

1

Getting Started

1. Calculate.

a) $500 \times 0.03 = \underline{15}$

c) $(1250)(0.25)(3) = \underline{937.5}$

b) $1.25 \times 137.6 = \underline{172}$

d) $18.5 \times \frac{73}{365} = \underline{3.7}$

2. Write each percent as a decimal.

a) $8\% = \underline{0.08}$

c) $73.4\% = \underline{0.734}$

b) $12.5\% = \underline{0.125}$

d) $0.79\% = \underline{0.0079}$

Hint

Write each percent as a decimal before calculating.

3. Calculate each percent.

a) 1% of 1500 = 15

c) 25% of 80 = 20

b) 10% of 45 = 4.5

d) 0.1% of 6000 = 6

Tech Tip

Percent of a Number

Calculate 1.5% of 315. If your calculator has a $\%$ key, enter

315 \times 1.5 $\%$ or 315 \times 1.5 2nd $\%$

If your calculator does not have a $\%$ key, enter

315 \times 0.015 or 315 \times 1.5 \div 100

4. Calculate each percent to one decimal place.

a) 7% of 2000 = 140

c) 0.5% of 528 = 2.6

b) 13.5% of 240 = 32.4

d) 8.25% of 290 = 23.9

5. Solve for x .

a) $2x = 12$

$x = \underline{6}$

c) $x - 7 = 32$

$x = \underline{39}$

b) $7x = 21$

$x = \underline{3}$

d) $\frac{x}{5} = 45$

$x = \underline{225}$

6. Solve for each variable.

a) $4d + 15 = 295$

$$4d = 280$$

$$d = 70$$

c) $\frac{p}{3} - 15 = 120$

$$\frac{p}{3} = 135$$

$$p = 405$$

b) $11s + 8 = 96$

$$11s = 88$$

$$s = 8$$

d) $6.5t + 73 = 83.4$

$$6.5t = 10.4$$

$$t = 1.6$$

7. Substitute and solve.

a) $P = 2l + 2w$

$$l = 4, w = 1.5$$

$$P = 2(\underline{4}) + \underline{2(1.5)}$$

$$P = \underline{11}$$

b) $A = lw$

$$l = 3, A = 12$$

$$\underline{12} = \underline{3} w$$

$$\underline{4} = w$$

8. Write each length of time as a fraction of the unit given.

a) $3 \text{ wk} = \frac{\boxed{3}}{\boxed{52}} \text{ yr}$

c) $23 \text{ d} = \frac{\boxed{23}}{\boxed{30}} \text{ mo}$

b) $7 \text{ wk} = \frac{\boxed{7}}{\boxed{52}} \text{ yr}$

d) $5 \text{ mo} = \frac{\boxed{5}}{\boxed{12}} \text{ yr}$

Hint

Use

1 yr (year)
= 365 d (days)
= 52 wk (weeks)
= 12 mo (months)

1 mo = 30 d

9. Rahm decided to put some money in the bank for 1.36 yr.

a) How long is this in days? Round up.

$$1.36 \text{ yr} \times \underline{365} \text{ d/yr is about } \underline{497} \text{ d}$$

b) How long is this in weeks? Round up.

$$1.36 \text{ yr} \times \underline{52} \text{ wk/yr is about } \underline{71} \text{ wk}$$

10. Hank worked in Nunavut as a journeyman welder on a temporary contract. His contract was for 7 mo.

a) What is the length of Hank's contract in days? $\underline{210}$ d

b) What is the length of Hank's contract in years? $\frac{\underline{7}}{\underline{12}}$ yr



Hint

When working with money, round to the nearest cent after you have made the final calculation.

B. What is the amount Sue will have in 120 d?

$$A = \$ 5000 + \$ 8.219\dots$$

$$= \$ 5008.219\dots$$

Sue will have \$5008.22 for her trip.

Practice

1. a) Match each variable with a value.

