Performance Assessment Task

A New Arena

Your company has been asked to create a proposal for a seating plan for a new NHL arena. Your proposal must include the number of seats in the new arena, the layout of those seats, and the suggested price of each seat. Make sure all calculations are presented clearly and in logical order.

Determine the number and layout of seats (using an arithmetic sequence or series)

The number of seats in the arena needs to be between 18 000 and 22 500. One ring of seats all the way around the rink is considered a row, and Row 1 is considered to be the row closest to the ice. The number of seats in each row must form an arithmetic sequence, increasing by the same number in each subsequent row.

Your task is to decide on the total number of seats in the arena by designing a seating arrangement that has a reasonable number of rows.

Determine:

- the number of seats in the first row
- the number of rows required
- the number of seats by which each row increases
- the number of seats in the last row
- the total number of seats in the arena

Determine pricing (using a geometric sequence or series)

A similar arena currently charges $6000 per season for seats in rows 1-10, $4000 for season seats in rows 11-20, $3000 for season seats in rows 21-30, and $2000 for season seats in rows 31-40. You think a more fair way to determine season ticket prices is to use a geometric sequence, and decrease the price in each subsequent row by the same factor based on the price of the row in front of it.

Determine:

- a reasonable price per game for each seat in the first row
- the factor by which the cost of each seat per game will decrease in each subsequent row from row 1
- the price per game of each seat in the last row

Identify and explain assumptions

As you worked on your proposal, there are many factors you may have considered, such as the layout of the arena. You also needed to make assumptions, such as reasonableness of pricing.

- Clearly explain any assumptions you made while working on the proposal. Include any considerations that may have influenced your decisions or impacted your calculations.
- Clearly explain how you decided on the number of seats in each row, the number of rows, and the pricing.

Note: Your proposal can take any form, but must be supported by relevant mathematics.

Rubric: A New Arena

Student _____ **Date** _____

Level / Criteria	Excellent	Proficient	Adequate	Limited *	Insufficient/ Blank *
Solve problems (arithmetic) (Relations and Functions 9) [C, CN, PS, R]	Selects appropriate formulae and applies them **correctly** to determine the total number of seats and the number of seats in the last row.	Selects appropriate formulae and applies them in a **substantially correct** manner to determine the total number of seats and the number of seats in the last row.	Selects appropriate formulae and applies them in a **partially correct** manner to determine the total number of seats and the number of seats in the last row.	**Unable** to select appropriate formulae and/or **unable** to apply them to solve the problem.	No score is awarded because there is insufficient evidence of student performance based on the requirements of the assessment task.
Solve problem (geometric) (Relations and Functions 10) [C, PS, R]	Selects appropriate formula and applies it **correctly** to determine the price of seats in the last row.	Selects appropriate formula and applies it in a **substantially correct** manner to determine the price of seats in the last row.	Selects appropriate formula and applies it in a **partially correct** manner to determine the price of seats in the last row.	**Unable** to select appropriate formula and/or **unable** to apply it to solve the problem.	
Identify and explain assumptions (Relations and Functions 9, 10) [C, R]	Provides a **perceptive** explanation of numbers chosen for calculations and assumptions made in the proposal.	Provides a **logical** explanation of numbers chosen for calculations and assumptions made in the proposal.	Provides a **reasonable** explanation of numbers chosen for calculations and assumptions made in the proposal.	Provides a **vague** explanation of numbers chosen for calculations and assumptions made in the proposal.	

* When work is judged to be limited or insufficient, the teacher makes decisions about appropriate intervention to help the student improve.