**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**
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**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
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