Variable	Value
principal	280 d
interest	1.95%
rate	\$2000.00
time	\$29.92

b) Use the values in Part a) to calculate the interest earned. Is the interest that was given correct?

$$I = \frac{Prt}{365}$$

$$= \$ 2000.00 \times 0.0195 / \text{yr} \times \frac{280}{365} \text{ yr}$$

$$= \$ 29.917\dots, \text{ or } \$ 29.92$$

The interest is correct.

c) What is the amount at the end of the investment?

$$A = P + I$$

$$= \$ 2000.00 + \$ 29.92$$

$$= \$ 2029.92$$

2. Saskia is a golf pro in Banff. She invested \$1400 for 36 wk in a GIC. She will use the money for new golf clubs. The interest rate is 1.75%/yr.

How much will Saskia have to spend?

$$\text{e.g., } I = (\$1400)(0.0175/\text{yr})\left(\frac{36}{52} \text{ yr}\right)$$

$$= \$16.961\dots$$

$$A = \$1400 + \$16.961\dots$$

$$= \$1416.961\dots$$

Saskia will have \$1416.96 to spend on new clubs.



3. Derain is a tour guide in the Rocky Mountains. He works about 8 mo a year. Derain invests some of his salary while he works so he has money when he is not working.

a) Complete the chart.

Interest	Principal	Interest rate (per year)	Time
$I = (\$850)(0.015/\text{yr})\left(\frac{6}{12} \text{ yr}\right)$ $= \$6.38$	\$850	1.5%	6 mo
$I = (\$1200)(0.0175/\text{yr})(1 \text{ yr})$ $= \$21$	\$1200	1.75%	1 yr
$I = (\$1500)(0.0165/\text{yr})\left(\frac{215}{365} \text{ yr}\right)$ $\doteq \$14.58$	\$1500	1.65%	215 d
$I = (\$500)(0.01/\text{yr})\left(\frac{21}{52} \text{ yr}\right)$ $= \$2.02$	\$500	1.0%	21 wk

b) What is the total interest earned on all Derain's investments?

$$\$6.38 + \$21 + \$14.58 + \$2.02 = \$43.98 \quad \text{The total interest is } \$43.98.$$

4. Tamara is a broker's assistant. She invested \$750 for 6 mo at an annual interest rate of 1.5%. She calculated the interest earned as \$56.25. However, the paperwork showed she earned \$5.63.

Tamara's Calculation:

$$I = (\$750)(0.15/\text{yr})\left(\frac{6}{12} \text{ yr}\right)$$

$$= \$56.25$$

What mistake did Tamara make? Show the correct solution.

e.g., Tamara made a mistake changing the interest rate to a decimal.

$$1.5\% = 0.015, \text{ not } 0.15$$

$$I = (\$750)(0.015/\text{yr})\left(\frac{6}{12} \text{ yr}\right)$$

$$= \$5.625, \text{ or } \$5.63$$

Tamara earned \$5.63 in interest.

REFLECTING

What are some other situations where the formula for simple interest might be used?

Practice

1. Complete the chart. Round interest rates to the nearest hundredth of a percent, time to the nearest day, and money to the nearest cent.

Principal (P)	Interest rate per year (r)	Time (t)	Simple interest (I)
\$2548.55	8.25%	240 d	\$138.25
\$735.00	5.1%	27 d	\$2.99
\$2600.00	3.85%	2 mo	\$16.67
\$182.65	6.75%	270 d	\$9.12

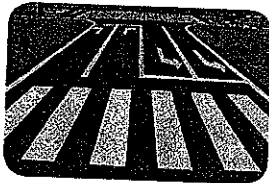
2. Dan is an RV service technician in Saskatchewan. He invested \$3200 in a savings account 2 yr ago. The interest rate was 0.8%/yr. He wants to spend the money fixing up an RV to sell. How much does Dan have to spend on the repairs?

$$\text{e.g., } I = Prt$$

$$= \$3200 \times 0.008 \times 2$$

$$= \$51.20$$

$$A = \$3200 + \$51.20 \quad \text{Dan has } \$3251.20 \text{ to spend.}$$



3. a) Graham needs to purchase a line-stripping machine for his painting business. He has saved \$4200. He invested his savings in a 9 mo term GIC for his new machine. At the end of the term, his GIC paid \$51.26.

