COMMITTEE OF THE WHOLE - PUBLIC
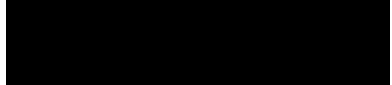# SCHOOL DISTRICT 41 - BURNABY
AGENDA

Monday, February 12, 2024, 4:00 pm
Video Conference

the backbone of many mathematical concepts, including modular arithmetic for solving remainders, prime factorization, Diophantine Equations, cryptography, permutations, and combinatorics. These concepts are not only fascinating in their theoretical elegance but also find practical use in fields such as computer science, data analysis, cryptography, and other areas of mathematics. By offering ANTPS, we aim to provide students with a solid understanding of these fundamental concepts and their applications, thereby preparing them for the challenges of advanced study and professional pursuits.

Furthermore, the course is designed to cultivate a problem-solving mindset and foster critical thinking skills. Through rigorous exercises and real-world applications, students will develop the ability to approach complex problems systematically and creatively. This skillset is invaluable in a rapidly evolving technological landscape where the ability to analyze data, identify patterns, and devise innovative solutions is highly sought after. By mastering the principles of advanced number theory and problem solving, students will not only gain a deeper appreciation for the beauty of mathematics but also acquire a versatile toolkit that can be applied across a wide range of academic and professional domains.

Goals:

- Students will develop a basic understanding of number theory that can be transferred to a variety of fields with a focus in STEM
- Students will cultivate critical thinking skills by guiding them in the process of inquiry, extracting vital information, exploring novel concepts, and discerning underlying patterns
- Students will facilitate connections among those who share a passion for mathematics, fostering collaboration, idea sharing, and mutual inspiration to enhance their mathematical prowess
- Students will be empowered to comprehend and convey mathematical concepts through logical reasoning, critical analysis, and rigorous justification
- Students will develop enthusiasm for problem-solving and instruct them in the art of creative thinking, enabling them to generate novel ideas and devise unique solutions for intricate problems

Aboriginal Worldviews and Perspectives:

The new course, 'Advanced Number Theory and Problem Solving,' not only explores traditional mathematical concepts but also actively incorporates Indigenous perspectives. As exemplified by the Yuki culture of California, we will delve into the fascinating practice of counting in different bases.

In line with the First People's principles of learning, our course is designed to foster a holistic and inclusive educational environment. We recognize that learning is a journey of self-discovery that connects individuals with their communities. Our curriculum promotes the development of self-awareness while emphasizing the importance of connecting with peers and mentors. Learning is not merely an individual endeavor but a communal one, where knowledge is shared, passed down, and co-created.

Our approach to teaching is reflective and experiential, encouraging students to explore mathematical concepts through inquiry and hands-on problem-solving. The course values the relationship between mathematics and the world around us, emphasizing that learning is relational and connected to real-life experiences. By embracing these principles, we aim to create a learning environment that not only imparts mathematical knowledge but also respects and integrates Indigenous worldviews and perspectives, making the educational experience richer and more inclusive for all students.

Course Name: Advanced Number Theory and Problem Solving **Grade:12**

BIG IDEAS

| Students learn to communicate /explain/reason using mathematics | Problem solving skills in mathematics can be fostered, developed, and trained | Engage in a thinking environment where students can foster critical and creative thinking skills | Students part of a math community can help each other to become better mathematicians | Strong mathematics skills can lead to a successful career in STEM |

Learning Standards

Curricular Competencies	Content

Students are expected to do the following:

Reasoning and Modeling:

Develop thinking strategies to solve puzzles and play games:
In our course, students will engage in various mathematical puzzles and games that require creative thinking and problem-solving.
Explore, analyze, and apply mathematical ideas using reason, technology, and other tools: Students will explore advanced number theory concepts using mathematical reasoning, technology, and other analytical tools.
Model with mathematics in situational contexts: We will emphasize real-world applications of number theory, enabling students to apply mathematical models to practical situations.
Think creatively and with curiosity and wonder when exploring problems:
Throughout the course, we encourage students to approach mathematical problems with curiosity, creativity, and a sense of wonder.

Understanding and Solving:

Develop, demonstrate, and apply conceptual understanding of mathematical ideas through experimentation, inquiry, and problem solving: Students will engage in experimentation, inquiry, and problem-cLo

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Big Ideas – Elaborations

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Creative and Curious Thinking:

Encourage students to explore mathematical problems with open-mindedness, trying different strategies and fostering creative and innovative mathematical thinking.

Cultivate curiosity and wonder by prompting students to ask questions that lead to deeper understanding and further avenues of investigation.
Inquiry Skills:

Promote structured, guided, and open inquiry in mathematical problem-solving.
Teach students to notice and wonder, determining what's necessary to make sense of and solve problems.

Visualization:

Develop the ability to create and use mental images as a tool for understanding mathematical concepts. Visualization can be supported through dynamic materials, concrete objects, drawings, and diagrams.

Flexible and Strategic Problem Solving:

Guide students in deciding which mathematical tools and strategies to use when confronted with mathematical problems.
Teach effective problem-solving strategies, including methods like guess and check, modeling, simplifying problems, using charts, diagrams, and role-playing.

