Chapter 7

Financial Applications

Curriculum Expectations

Discrete Functions

Solving Problems Involving Financial Applications

C3.1 make and describe connections between simple interest, arithmetic sequences, and linear growth, through investigation with technology (e.g., use a spreadsheet or graphing calculator to make simple interest calculations, determine first differences in the amounts over time, and graph amount versus time)

Sample problem: Describe an investment that could be represented by the function $f(x) = 500(1 + 0.05x)$.

C3.2 make and describe connections between compound interest, geometric sequences, and exponential growth, through investigation with technology (e.g., use a spreadsheet to make compound interest calculations, determine finite differences in the amounts over time, and graph amount versus time)

Sample problem: Describe an investment that could be represented by the function $f(x) = 500(1.05)^x$.

C3.3 solve problems, using a scientific calculator, that involve the calculation of the amount, A (also referred to as future value, FV), the principal, P (also referred to as present value, PV), or the interest rate per compounding period, i, using the compound interest formula in the form $A = P(1 + i)^n$ [or $FV = PV(1 + i)^n$]

Sample problem: Two investments are available, one at 6% compounded annually and the other at 6% compounded monthly. Investigate graphically the growth of each investment, and determine the interest earned from depositing $1000 in each investment for 10 years.

C3.4 determine, through investigation using technology (e.g., scientific calculator, the TVM Solver on a graphing calculator, online tools), the number of compounding periods, n, using the compound interest formula in the form $A = P(1 + i)^n$ [or $FV = PV(1 + i)^n$]; describe strategies (e.g., guessing and checking; using the power of a power rule for exponents; using graphs) for calculating this number; and solve related problems

C3.5 explain the meaning of the term *annuity*, and determine the relationships between ordinary simple annuities (i.e., annuities in which payments are made at the *end* of each period, and compounding and payment periods are the same), geometric series, and exponential growth, through investigation with technology (e.g., use a spreadsheet to determine and graph the future value of an ordinary simple annuity for varying numbers of compounding periods; investigate how the contributions of each payment to the future value of an ordinary simple annuity are related to the terms of a geometric series)

C3.6 determine, through investigation using technology (e.g., the TVM Solver on a graphing calculator, online tools), the effects of changing the conditions (i.e., the payments, the frequency of the payments, the interest rate, the compounding period) of ordinary simple annuities (e.g., long-term savings plans, loans)

Sample problem: Compare the amounts at age 65 that would result from making an annual deposit of $1000 starting at age 20, or from making an annual deposit of $3000 starting at age 50, to an RRSP that earns 6% interest per annum, compounded annually. What is the total of the deposits in each situation?

C3.7 solve problems, using technology (e.g., scientific calculator, spreadsheet, graphing calculator), that involve the amount, the present value, and the regular payment of an ordinary simple annuity (e.g., calculate the total interest paid over the life of a loan, using a spreadsheet, and compare the total interest with the original principal of the loan)

Technology Notes

The technology used in this chapter includes graphing calculators, specifically the TI-83 Plus/TI-84 Plus series and the TI-Nspire™ CAS graphing calculator, and spreadsheet software, specifically Microsoft Excel®.

Chapter 7 Planning Chart

Section Suggested Timing	Student Text Page(s)	Teacher's Resource Blackline Masters	Assessment	Tools
Chapter 7 Opener • 10–15 min	415			
Prerequisite Skills • 45–60 min	416–417	• G–1 Grid Paper • BLM 7–1 Prerequisite Skills		• grid paper • graphing calculator (optional)
7.1 Simple Interest • 75 min	418–425	• G–1 Grid Paper • BLM 7–2 Section 7.1 Practice		• graphing calculator • computer with graphing or spreadsheet software • grid paper
7.2 Compound Interest • 75 min	426–435	• BLM 7–3 Section 7.2 Practice		• graphing calculator • computer with graphing software • TI-Nspire™ CAS graphing calculator (optional)
7.3 Present Value • 75 min	436–443	• G–2 Placemat • T–1 Microsoft® *Excel* • BLM 7–4 Section 7.3 Practice		• scientific calculator • graphing calculator • computer with spreadsheet software
7.4 Annuities • 75–150 min	444–455	• T–1 Microsoft® *Excel* • BLM 7–5 Section 7.4 Practice		• scientific calculator • graphing calculator with TVM Solver application • TI-Nspire™ CAS graphing calculator • computer with spreadsheet software
7.5 Present Value of an Annuity • 75 min	456–463	• BLM 7–6 Section 7.5 Practice	• BLM 7–7 Section 7.5 Achievement Check Rubric	• scientific calculator • graphing calculator with TVM Solver application
Chapter 7 Review • 60–75 min	464–465	• BLM 7–8 Chapter 7 Review		• graphing calculator with TVM Solver application • computer with graphing or spreadsheet software (optional)
Chapter 7 Chapter Problem Wrap-Up • 15–30 min	465		• BLM 7–9 Chapter 7 Problem Wrap-Up Rubric	• graphing calculator with TVM Solver application
Chapter 7 Practice Test • 45–60 min	466–467		• BLM 7–10 Chapter 7 Practice Test	• graphing calculator with TVM Solver application • computer with graphing or spreadsheet software (optional)
Chapters 6 and 7 Review • 60–75 min	468–469	• G–1 Grid Paper		• grid paper • graphing calculator with TVM Solver application
Chapter 7 Task: Loans and Annuities Due • 75 min	470		• BLM 7–11 Task: Loans and Annuities Due Rubric	• graphing calculator with TVM Solver application
Course Review • 75–150 min	471–477	• G–1 Grid Paper • BLM 7–12 BLM Answers		• grid paper • graphing calculator with TVM Solver application

