8.3 Payments and Total Interest

Student Text Pages
397–404

Suggested Timing
75 min

Materials and Technology Tools
- computer with Internet access
- TVM solver

Related Resources
- BLM 8–6 Section 8.3 Payments and Total Interest

Teaching Suggestions

- If students were successful with the first two sections of this chapter, they should have little difficulty with the mathematics in this section.
- Discuss options for reducing the amount of interest paid. These include making larger payments, negotiating a lower interest rate, and making periodic lump-sum payments. Another option is to *not* borrow money.

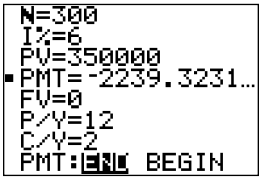
Investigate

- Students may work individually or in pairs.
- Ensure that instructions are read clearly and followed in detail.
- Discuss as a whole group to ensure big ideas have been grasped by students. Stress the connection to the concepts of the previous chapter.

Investigate Responses (page 397)

2. a) Rates may vary.

b) PV = 350000, i = ■, N = 25 × 12 = 300
A sample screen is shown for a 6% interest rate.



The monthly payment will be approximately $2239.32.

3. a), c)

Interest Rate (%)	Monthly Payment ($)	Total of Payments = 300 × Monthly Payment ($)	Interest Paid = Total of payments − 350 000 ($)
4	1841.07	552 321	202 321
5	2035.62	610 686	260 686
6	2239.32	671 796	321 796
7	2451.46	735 438	385 438

Examples

- Other than the obvious calculation of interest, there are two important concepts illustrated in **Examples 2 and 3**. Example 2 involves buying a car, which loses its value over time. Example 3 involves real estate, which (usually) increases in value over time.

Communicate Your Understanding

- For **question C1**, see Teaching Strategies above.
- A worked example may help illustrate the concepts in **question C2**.
- Note that there are no right or wrong answers for **question C3**. Both sides of the argument have valid points depending on one's financial situation.
- You may wish to use **BLM 8–6 Section 8.3 Payments and Total Interest** for remediation or extra practice.

Communicate Your Understanding Responses (page 401)

C1 Answers may vary depending on the student's previous knowledge. The following factors may be mentioned. Negotiating a lower rate of interest will reduce the interest paid. Increasing the size of individual payments and reducing the time over which the loan is paid is the most significant factor. Making more frequent payments even if the total per year does not change will reduce the total interest by a small amount. Finally, borrowing less money results in less interest being paid.

C2 **a)** In general, the shorter the term of the loan, the larger the individual payments will have to be. A term of 4 years will result in higher payments than a term of 5 years.

b) In general, the shorter the term of a loan, the smaller the total interest paid will be as long as the interest rate is the same for both terms. A term of 4 years will result in less total interest paid than a term of 5 years.

C3 Answers may vary. Financial institutions always charge a higher rate of interest on money which is lent than they pay for money which is deposited. By paying the full price for an item rather than borrowing you avoid adding the cost of interest to the price of the item. The other advantage is that there is a comparative freedom that results from not owing money.

There are several situations in which borrowing can make sense. To own a home is not possible for most people without borrowing. To buy a vehicle, it makes sense to borrow. If the cost of an item is likely to increase significantly in the near future it makes sense to buy early so the cost of interest is offset by the increase in value of the item.

Practise, Connect and Apply, Extend

- For some students not all parts of all questions need be assigned. Other students may benefit from completing all the questions.
- Students should be encouraged to refer to the worked Examples if any difficulties arise.
- It may be necessary to demonstrate **question 1**, part a) and then work through **questions 2 and 3**. Take up the questions before continuing to ensure student understanding.
- For some students, it may be necessary to work thorough part a) of **questions 4, 6, and 7. S**tress the use of technology, for example, a TVM Solver, throughout.
- For **Questions 8 to 14**, use a TVM Solver or an on-line calculator, if available.
- Some students may benefit from starting questions 11 to 13 by constructing a time line. Student should be encouraged to keep their notes and calculations separate question 11, the Chapter Problem.
- **Question 15** provides students the opportunity to use the Internet to research different types of mortgages and to determine the cost of having a mortgage.

Literacy Connections

- The meaning of *mortgage* as derived from the French term *mort* is given on student text page 397. Have students determine the meaning of other terms such as *amortization* by referring to a dictionary.

Common Errors

- Sometimes students may confuse which values to enter into the various TVM Solver variables.

R_x Have students estimate a reasonable answer before making calculations or reflect on the reasonableness of the calculator-produced answer.

Ongoing Assessment

- You may wish to collect students' responses to the Communicate Your Understanding questions to use as a formative assessment tool.

Accommodations

Motor– encourage students to use technology for graphing

Mathematical Processes Integration

The table shows questions that provide good opportunities for students to use the mathematical processes.

Process Expectations	Selected Questions
Problem Solving	8, 10, 11, 13, 14, 17
Reasoning and Proving	13, 15–17
Reflecting	10, 13, 17
Selecting Tools and Computational Strategies	2–11, 13, 14, 16, 17
Connecting	6–8, 10–13, 17
Representing	4, 14, 17
Communicating	1, 10, 13, 15–17