**Area of Learning: MATHEMATICS — Calculus Grade 12**

**BIG IDEAS**

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| The **concept of a limit** is foundational to calculus. |  | Differential calculus develops the concept of **instantaneous rate of change**. |  | Integral calculus develops the concept of determining a product involving a **continuously changing** quantity over an interval. |  | Derivatives and integrals are **inversely related**. |

**Learning Standards**

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| **Curricular Competencies** | **Content** |
| *Students are expected to do the following:*  Reasoning and modelling   * Develop **thinking strategies** to solve puzzles and play games * Explore, **analyze**, and apply mathematical ideas using **reason**, **technology**, and **other tools** * **Estimate reasonably** and demonstrate **fluent, flexible, and strategic thinking** about number * **Model** with mathematics in **situational contexts** * **Think creatively** and with **curiosity and wonder** when exploring problems   Understanding and solving   * Develop, demonstrate, and apply conceptual understanding of mathematical ideas through play, story, **inquiry**, and problem solving * **Visualize** to explore and illustrate mathematical concepts and relationships * Apply **flexible and strategic approaches** to **solve problems** * Solve problems with **persistence and a positive disposition** * Engage in problem-solvingexperiences **connected** with place, story, cultural practices, and perspectives relevant to local First Peoples communities, the local community, and other cultures | *Students are expected to know the following:*   * **functions** and graphs * **limits:**   + left and right limits   + limits to infinity   + continuity * **differentiation:**   + **rate of change**   + **differentiation rules**   + higher order, implicit   + **applications** * **integration:**   + **approximations**   + fundamental theorem of calculus   + **methods of integration**   + **applications** |

**Area of Learning: MATHEMATICS — Calculus Grade 12**

**Learning Standards (continued)**

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| **Curricular Competencies** | **Content** |
| Communicating and representing   * **Explain and justify** mathematical ideas and **decisions** in **many ways** * **Represent** mathematical ideas in concrete, pictorial, and symbolic forms * Use mathematical vocabulary and language to contribute to **discussions** in the classroom * Take riskswhen offering ideas in classroom **discourse**   Connecting and reflecting   * **Reflect** on mathematical thinking * **Connect mathematical concepts** with each other, other areas,  and personal interests * Use **mistakes** as **opportunities to advance learning** * **Incorporate** First Peoples worldviews, perspectives, **knowledge**,  and **practices** to make connections with computer science concepts |  |