Cost for renting:
**Answer assumes she needs tools every day of the week**
Average number of days from mid-April to mid-October:

$$(365)\left(\frac{6}{12}\right) = 182.5$$

Cost per year = (182.5)(55)
Cost per year = $10 037.50

Total cost = (4)(10 037.50)
Total cost = $40 150

I would recommend that Lindsay buy the used tractor because it is the cheapest option.

**B.** Credit card A:
The present value is $800.
The regular payment amount is $100.
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 19.5%.
The compounding frequency is 365 times a year.
*The future value is unknown.*
Using the financial application on a graphing calculator, the future value is $256.795... or $256.80. The total interest paid is $56.795... or $56.80.

Credit card B:
The present value is $1700.
The regular payment amount is $100.
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 16.5%.
The compounding frequency is 365 times a year.
*The future value is unknown.*
Using the financial application on a graphing calculator, the future value is $1225.013... or $1225.01. The total interest paid is $125.013... or 125.01.

Total interest = 56.795... + 125.013...
Total interest = 181.808...
Total interest = $181.81
Lindsay will have to pay $181.81 in interest over the 6 months.

**C.** The present value is
256.795... + 1225.013... = $1481.808....
*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 6.2%.
The compounding frequency is 12 times a year.
*The future value is unknown.*
Using the financial application on a graphing calculator, the regular payment amount is $251.453... or $251.45. The total interest paid is $26.911... or $26.91.

She will have to pay $26.91 in interest to consolidate her debts.

**D.** Tractor and trailer:
Value after 4 years = $2300(1 - 0.15)^4$
Value after 4 years = 1200.614...
Value after 4 years = $1200.61

Tools:
Value after 4 years = $800(1 - 0.30)^4$
Value after 4 years = $192.08

Total equity = 1200.614... + 192.08
Total equity = 1392.694...
Total equity = $1392.69
She will have $1392.69 of equity after 4 years.

**E.**

| Item | Cost for Four Seasons ($) | Equity after Four Seasons ($) |
|---|---|---|
| Tractor and trailer, including financing | 2439.74 | 1200.61 |
| Tools | 800 | 192.08 |
| Miscellaneous materials | 1700 | |
| Gas for truck ($200/month for 24 months) | 4800 | |
| Finance charges on credit cards | 181.81 | |
| Finance charges on line of credit | 26.91 | |
| Total | 9948.46 | 1392.69 |

Costs per season = $\frac{9948.46 - 1392.69}{4}$
Costs per season = $2138.95

**F.** If she wants to earn a profit of $7000 each season, she should charge each client $\frac{\$7000 + \$2138.74}{9}$ or $1015.44 per season.

## Cumulative Review, page 140

**1. a)** $A = P(1 + rt)$
$A = 20\,000(1 + (0.042)(5))$
$A = 20\,000(1 + 0.21)$
$A = 20\,000(1.21)$
$A = \$24\,200$
$I = Prt$
$I = (20\,000)(0.042)(5)$
$I = \$4200$
The future value will be $24 200, and the total interest earned will be $4200.
**b)** $A = P(1 + rt)$
$A = 5500(1 + (0.024)(3))$
$A = 5500(1 + 0.072)$
$A = 5500(1.072)$
$A = \$5896$
$I = Prt$
$I = (5500)(0.024)(3)$
$I = \$396$

The future value will be \$5896, and the total interest earned will be \$396.

**2.** $A = P + Prt$
$3000 = 2500 + 2500(0.055)t$
$500 = 137.5t$
$3.636\ldots = t$
It will take Cam about 4 years to achieve his goal.

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

$$A = 5000\left(1+\frac{0.036}{12}\right)^{48}$$
$$A = 5000(1+0.003)^{48}$$
$$A = 5000(1.003)^{48}$$
$$A = 5000(1.154\ldots)$$
$$A = 5773.175\ldots$$
$$A = \$5773.18$$

$I = A - P$
$I = 5773.175\ldots - 5000$
$I = \$773.175\ldots$
The future value will be \$5773.18, and the total interest earned will be \$773.18.

