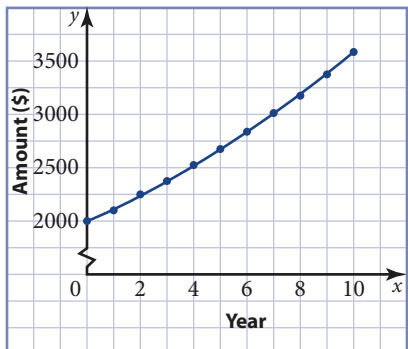


# 8

# Review

## 8.1 Simple and Compound Interest, pages 422–429

1. Show the growth of a \$2000 investment, at both 5% per year simple interest and 5% per year, compounded annually, for six years, using a table and a graph.
2. Use tables and graphs to compare the amounts after four years for a \$1500 investment at
  - a) 3% per year, compounded annually
  - b) 3.5% per year, compounded annually
  - c) 4% per year, compounded annually
3. The graph shows the growth of a \$2000 investment at 6% per year, compounded annually.



- a) How much is the investment worth after five years?
- b) Estimate the time it would take for the investment to double in value.
- c) How would the graph change if the interest rate were 4% per year, compounded annually? Justify your response.

## 8.2 Compound Interest, pages 430–435

4. Substitute the values into the formula  $A = P(1 + i)^n$ . Do not evaluate.
  - a) a \$600 investment at 7% per year, compounded semi-annually, for three years
  - b) a \$4000 loan at 9% per year, compounded quarterly, for five years
  - c) a \$6000 loan at 8.4% per year, compounded monthly, for three years
  - d) a \$1200 investment at 4.5% per year, compounded semi-annually, for two years
5. Bill made two investments.
  - A \$5000 at 5.5% per year, compounded quarterly, for four years
  - B \$2500 at 5.8% per year, compounded semi-annually, for four years
  - a) Which investment earned him more money?
  - b) What is the total interest earned on his investments?
6. Barbara borrowed \$2300 at 10% per year, compounded quarterly.
  - a) How much must she repay after five years?
  - b) How much of the amount she repays is interest?

## 8.3 Present Value, pages 436–441

7. Neaz wants to invest enough money today so that his son will have \$4800 toward his expenses when he goes to college in five years. If the annual interest rate is 5.7% per year, compounded monthly, how much should Neaz invest?

8. Suppose you owe a sum of \$10 000 due in six years. Your creditor is willing to accept early payment of the loan by discounting it at 9.6% per year, compounded monthly. How much should your creditor be willing to accept to pay off the loan today?
9. Jai wants to buy a car. Which is the better deal, with interest rates at 5% per year, compounded semi-annually?
- **Plan A:** \$16 250 cash now
  - **Plan B:** \$1000 down plus \$15 500 in one year
  - **Plan C:** \$500 down plus \$16 000 in one year

#### 8.4 The TVM Solver, pages 442–445

10. Copy and complete the table. Use a TVM Solver.

Present Value (\$)	Future Value (\$)	Term (years)	Compounding Period	Annual Interest Rate (%)
8 000	12 000	5	monthly	
6 000	13 000	10	semi-annually	
1 340	2 000		quarterly	6
100 000	1 000 000		semi-annually	8
4 000		3	monthly	3
	25 000	8	quarterly	5.5

11. A \$1000 investment earns interest at 4% per year, compounded quarterly.
- a) How long will it take to double the value of the investment?
  - b) Would other investments double in the same length of time? Explain.

#### 8.5 Effects of Changing the Conditions on Investments and Loans, pages 446–453

12. For a \$3000 investment, at 6% per year, compounded quarterly, use a graph to compare the final amounts after each time period.
- a) one year
  - b) two years
  - c) three years
13. You deposit \$2000 into an investment account for two years at 7% per year. How much will you earn if interest is compounded
- a) annually?
  - b) semi-annually?
  - c) quarterly?
  - d) monthly?
14. Marlon can purchase a company car for his real estate business for \$30 000. He expects to sell the car for \$12 000 after five years. Interest lost on the money used for the purchase is estimated at 6% per year, compounded quarterly. Alternatively, Marlon can lease the car for \$4000 per year.
- a) Calculate the cost of purchasing the car, keeping it for five years, and then selling it. Include the cost of lost interest on the money used for the purchase.
  - b) Calculate the cost of leasing the car for five years.
  - c) Which plan is a better deal for Marlon? How much more would he pay with the other plan?