Problem-Solving Skills:

Train students to interpret situations and identify mathematical problems within them.
Develop their skills in applying mathematics to solve these problems and assessing the solutions within the context.
Encourage the iterative problem-solving process until a satisfactory solution is achieved.

Persistence and Positive Disposition:

Instill in students the value of perseverance and determination in the face of mathematical challenges, fostering a resilient problem-solving mindset.
Explain and Justify Mathematical Reasoning:

Teach students to use mathematical arguments effectively to convince others and anticipate the consequences of their solutions.
Effective Communication:

Encourage students to express their mathematical ideas through oral, written, visual, and technological means, adapting their communication style to suit the context and audience.

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BAA Courses

- Provide an opportunity for educators to explore content beyond the boundaries of the Ministry curriculum.

- Help educators respond to the local needs of schools and their communities and provide choice and flexibility for students.

- BAA courses can be created at the Grades 10-12 levels.

# Advanced Number Theory and Problem Solving 12

Course Synopsis

Advanced Number Theory and Problem Solving provides students with the essential knowledge and skills to proficiently understand and utilize advanced concepts in number theory. These concepts are integral in fields such as science, computer engineering, statistics, data analysis, and various branches of mathematics.

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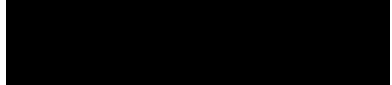
Big Ideas
Advanced Number Theory & Problem Solving 12
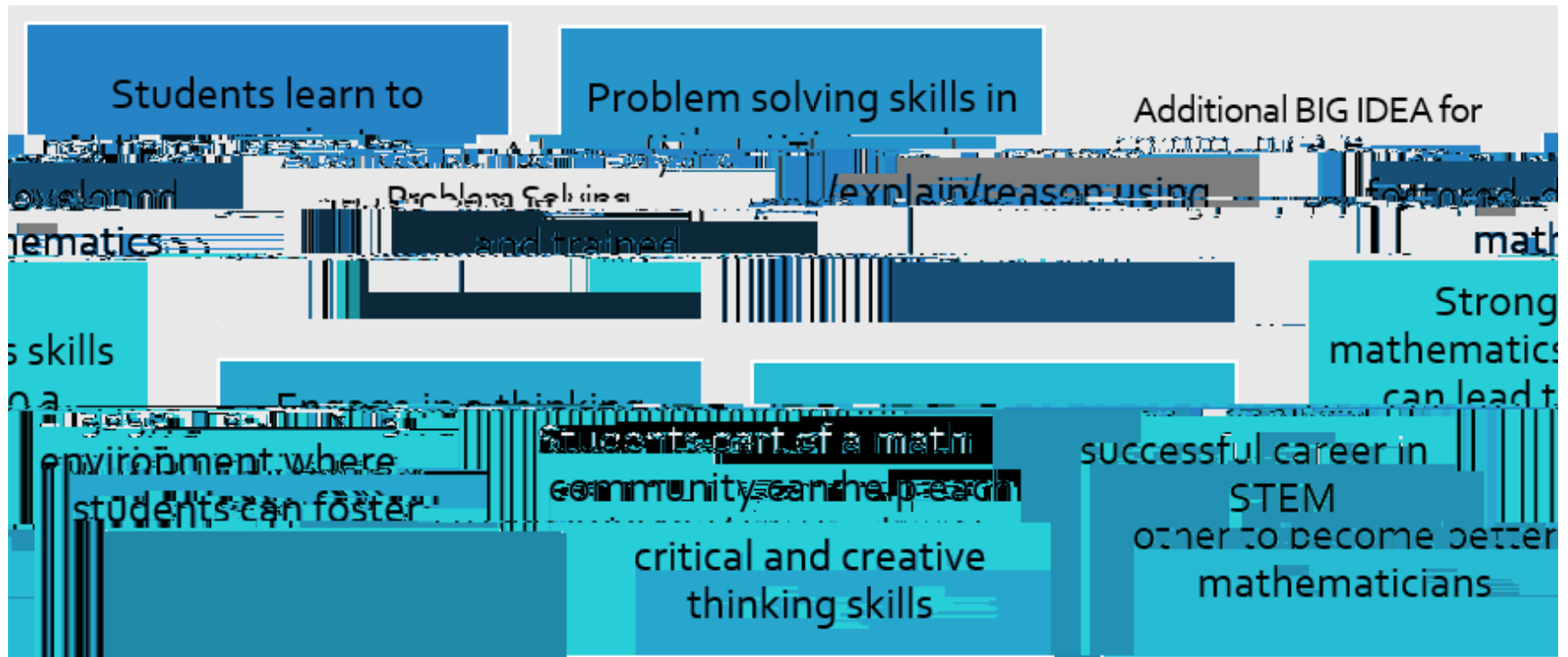
Thank You

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be curious and supportive throughout the conversation to assist the host school team in sharing
their school plan. In support of generative dialogue, below are potential gu-13.002 schoalogue, beloe0 el 0 612