

Chapter
2Series and Financial
Applications

Everyday, people spend or borrow money to acquire goods. Businesses and financial institutions offer loans, mortgages, credit cards, and other forms of credit. When people borrow money, they pay interest, which is the cost of using money.

When people save and invest money, they earn interest. You will investigate and learn more about the effects that compound interest and time have on the deposits of savings, repayment of loans, and credit purchases.

In this chapter, you will

- investigate and use arithmetic series
- investigate and use geometric series
- use computer spreadsheets to analyze and represent the repayment of a loan or the deposits of savings over time
- investigate the relationship between a geometric series and the value of an ordinary simple annuity, which is a series of regular payments or deposits that earn interest over a period of time
- analyze and solve problems involving future value
- analyze and solve problems involving present value
- use technology to further investigate financial situations involving compound interest and to generate amortization tables for loans and mortgages
- explore the effects of changing the value of the payment, interest rate, and principal on the amortization of Canadian mortgages

Visit the Nelson Mathematics student Web site at www.math.nelson.com. You'll find links to interactive examples, online tutorials, and more.

Connections



The Chapter Problem

Financial Planning

Many people do not have the time or expertise to manage their investments or finances, so they hire a professional financial advisor. The advisor may

- help the client to plan and follow a budget
- help the client to reach short- and long-term financial goals
- set up education funds for the client's children
- give advice on investments, such as registered retirement savings plans (RRSP), guaranteed investment certificates (GICs), mutual funds, stocks, or bonds
- manage the client's assets after retirement and estate planning

Investment Problem

You are a financial planner and you have a new client. Mr. Sacchetto is a math teacher who is celebrating his 37th birthday and his son Bart's fourth birthday.

- Mr. Sacchetto wishes to establish an education fund for his son by depositing \$25 at the end of each month until Bart's 18th birthday.
- He intends to renew his mortgage today at 8.4%/a, compounded semiannually. He still owes \$77 000, and 20 years remain in the term of the mortgage. He would like to make monthly payments.
- Mr. Sacchetto owes \$8986 on his car. To pay this debt, he makes payments of \$300 at the end of each month. The interest rate is 10.2%/a, compounded monthly.
- Mr. Sacchetto wants to retire on his 55th birthday with \$120 000 in savings. At that time, he wishes to begin withdrawing a regular amount from these savings at the end of each month. For this reason, he wishes to set up a registered income fund (RIF) that will be depleted, or used up, on his 75th birthday.

As his advisor, he asks you to develop a financial plan for him. Throughout the chapter, you will be asked questions that will assist you in developing the plan.

For help with this problem, see pages 116, 126, 142, 155, 167, 182, and 195.

Challenge 1

Joe and Anne wish to buy a house that costs \$148 000. They know very little about mortgages or how to qualify for a mortgage. Here are some of their questions.

- What does it mean to “qualify” for a mortgage?
- What is the minimum down payment required for a mortgage?
- What are some of the advantages of making a larger down payment?
- Can all or a portion of an RRSP be used as collateral or as a deposit?
- What are the terms and conditions of a mortgage?
- Is it possible to make extra payments or to increase the payments? Is it also possible to change the terms of a mortgage or to make an “early renewal”?
- What are the current interest rates on mortgages? What is an affordable monthly mortgage payment?

Learn more about Canadian mortgages and write a report that addresses these questions. You may find it helpful to visit a local bank or credit union. Visit Nelson Thomson Learning’s Web site at www.math.nelson.com for more information.

Challenge 2

A **perpetuity** is an annuity that pays out a specified amount beginning on a fixed date and continuing forever. One example of a perpetuity is the series of interest payments from a sum of money invested permanently. Investigate perpetuities further.

Determine how much is needed to establish a scholarship fund that pays scholarships of \$1200 every three months forever if the endowment can be invested at 8%/a, compounded quarterly, and if the first scholarship is paid

(a) three months from now

(b) two years from now

Web Challenge

For a related Internet activity, go to www.math.nelson.com.