# 8

## Practice Test

For questions 1 to 4, choose the best answer.

- Which statement is false when comparing simple and compound interest?
  - Simple interest is paid on the principal value but compound interest is paid on an accumulating value.
  - Compound interest is always greater than simple interest.
  - Simple interest is an example of linear growth and compound interest is an example of exponential growth.
  - Compound interest grows faster than simple interest after the first interest period, if the yearly interest rates are equal.
- When money is invested at 5% per year, compounded semi-annually, for five years,
  - $n = 5$  and  $i = 0.05$
  - $n = 5$  and  $i = 0.025$
  - $n = 10$  and  $i = 0.025$
  - $n = 10$  and  $i = 0.05$
- When changing the compounding period on an investment, which statement is true?
  - More frequent compounding results in a greater amount of interest.
  - More frequent compounding results in the same amount of interest.
  - More frequent compounding results in a lesser amount of interest.
  - More frequent compounding changes both the principal and amount, so there is no consistent result.
- Which formulas are not correct?
  - $P = A(1 + i)^n$
  - $A = P(1 + i)^n$
  - $P = A(1 + i)^{-n}$
  - $P = A(1 - i)^n$
- Show the growth of an \$1000 investment, at 7% per year, simple interest, and at 7% per year, compounded annually, for 10 years. Use a table and a graph.
- A credit card company charges interest at 18.5% per year, compounded monthly. Andrea has an unpaid balance of \$768.42. If she does not pay off her balance and makes no further purchases, how much will she owe after
  - one month?
  - three months?
- Brenda and Al have \$5000 to invest at 6% per year, compounded quarterly. How long would it take for their investment to grow to \$8000?
- Erik needs to borrow \$2000. Which loan should he take?
  - \$2000 for three years at 10% per year, compounded semi-annually
  - \$2000 for three years at 9.2% per year, compounded quarterlyJustify your response.
- If \$4000 is invested for 10 years, what annual interest rate, compounded semi-annually, would double the money?

## Chapter Problem Wrap-Up

In Section 8.1, you illustrated the growth of money the Kwans set aside to begin a business. In Section 8.3, you determined how much the Kwans needed to set aside to have money for business growth. In Section 8.5, you explained the effects of two compounding periods on their investments.

The Kwans are ready to sell their business for \$250 000. They will invest the proceeds from the sale, along with the amounts of their investments in Section 8.5. Research current interest rates and provide a plan for the Kwans to invest their money in six different ways. Each investment should mature in a different year, over the next 10 years. Write a report for the Kwans and



include the details of their investments, as well as showing the growth of their investments each year until they mature.

10. Jeeva is 10 years old. His parents have decided to invest some money for his education, so that he will have \$15 000 at age 18 when he goes to college. If the investment can earn 6.6% per year, compounded monthly, how much will his parents need to invest?
11. Use words, numbers, and graphs to illustrate the differences among investing \$1000 for five years, at 4.5% per year, compounded
  - a) annually
  - b) semi-annually
  - c) quarterly
  - d) monthly
12. A perpetuity is an investment that continues forever, paying out the interest but leaving the principal untouched. The interest rate depends on the economy at

the time. A school sets up a scholarship perpetuity with a donation of \$50 000. The recipient receives a scholarship worth the amount of the interest earned in that year. The interest rates for the last five years are shown in the table.

Annual Interest Rate (%)	Compounding Period	Scholarship Amount (\$)
8	semi-annually	
7.5	quarterly	
5.5	semi-annually	
7	semi-annually	
9	annually	

- a) Find the amount of each scholarship.
- b) What yearly interest rate, compounded annually, is necessary to guarantee a scholarship of at least \$5000?