Chapter 7 Blackline Masters Checklist

	BLM	Title	Purpose
Prerequisite Skills			
	G–1	Grid Paper	Student Support
	BLM 7–1	Prerequisite Skills	Practice
7.1 Simple Interest			
	G–1	Grid Paper	Student Support
	BLM 7–2	Section 7.1 Practice	Practice
7.2 Compound Interest			
	BLM 7–3	Section 7.2 Practice	Practice
7.3 Present Value			
	G–2	Placemat	Student Support
	T–1	Microsoft® *Excel*	Student Support
	BLM 7–4	Section 7.3 Practice	Practice
7.4 Annuities			
	T–1	Microsoft® *Excel*	Student Support
	BLM 7–5	Section 7.4 Practice	Practice
7.5 Present Value of an Annuity			
	BLM 7–6	Section 7.5 Practice	Practice
	BLM 7–7	Section 7.5 Achievement Check Rubric	Assessment
Chapter 7 Review			
	BLM 7–8	Chapter 7 Review	Practice
Chapter 7 Chapter Problem Wrap-Up			
	BLM 7–9	Chapter 7 Chapter Problem Wrap-Up	Assessment
Chapter 7 Practice Test			
	BLM 7–10	Chapter 7 Practice Test	Summative Assessment
Chapters 6 and 7 Review			
	G–1	Grid Paper	Student Support
Chapter 7 Task: Loans and Annuities Due			
	BLM 7–11	Task: Loans and Annuities Due Rubric	Assessment
Course Review			
	G–1	Grid Paper	Student Support
	BLM 7–12	BLM Answers	Answers

Prerequisite Skills

Student Text Pages
416 to 417

Suggested Timing
45–60 min

Tools
- grid paper
- graphing calculator (optional)

Related Resources
- G–1 Grid Paper
- BLM 7–1 Prerequisite Skills

Assessment
You may wish to use **BLM 7–1 Prerequisite Skills** as a diagnostic assessment. Refer students to the Skills Appendix for examples and further practice of topics.

Common Errors

- Some students may confuse the concepts of sequences and series.

R_x Have students use a Frayer model or other literacy strategy to consolidate and distinguish the concepts.

- Some students may not perform steps in the correct order when solving an equation.

R_x Have students focus on performing the same operation to both sides of an equation, with the goal of isolating the variable. A computer algebra system (CAS) may be helpful here. Students can program the calculator to perform each step on both sides of an equation. If the equation then looks more complicated than before, they can go back and consider a different operation.

Differentiated Instruction

- Use an **anticipation guide** to hypothesize the definitions of *simple interest* and *compound interest*, and their connections to sequences and series.

Teaching Suggestions

- Consider having students work with a partner to review the concepts and work on the problems in this section.

Chapter Problem

The Chapter Problem is introduced on page 417. Some questions to prepare students could include:

- What is an inheritance?
- What is a financial advisor? How could one be useful?
- Why do people invest their money? What is the goal of an investment?

The Chapter Problem is revisited in Section 7.1 (question 10), Section 7.2 (question 12), Section 7.3 (question 15), and Section 7.5 (question 12). These questions are designed to help students move toward the Chapter Problem Wrap-Up on page 465. You may wish to assign the Chapter Problem questions in each section where they appear. Alternatively, you may wish to assign them all with the Chapter Problem Wrap-Up when students have completed the chapter, as part of a summative assessment.