

## Section 8.1 Future Value of an Ordinary Simple Annuity

1. Draw a time line representing the future value of each ordinary annuity.
  - i) \$1000 invested annually for 5 years at 6% per year, compounded annually
  - ii) \$400 invested semi-annually for 48 months into an account that pays 3.2% per year, compounded semi-annually
  - iii) \$750 invested monthly for 1 year at 4.8% per year, compounded monthly
  - iv) \$2500 invested quarterly for 3 years into a mutual fund that historically has paid 11.6% per year, compounded quarterly
2.
  - a) Express the future value of each annuity in question 1 as the sum of a series of compound interest investments.
  - b) Calculate the future value of each annuity by adding each series.
3.
  - a) Determine the values of the variables PMT,  $i$ , and  $n$  for each annuity in question 1.
  - b) Use the future value of an annuity formula to calculate the future value of each annuity in question 1.
4.
  - a) Choose a method to determine the future value of each ordinary annuity.
    - i) monthly payments of \$300 at 6.6% per year, compounded monthly for 2 years
    - ii) \$2500 deposited quarterly for 3 years at 5.6% per year, compounded quarterly
    - iii) annual payments of \$1200 at 2.5% per year, compounded annually for 8 years
  - b) Use a TVM Solver to check each of your answers in part a).
5. Micah is in grade 11 and has a part time job at a clothing store. He decides to deposit \$250 at the end of every month into an account that pays 3.5% interest per year, compounded monthly.
  - a) Calculate the amount that will be in Micah's account after 1 year.
  - b) If Micah decides to deposit \$500 at the end of every month, will the amount in his account after 1 year be double the answer to part a)? Without using a calculator, explain why or why not.
  - c) Calculate the amount that will be in Micah's account after 1 year if he deposits \$500 at the end of every month.
6. Cathryn sold some of her paintings at an art exhibition last year. Her father suggested that she invest her profits so she bought \$1500 in a mutual fund. After management fees were paid, the fund averaged 8.9% net growth per year, with interest compounded annually.
  - a) Assuming the rate of growth remains the same, determine the future value of Cathryn's \$1500 investment after 1 year.
  - b) If Cathryn continues to invest \$1500 annually, calculate the total value of her investments when she makes her 10th investment, assuming the same growth rate.
  - c) Cathryn's father had been investing \$750 annually in the same mutual fund for the previous 10 years. If he continues to invest \$750 annually, calculate his total investment after 10 more years, assuming a net growth rate of 8.9% per year for all 20 years.

Name: \_\_\_\_\_

Date: \_\_\_\_\_

**BLM 8-3**

(page 2)

7. Jacquelyne decided to start a RESP (Registered Education Savings Plan) for her niece. On her niece's 1st birthday and each following birthday, Jacquelyne invested \$350 into the RESP that paid 5.5% annual interest, compounded annually.
- a) Use a TVM Solver to determine the amount in the fund on the child's 9th and 18th birthdays.
  - b) By the time her niece turned 18, how much of her own money had Jacquelyne invested?
  - c) How much interest did her RESP earn after 18 years?
  - d) Jacquelyne's niece decided to take a year off before attending college. Use the compound interest formula to determine the value of her RESP on her 19th birthday, assuming Jacquelyne's final investment into the fund was on her 18th birthday.
  - e) How much interest did the RESP earn in the final year?
8. When Casey started a job last summer, he saved \$900 per month at the end of each of the 3 months he worked. During the school year, Casey did not work and allowed his savings to grow. If Casey's account pays 3.8% per year, compounded monthly, determine the amount in his account 12 months after he started his summer job.
9. Alejandro wants to buy a drum kit with an after-tax cost of \$1475. He can save \$60 per month and will deposit it into an account that earns 7.2% annual interest, compounded monthly. How long will it take before Alejandro can buy the drum kit?