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

$$A = 24\,000\left(1+\frac{0.06}{4}\right)^{40}$$
$$A = 24\,000(1+0.015)^{40}$$
$$A = 24\,000(1.015)^{40}$$
$$A = 24\,000(1.814\ldots)$$
$$A = 43\,536.441\ldots$$
$$A = \$43\,536.44$$

$I = A - P$
$I = 43\,536.441\ldots - 24\,000$
$I = \$19\,536.441\ldots$
The future value will be \$43 536.44, and the total interest earned will be \$19 536.44.

**4.** e.g., Since the rate and term are the same, I would choose investment B because the interest is compounded more frequently.
Investment A:

$$A = P(1+i)^n$$
$$A = 5000(1+0.05)^{10}$$
$$A = 5000(1.05)^{10}$$
$$A = 5000(1.628\ldots)$$
$$A = 8144.473\ldots$$
$$A = \$8144.47$$

$I = A - P$
$I = 8144.473\ldots - 5000$
$I = \$3144.473\ldots$

Investment B:

$$A = P(1+i)^n$$
$$A = 5000\left(1+\frac{0.05}{2}\right)^{20}$$
$$A = 5000(1+0.025)^{20}$$
$$A = 5000(1.025)^{20}$$
$$A = 5000(1.638\ldots)$$
$$A = 8193.082\ldots$$
$$A = \$8193.08$$

$I = A - P$
$I = 8193.082\ldots - 5000$
$I = \$3193.082\ldots$

Investment B e.g. It has a more frequent compounding period that earns more interest.

**5.** e.g., I estimate the value of this investment will be about \$4000 after 16 years.
Calculation:
$A = P(1+i)^n$
$A = 1000(1+0.09)^{16}$
$A = 1000(1.09)^{16}$
$A = 1000(3.970\ldots)$
$A = 3970.305\ldots$
$A = 3970.31$
My estimate was \$29.69 higher than the actual value.

**6.** $P = \dfrac{A}{(1+i)^n}$

$$P = \frac{1500}{\left(1+\frac{0.06}{12}\right)^{24}}$$
$$P = \frac{1500}{(1+0.005)^{24}}$$
$$P = \frac{1500}{(1.005)^{24}}$$
$$P = \frac{1500}{1.127\ldots}$$
$$P = 1330.778\ldots$$

Connie needs to invest \$1330.78.

**7. a)** Hans' investment

$$P = \frac{A}{(1+i)^n}$$
$$P = \frac{5000}{\left(1+\frac{0.04}{4}\right)^{40}}$$
$$P = \frac{5000}{(1+0.01)^{40}}$$
$$P = \frac{5000}{(1.01)^{40}}$$
$$P = \frac{5000}{1.488\ldots}$$
$$P = 3358.265\ldots$$
$$P = \$3358.27$$

Emma's investment:

$$P = \frac{A}{(1+i)^n}$$
$$P = \frac{5000}{\left(1+\frac{0.036}{12}\right)^{120}}$$
$$P = \frac{5000}{(1+0.003)^{120}}$$
$$P = \frac{5000}{(1.003)^{120}}$$
$$P = \frac{5000}{1.432\ldots}$$
$$P = 3490.262\ldots$$
$$P = \$3490.26$$

Emma made the greater original investment.

**b)** $\text{Hans' rate of return} = \frac{5000 - 3358.27}{3358.27}$

$$\text{Hans' rate of return} = \frac{1641.73}{3358.27}$$
$$\text{Hans' rate of return} = 0.488...$$
$$\text{Hans' rate of return} = 48.89\%$$

$$\text{Emma's rate of return} = \frac{5000 - 3490.26}{3490.26}$$
$$\text{Emma's rate of return} = \frac{1509.74}{3490.26}$$
$$\text{Emma's rate of return} = 0.432...$$
$$\text{Emma's rate of return} = 43.26\%$$

Hans had the greater rate of return.

**8. a)** The present value is $0.
The regular payment amount is $500.
The payment frequency is 2 times a year.
The number of payments is 10.
The payments are made at the end of the payment periods.
The annual interest rate is 3.8%.
The compounding frequency is 2 times a year.
*The future value is unknown.*
Using the financial application on a graphing calculator, the future value is $5449.896...
At the end of 5 years, there will be $5449.90 in the account.

**b)**
$I = A - P$
$I = 5449.896\ldots - 500(10)$
$I = 5449.896\ldots - 5000$
$I = \$449.896\ldots$
The amount of interest in the account will be $449.90.

