

CHAPTER 5: RUBRIC FOR CHALLENGE 1

Assessment Category	Scores and Criteria			
	Passable level of achievement – below provincial standard LEVEL 1	Moderate level of achievement – below, but approaching provincial standard LEVEL 2	High level of achievement – at provincial standard LEVEL 3	Very high to outstanding level of achievement – above provincial standard LEVEL 4
Knowledge and Understanding				
Demonstration of understanding of a concept	Attempted solution demonstrates limited understanding of how average monthly temperature and a periodic function are related.	A link between the data and a periodic function is attempted, and the explanation demonstrates some understanding of the model and its relation to the question.	The student uses a sinusoidal model for the data and reasonably explains the link between the model and the values of a, k, b, and d.	The student's detailed explanation for the relation between average monthly temperature and the sinusoidal model refers to the values of a, k, b, and d of the model.
Performance of an algorithm by hand, mentally, or using technology	- The table for average monthly temperature is correct but poorly organized and covers only a single year. - The scatter plot and the curve of best fit do not reasonably reflect the data. - The mathematical model has many errors and does not reflect the situation.	- The table for average monthly temperature is correct but only covers a single year. - The scatter plot and the curve of best fit reasonably represent the data. - The mathematical model has some errors and does not quite reflect the data.	- The table for average monthly temperature is clear and covers two years. - The scatter plot and the curve of best fit accurately reflect the data. - With the exception of minor errors, the mathematical model is correct.	- The table for average monthly temperature is accurate, and the student refers to more than one Web site. - The scatter plot and the curve of best fit are accurate and verified by an alternative method. - There are no errors in the mathematical model.
Thinking, Inquiry, Problem Solving				
Selection and sequencing of a variety of tools and strategies to solve a problem	The student selects a few appropriate tools and uses these to make a limited attempt to solve the problem.	The student selects some appropriate tools and uses these to solve some of the problem.	The student chooses appropriate tools and uses these to solve most of the problem.	The student chooses appropriate tools and incorporates these in the execution of a plan to solve the problem and verify the solution.
Justification of reasoning and/or conclusion	Reasoning is evident but lacks consistency.	Reasoning is evident and logical in parts of the problem.	Reasoning is logical and consistent within the context of average monthly temperature and periodic functions.	Reasoning is logical and consistent, and description is detailed.
Making conclusions and inferences	Conclusions are somewhat connected with work but are not supported.	Conclusions are consistent with work but are not fully supported.	Conclusions are supported by evidence and integrate aspects of the problem.	Conclusions are supported, integrate all aspects of the problem, and are convincing.

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CHAPTER 5: RUBRIC FOR CHALLENGE 1 (continued)

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	Passable level of achievement – below provincial standard LEVEL 1	Moderate level of achievement – below, but approaching provincial standard LEVEL 2	High level of achievement – at provincial standard LEVEL 3	Very high to outstanding level of achievement – above provincial standard LEVEL 4
Communication				
Correct use of mathematical symbols, labels, and conventions	The student uses few mathematical conventions.	The student correctly uses some mathematical conventions.	- The student correctly uses most mathematical conventions by correctly labelling the table for average monthly temperature, the scatter plot, and curve of best fit. - The trigonometric equation which models the data is correct.	The student correctly uses mathematical conventions.
Ability to read and interpret mathematics	The student gathers limited, but accurate information from mathematical language or forms such as charts or graphs.	The student gathers some information from mathematical language or forms such as charts or graphs but has difficulty interpreting it.	The student gathers sufficient information from the curve of best fit for average monthly temperature to determine the values of a, k, b, and d in the general form of a sinusoidal equation. The student also interprets the model correctly in the context of the problem.	The student gathers complex information from mathematical language or forms such as charts or graphs and interprets it fully.
Integration of narrative and mathematical forms (graphs, charts, and diagrams)	Either mathematical or narrative form is present, but not both.	Both mathematical and narrative forms are present, but not integrated.	Mathematical and narrative forms are present and integrated.	A variety of mathematical forms and narrative are present, integrated, and well chosen.
Appropriate use of mathematical vocabulary	Few mathematical words are used correctly.	Some mathematical words are used correctly.	Most mathematical words are used correctly.	Mathematical words are used correctly.
Degree of clarity in explanations and justifications	Explanations and justifications lack clarity.	Explanations and justifications are understandable but lack clarity.	Explanations and justifications are clear.	Explanations and justifications are clear and thorough.
Application				
Selection of a tool or strategy to solve a problem	The selected tool selected is only partially appropriate to the context of the question.	The selected tool is generally appropriate to the question.	The table and the graph of the average monthly temperature are used to determine the values of a, k, b, and d in $y = a \sin k(\theta + b) + d$ or $y = a \cos k(\theta + b) + d$.	The selected tool is appropriate and efficient and relates to the broadest context of the question.
Use of a selected tool or strategy	Selected tool or strategy is used with some inaccuracies.	Selected tool or strategy is used, but solution may contain minor errors.	Selected tool or strategy is used correctly.	Selected tool or strategy is used correctly and is verified or supported.