

Using the financial application on a graphing calculator, the monthly payment amount is \$368.653... or \$368.66. The total cost is $\$368.653 \dots (18) = \$6635.762 \dots$ or \$6635.77.

Let x represent the number of days the lenses are rented for.

$$40x = 6635.762 \dots$$

$$x = 165.894 \dots$$

Number of days per month = $x/18$

Number of days per month = 9.216...

Carmen could rent the lenses for 9 days a month for the cost of buying.

16. e.g., Equipping an office with a computer network for 2 years.

Option 1: Buying the equipment for \$7500 financed at 5.5% interest, compounded monthly, paid back over 2 years, with depreciation of 40% per year on resale.

Option 2: Leasing the equipment at \$230 per month. Cost of buying is \$5237.28; cost of leasing is \$5520.

Buying is slightly cheaper, but leasing avoids the costs and uncertainties of resale.

History Connection, page 133

A. e.g., British Columbia; the Criminal Code of Canada states that any rate of interest above 60%/a is illegal.

B. e.g., In 2006, the B.C. Supreme Court issued a decision on a case against a moneylender stating that any charges, flat rate or otherwise, were to be interpreted as interest. Also in 2006, the federal government amended the criminal code to allow provinces to regulate the money-lending business.

Chapter Self-Test, page 134

1. a) $A = P(1+i)^n$

$$A = 5000 \left(1 + \frac{0.0725}{4} \right)^8$$

$$A = 5000(1+0.018 \dots)^8$$

$$A = 5000(1.018 \dots)^8$$

$$A = 5000(1.154 \dots)$$

$$A = 5772.697 \dots$$

$$I = A - P$$

$$I = 5772.697 \dots - 5000$$

$$I = 772.697 \dots$$

\$5772.70 will be due at the maturity date, with \$772.70 being interest.

b) $A = P(1+i)^n$

$$A = 5000(1+0.0725)^2$$

$$A = 5000(1.0725)^2$$

$$A = 5000(1.150 \dots)$$

$$A = 5751.281 \dots$$

$$I = A - P$$

$$I = 5751.281 \dots - 5000$$

$$I = 751.281 \dots$$

\$5751.28 will be due at the maturity date, with \$751.28 being interest.

c) The present value is \$5000.

The regular payment amount is unknown.

The payment frequency is 12 times a year.

The number of payments is 24.

The payments are made at the end of the payment periods.

The annual interest rate is 7.25%.

The compounding frequency is 4 times a year.

The future value is \$0.

Using the financial application on a graphing calculator, the regular monthly payments will be \$224.331..., or \$224.34.

The total amount paid is

$$\$224.331 \dots (24) = \$5383.957 \dots \text{ or } \$5383.96.$$

The interest paid is \$383.96.

Ryan will pay \$5383.96 altogether, and he will pay \$383.96 in interest.

2. a) $P = \frac{A}{(1+i)^n}$

$$P = \frac{15000}{\left(1 + \frac{0.055}{12} \right)^{48}}$$

$$P = \frac{15000}{1.245 \dots}$$

$$P = 12043.834 \dots$$

Allison can borrow at most \$12 043.83.

b) The present value is \$12 043.83.

The regular payment amount is unknown.

The payment frequency is 12 times a year.

The number of payments is $5 \cdot 12$ or 60.

The payments are made at the end of the payment periods.

The annual interest rate is 5.5%.

The compounding frequency is 12 times a year.

The future value is \$0.

Using the financial application on a graphing calculator, the regular payment amount is \$230.051. Allison will be able to repay the loan in 5 years if she pays \$230.05 a month. She will pay \$1759.24 in interest.

3. a) Credit card:

The present value is $1265(0.97)$, or \$1227.05.
The regular payment amount is unknown.
The payment frequency is 12 times a year.
The number of payments is 12.
The payments are made at the end of the payment periods.
The annual interest rate is 14.5%.
The compounding frequency is 365 times a year.
The future value is \$0.
Using the financial application on a graphing calculator, the regular payment amount is \$110.511... or \$110.52.

Line of credit:

The present value is \$1265.
The regular payment amount is unknown.
The payment frequency is 12 times a year.
The number of payments is 12.
The payments are made at the end of the payment periods.
The annual interest rate is 6.8%.
The compounding frequency is 365 times a year.
The future value is \$0.
Using the financial application on a graphing calculator, the regular payment amount is \$109.350... or \$109.36.

The payments will be \$110.52 for the credit card, and \$109.36 for the line of credit.

b) e.g., Christian should use the line of credit, because both options have the same number of payments, the line of credit is cheaper.

4. Number of months = 2
Number of weeks = 8.666...
Number of days = 60.833...

Rent daily:
Total cost = $60(60.833...)$
Total cost = \$3650

Rent weekly:
Total cost = $375(8.666...)$
Total cost = \$3250

Buy used:
Assume that Erin will keep the boat after the two months at her parents' cottage.

The present value is \$2200.
The regular payment amount is unknown.
The payment frequency is 12 times a year.
The number of payments is 6.
The payments are made at the end of the payment periods.
The annual interest rate is 5.2%.
The compounding frequency is 12 times a year.
The future value is \$0.
Using the financial application on a graphing calculator, the regular payment amount is \$372.247... or \$372.25.
Erin will pay $\$372.247... (6) = \$2233.486...$ or \$2233.49 for the sailboat.

Value after 6 months = $2200(1 - 0.25)^{0.5}$
Value after 6 months = \$1905.255...

Total cost = $2233.486... - 1905.255...$
Total cost = \$328.231...
If Erin sells her boat after she pays off the loan, her total cost is \$328.231... or \$328.23.

Erin should buy a used Laser sailboat, because the cost is lower, she can use it for many years, and she will be able to sell it to make some money back.

Chapter Review, page 136

1. a) The present value is \$1985.
The regular payment amount is \$403.75.
The payment frequency is 12 times a year.
The number of payments is 5.
The payments are made at the end of the payment periods.
The annual interest rate is unknown.
The compounding frequency is 365 times a year.
The future value is \$0.
Using the financial application on a graphing calculator, the interest rate being charged is 6.757... or 6.76%

b) $I = A - P$
 $I = 403.75(5) - 1985$
 $I = 2018.75 - 1985$
 $I = \$33.75$
Aaron will pay \$33.75 in interest.

2. a) The present value is \$1025.00.
The regular payment amount is \$50.
The payment frequency is 12 times a year.
The number of payments is unknown.
The payments are made at the end of the payment periods.
The annual interest rate is 18.9%.
The compounding frequency is 365 times a year.
The future value is \$512.50.
Using the financial application on a graphing calculator, the number of payments is 13.718... or 14.

Amber will have paid off half the cost of her gown after 14 months.
b) The present value is \$1025.
The regular payment amount is \$50.
The payment frequency is 12 times a year.
The number of payments is unknown.
The payments are made at the end of the payment periods.
The annual interest rate is 18.9%.
The compounding frequency is 365 times a year.
The future value is \$0.
Using the financial application on a graphing calculator, the number of payments is 24.994... or 25.

Amber will pay off the total amount after 25 months.

c) $I = A - P$
 $I = 50(24.994...) - 1025$
 $I = 1249.706... - 1025$
 $I = \$224.706...$
Amber will pay \$224.71 in interest.