**9.** The present value is $0.
*The regular payment amount is unknown.*
The payment frequency is 12 times a year.
The number of payments is $20 \cdot 12$ or 240.
The payments are made at the end of the payment periods.
The annual interest rate is 5%.
The compounding frequency is 12 times a year.
The future value is $100 000.
Using the financial application on a graphing calculator, the regular payment amount is $243.289... Darka will need to pay $243.29 every month to reach her goal.

**10.** Option A:

GIC: $A = P(1+i)^n$

$$A = 15\,000(1+0.035)^{10}$$
$$A = 15\,000(1.035)^{10}$$
$$A = 15\,000(1.410\ldots)$$
$$A = 21158.981\ldots$$
$$A = \$21\,158.98$$

CSB: $A = P(1+i)^n$

$$A = 5000\left(1+\frac{0.04}{12}\right)^{120}$$
$$A = 5000(1+0.003\ldots)^{120}$$
$$A = 5000(1.003\ldots)^{120}$$
$$A = 5000(1.490\ldots)$$
$$A = 7454.163\ldots$$
$$A = \$7454.16$$

Total = 21 158.981... + 7454.163...
Total = $28 613.144...
Total = $28 613.15

Option B: $A = P(1+i)^n$

$$A = 20000\left(1+\frac{0.038}{365}\right)^{3650}$$

$$A = 20000(1+0.000...)^{3650}$$

$$A = 20000(1.000...)^{3650}$$

$$A = 20000(1.462...)$$

$$A = 29245.113...$$

$$A = \$29245.11$$

Option B. e.g., Option A is worth $28 613.15 and option B is worth $29 245.11.

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

$$A = 1500\left(1+\frac{0.072}{12}\right)^{4}$$

$$A = 1500(1+0.006)^4$$

$$A = 1500(1.006)^4$$

$$A = 1500(1.024...)$$

$$A = 1536.325...$$

$$A = \$1536.33$$

Stan needed to pay back $1536.33.

**b)** $I = A - P$

$I$ = 1536.325... – 1500

$I$ = $36.325...

Stan paid $36.33 in interest.

**12. a)** The present value is $25 000.
*The regular payment amount is unknown.*
The payment frequency is 12 times a year.
The number of payments is 60.
The payments are made at the end of the payment periods.
The annual interest rate is 4.2%.
The compounding frequency is 12 times a year.
The future value is $0.

Using the financial application on a graphing calculator, Marlene's monthly payment will be $462.672... or $462.68.

**b)**

$I = A - P$

$I$ = 462.672...(60) – 25 000

$I$ = 27 760.372... – 25 000

$I$ = $2760.372...

Marlene will pay $2760.38 in interest over the term of the loan.

**13. a)** The present value is $5200.
The regular payment amount is $250.
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 19.5%.
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 required is 25.639... or 26. The amount of interest paid is $1209.869... or $1209.87.

It will take Monty 26 months to reduce his credit card balance to zero.

**b)** The present value is $5200.
The regular payment amount is $500.
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 19.5%.
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 required is 11.494... or 12. The amount of interest paid is $547.163... or $547.17.
Monty will pay off his debt in 12 months, which is 14 months sooner than if he only paid $250 a month.

**c)** Savings = 1209.869... – 547.163...
Savings = $662.706...
Monty will save $662.71 in interest if his monthly payment is $500.

**14. a)** Misty's parents:
Total cost = 800(12)(5)
Total cost = $48 000

Danielle's parents:
Down payment = $50 000

Mortgage cost:
The present value is 205 000 – 50 000, or $155 000.
*The regular payment amount is unknown.*
The payment frequency is 12 times a year.
The number of payments is 60.
The payments are made at the end of the payment periods.
The annual interest rate is 4%.
The compounding frequency is 2 times a year.
The future value is $0.
Using the financial application on a graphing calculator, the regular payment amount is $2852.258... or $2852.26.
The total cost of use is $171 135.480....

Rent income = 750(3)(12)(5)
Rent income = $135 000

Total cost = 50 000 + 171 135.480... – 135 000
Total cost = $86 135.48

The housing costs of Misty's parents are $48 000, and the housing costs of Danielle's parents are $86 135.48.

**b)** e.g., Danielle's parents, because if they resell the house they should make a profit.