

*Applied Mathematics 30*

**Teacher Notes:  
Canada Winter Games**



*February 2009*

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# *Applied Mathematics 30*

## *Canada Winter Games—Teacher Notes*

### *Introduction*

This project relates to the planning of a trip to the Canada Winter Games in Halifax in 2011 by two students living in Red Deer. It allows students to use their knowledge from the Matrices and Pathways unit; the Cyclic, Recursive, and Fractal Patterns unit; the Statistics and Probability unit; and the Finance and Spreadsheets unit. It is designed to be completed in three to five hours of student time. The use of this project is optional; however, if you choose to use it, you may include it as part of your assessment. A hard copy will be mailed to your school in January 2009. Sample solutions can be found on the Alberta Education extranet at <https://phoenix.edc.gov.ab.ca>. The general scoring guide for the project is the same as the one issued in September 2000.

One of the written-response questions worth 10% on the Applied Mathematics 30 June 2009 Diploma Examination will be related to this project. Students who do not complete the project but who have completed the course will have the knowledge to answer the written-response question; however, students who have completed the project will gain experience with the related mathematical skills.

## *Specific Notes*

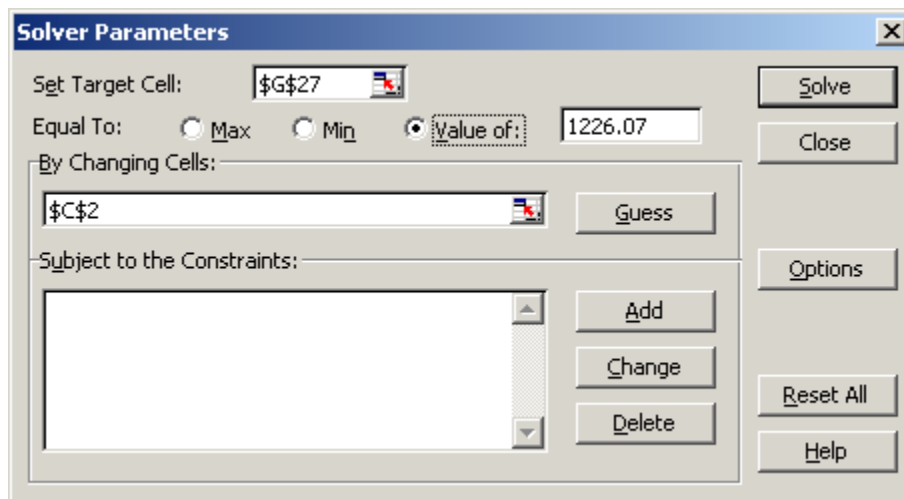
Teachers may want to

- discuss the meaning of local time for air travel in part A
- remind students of the calculator steps and settings used in matrix, statistical, and regression applications
- discuss the representation of the years for the regression in part B
- set up a spreadsheet template for students to use in Part C of the project. This part will likely require the most time to complete
- show students how to perform optimization in a spreadsheet with the Excel Solver tool as outlined below
- allow time for further research about the trip, destination, or Canada Games

To install Solver, click **Add-ins** on the **Tools** menu. Select **Solver Add-in** check box. Click **OK**.

To run Solver, click **Solver** on the **Tools** menu and enter the **Solver Parameters**:

Set Target Cell: G27  
Equal to: Value of 1226.07  
By Changing Cells: C2  
Then click **Solve**



Microsoft product screen shot reprinted with permission from Microsoft Corporation.

If Excel Solver is used, the spreadsheet formula for cell D7 would be =ROUND(\$C\$2,2).

## ***Program of Studies***

The project relates to mathematics learned in the following units of Applied Mathematics 30.

### ***Matrices and Pathways***

- Specific Outcomes**
- 1.2: Use the fundamental counting principle to determine the number of different ways to perform multistep operations. [PS, R]
  - 1.4: Model and solve consumer and network problems, performing matrix operations and using algebraic solution strategies as needed. [CN, PS, T, V]

### ***Statistics and Probability***

- Specific Outcomes**
- 2.1: Find the population standard deviation of a data set, using technology. [CN, E, T, V]
  - 2.2: Use z-scores to solve problems related to the normal distribution. [PS, R, T, V]

### ***Finance and Spreadsheets***

- Specific Outcome**
- 3.1: Design a financial spreadsheet template to allow users to input their own variables. [C, PS, T]

### ***Cyclic, Recursive, and Fractal Patterns***

- Specific Outcome**
- 4.4: Use technology to generate and graph sequences that model real-life phenomena. [PS, T, V]

## ***Mathematical Processes***

The seven mathematical processes identified in the *Program of Studies* are addressed in this project in the following manner.

<b>Communication</b>	Justify the flights, hotel, and event passes budget you have chosen. Research the history and significance of the Canada Games.
<b>Connections</b>	Relate mathematics to current and historical real-world situations and data, and connect different units within Applied Mathematics 30. Draw the transportation matrix on the map of Canada.
<b>Estimation and Mental Mathematics</b>	Check the reasonableness of calculator and spreadsheet solutions.
<b>Problem Solving</b>	Design a plan to save the necessary funds for your trip. Decide what value to use to budget for event passes. Choose flights.
<b>Reasoning</b>	Compare answers from different processes in network matrix questions. Decide what value to use to budget for event passes.
<b>Technology</b>	Determine mean and standard deviation. Perform operations on matrices. Determine regression equations. Use spreadsheets to determine the savings necessary to fund this trip.
<b>Visualization</b>	Draw transportation network on the map of Canada.

## *ICT Program of Studies*

**C.1—Students will access, use, and communicate information from a variety of technologies.**

**Specific Outcome** 4.2: Select information from appropriate sources, including primary and secondary sources.

**C.3—Students will critically assess information accessed through the use of a variety of technologies.**

**Specific Outcome** 4.1: Assess the authority, reliability, and validity of electronically accessed information.

**C.6—Students will use technology to investigate and/or solve problems.**

**Specific Outcomes**

- 4.1: Investigate and solve problems of prediction, calculation, and inference.
- 4.2: Investigate and solve problems of organization and manipulation of information.
- 4.3: Manipulate data by using charting and graphing technologies in order to test inferences and probabilities.
- 4.4: Generate new understandings of problematic situations by using some form of technology to facilitate the process.

**F.1—Students will demonstrate an understanding of the nature of technology.**

**Specific Outcome** 4.2: Solve mathematical and scientific problems by selecting appropriate technology to perform calculations and experiments.

**F.2—Students will understand the role of technology as it applies to self, work, and society.**

**Specific Outcome** 4.7: Use current, reliable information sources from around the world.

**P.2—Students will organize and manipulate data.**

**Specific Outcome** 4.1: Manipulate and present data through the selection of appropriate tools, such as scientific instrumentation, calculators, databases, and/or spreadsheets.