations Use of Pascal's triangle Use of combination for binomial expansion for non-integer exponents Rewrite rational expressions as partial fractions Perform operations with complex numbers in different formats <u>Students will grasp the following concepts:</u> Financial applications and compound interest are directly related to sequences and series and laws of logarithms. Counting principles can be used to determine the number of possible outcomes. The type of solutions (real vs complex) gives information about equations in real world contexts. Proof serves to validate mathematical formulae and the equivalence identities.	Learning experiences and strategies/planning for self-supporting learning: ☒Lecture ☐Socratic seminar ☒ Small group/pair work ☐ PowerPoint lecture/notes ☒ Individual presentations ☐ Group presentations ☐ Student lecture/leading ☐ Interdisciplinary learning Details: Most lessons will start with direct instruction and introduction from the instructor. Students will work in small groups to solve problems and complete explorations – some will be consistent across groups, some will be unique allowing for each group/individual to have time to present their work. Discussions regarding method, alternate approaches, and efficiency will be regularly included in the class. ☐ Other/s:

	Formative assessment: Topic Quiz #1 and #2 Lesson textbook problems Content specific IB Questionbank practice
	Summative assessment: Summative Assessments - Cumulative Test - September Questions for the cumulative assessments come from released questions in the IB Questionbank. Each summative assessment is cumulative with the majority (60-75%) of the test coming from the content covered between summative assessments.
	Differentiation: ☐Affirm identity ☒Value prior knowledge ☐Scaffold learning ☒ Extend learning Details: This unit will utilize prior knowledge of solving equations and binomial theorem to build and extend their knowledge of complex numbers and their multiple formats. Students will make connections to vectors (magnitude and modulus; argument and direction).

Approaches to learning (ATL)

Check the boxes for any explicit approaches to learning connections made during the unit. For more information on ATL, please see the guide.

☒Thinking

☒ Social

☒ Communication

☒ Self-management

☐ Research

Details:

Thinking - making connections within the content and applications

Social – partner work

Communication – utilizing the language and notation of mathematics

Self- Management - students will have problems sets to complete that will need to be balanced with their other time commitments and responsibilities.

Language and learning *Check the boxes for any explicit language and learning connections made during the unit. For more information on the IB's approach to language and learning, please see the guide.*	**TOK connections** *Check the boxes for any explicit TOK connections made during the unit*	**CAS connections** *Check the boxes for any explicit CAS connections. If you check any of the boxes, provide a brief note in the "details" section explaining how students engaged in CAS for this unit.*
☒ Activating background knowledge ☒ Scaffolding for new learning ☒ Acquisition of new learning through practice ☒ Demonstrating proficiency Details: Students must utilize background knowledge of content vocabulary from Algebra 2 to complete many of the concepts in Topic 1. New learning is scaffolded through progression practice. Topic 1 will build new vocabulary through exploration and practice.	☐ Personal and shared knowledge ☐ Ways of knowing ☒ Areas of knowledge ☐ The knowledge framework Details: Students will consider the following TOK question in pairs: How have notable individuals shaped the development of mathematics as an area of knowledge? Consider Pascal and "his" triangle.	☒ Creativity ☐ Activity ☐ Service Details: Students have the opportunity to create their own application problems using arithmetic or geometric sequences. Students are encouraged to use examples from their own lives or interests to write the explicit and/or recursive definitions. Students will present these to their classmates.

Resources *List and attach (if applicable) any resources used in this unit*
Textbook - Mathematics: Analysis and Approaches HL (Oxford – 2019) IB QuestionBank Revision Village Website videos and Question banks