

Pure Mathematics 30

**Teacher Notes:
Investment for Growth**



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Pure Mathematics 30

Investment for Growth—Teacher Notes

Introduction

This project relates to some of the criteria involved in choosing to make an investment and to the cumulative value of making regular contributions to an RRSP. It allows students to use the knowledge they have gained from the Exponential and Logarithmic Functions and Geometric Series Unit as well as from the Statistics Unit. This project is designed to be completed in three to five hours of student time. The use of this project is optional; however, if you do choose to use it, you may include it as a part of your assessment. Sample solutions for the project questions can be found on the Alberta Education extranet <https://phoenix.edc.gov.ab.ca>. A hard copy will be mailed to your school in late August. The general scoring guide for the project is the same as the one issued in September 2000.

The first written-response question, which is worth 10%, on the Pure Mathematics 30 January 2006 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 have had experience with the related mathematical skills in another context.

Specific Notes

Teachers might want to

- give students specific instructions on how to set up lists on a graphing calculator or columns and formulas on a spreadsheet (Part A, Question 1, and Part B, Question 2)
- remind students to use appropriate window settings when graphing with calculators (Part A, Question 2)
- remind students that the value of n in the geometric series formula in Part B represents the number of contributions
- remind students that the a -values in the exponential regressions are the y -intercepts of the exponential curves and are only approximations of the initial values for earnings per share
- explain to students that the analysis in Part C assumes that a constant sum is invested at the beginning of each year, and at the end of the year the investor withdraws the profits or makes up the losses

Program of Studies

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

Exponents, Logarithms and Geometric Series

- Specific Outcomes**
- 2.1: Derive and apply expressions to represent general terms and sums for geometric growth and to solve problems. [CN, R, T]
 - 2.4: Solve and verify exponential and logarithmic equations and identities. [R]
 - 2.5: Graph and analyze an exponential function using technology. [R, T, V]
 - 2.6: Model, graph, and apply exponential functions to solve problems. [PS, T, V]

Statistics

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

Mathematical Processes

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

Communication	Explain the meaning of the values of a and b in the exponential regression equation. Explain how to graphically solve for x in the exponential equation. Describe how to determine when the EPS value will be double that of its value in 2004.
Connections	Find the cumulative value of an RRSP into which regular deposits are made. Find the connection between EPS growth and exponential regression.
Estimation and Mental Mathematics	Check the reasonableness of calculator and spreadsheet solutions.
Problem Solving	Determine values and times for various conditions involving EPS for both companies and for the RRSP contributions. Determine the bounding values of an area under the normal distribution that is symmetric about the mean.
Reasoning	Decide which company is a better investment.
Technology	Use a calculator and/or spreadsheet to enter lists and to graph scatter plots from data. Generate exponential regression functions. Use graphing techniques to estimate solutions.
Visualization	Visualize the growth of revenue and EPS for the two companies.

ICT Program of Studies

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.

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

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

P.2—Students will organize and manipulate data.

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