Unit 2: Quadratic Functions

Time Out is related to *Unit 2: Quadratic Functions*.

Time Outs strengthen numeracy and reasoning skills by using math strategically.

Use strategic thinking to play the game and answer the questions that follow. You will be assessed according to the rubric provided.

Category	Strategy and Procedures	Mathematical Reasoning
	The student...	*The student...*
4	• uses efficient and effective strategies to solve the problem(s) and complete questions	• presents complex and refined mathematical reasoning
3	• uses effective strategies to solve the problem(s) and complete questions	• presents effective mathematical reasoning
2	• uses effective strategies inconsistently to solve the problem(s) and complete questions	• presents some evidence of mathematical reasoning
1	• does not use effective strategies to solve the problem(s) and complete questions	• presents superficial or confusing evidence of mathematical reasoning

This assessment is worth 8 marks. Take your time.

The Game of Nim

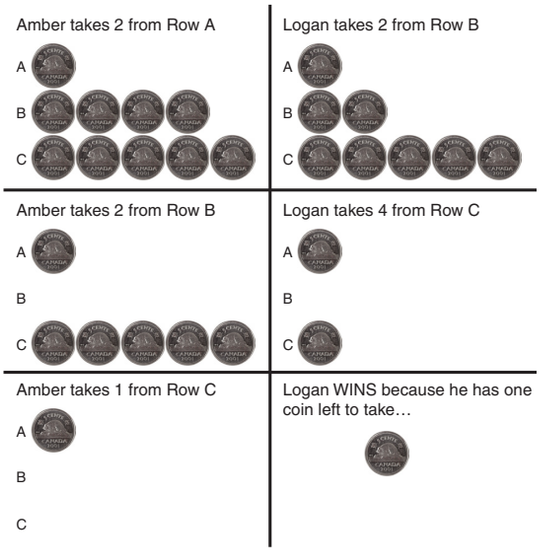
This version of Nim begins with 12 nickels (other coins will do) arranged in three horizontal rows as shown.

1. Two players take turns removing one or more coins according to the following rules.

   - On any turn, the coin(s) removed must be from the same horizontal row.
   - The person who takes the last coin wins. Only one coin can be removed by the winner.

   In case the game is still unclear, here is a game scenario between two fictional players – Logan and Amber.

   Start:



   Now it is your turn.

2. Play a minimum of five games of Nim with a friend or family member.

3. Answer questions A, B, and C after completing your games.

   a. Is there a winning strategy?

   b. Does it matter who goes first? Why or why not?

   c. Suppose the rules were changed to whoever ends up with the last coin loses. Is there a winning strategy? (You may want to play the game with this switch of the rules.)

You have completed *Unit 2: Time Out.*
Please proceed to the *Unit 2: Final Review Assignment*, on the next page of this *Workbook*.