What was the annual interest rate on Graham's GIC?
Round to the nearest hundredth of a percent.

$$\text{e.g., } I = Prt$$

$$\$51.26 = \$4200 \times r \times \frac{9}{12}$$

$$\$51.26 = \$3150 \times r$$

$$0.0162 = r$$

$$\text{So } 0.0162... \times 100\% = r$$

$$1.627... \% = r$$

The interest rate on Graham's GIC was 1.63%/yr.

- b) What are two ways to write the simple interest formula for Part a)?

$$\text{e.g., } I = Prt \text{ and } \frac{I}{Pt} = r$$

REFLECTING

How do you know the formulas in Part b) are equivalent?

4. Kazuhiro invested \$2000 of the money he earned working on a farm near Edmonton. He earned \$14.96 in interest. The interest rate was 1.4%/yr. For how long did Kazuhiro invest the principal? Round up for the number of days.

$$\text{e.g., } I = Prt$$

$$\$14.96 = \$2000 \times 0.014 \times t$$

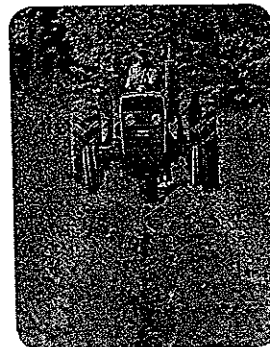
$$\$14.96 = \$28 \times t$$

$$\frac{\$14.96}{\$28} = t$$

$$0.534... \text{ yr} = t$$

$$t = 0.534... \text{ yr} \times 365 \text{ d/yr, or } 195.014... \text{ d}$$

Kazuhiro invested his principal for 196 d.



5. Joti earned \$48.74 in interest on money in a savings account. She invested her principal at an annual rate of 2.3% for 17 wk. How much money did Joti invest?

$$\text{e.g., } I = Prt$$

$$\$48.74 = P \times 0.023 \times \frac{17}{52}$$

$$\$48.74 = P \times 0.007...$$

$$\$6482.046... = P \quad \text{Joti invested } \$6482.05.$$

Hint

To express time in weeks as a fraction of a year, divide by 52.

6. a) Sally is a student-support worker. She is creating problems to help a student study for a math test. She needs a question, solving for P , using these values: $I = \$29.50$, $r = 3.1\%/yr$. She can use any value for t .

Rearrange the formula $I = Prt$ so P is isolated.

$$\frac{I}{rt} = \frac{Prt}{rt}$$

$$\frac{I}{rt} = P$$

Hint

Isolating P means you get P by itself on one side of the equation.

- b) Use the values in Part a). Create and solve a word problem.

e.g., James invested some money for 2 yr at an interest rate of 3.1%/yr. He earned \$29.50 in interest. How much did James invest?

$$P = \frac{\$29.50}{0.031 \times 2}$$

$$= \$475.806...$$

James invested \$475.81.

Practice

1. Rebecca invested \$6000 in a savings account that paid 3.2%/yr, compounded annually.

Complete this chart to determine the amount after Rebecca's account after 3 yr.

Year	Principal	Simple interest $I = Prt$	Amount at end of year $A = P + I$
1	\$6000	$I = (\$6000)(0.032)(1)$ $= \$192$	$A = \$6000 + \192 $= \$6192$
2	\$6192	$I = (\$6192)(0.032)(1)$ $= \$198.14$	$A = \$6192 + \198.14 $= \$6390.14$
3	\$6390.14	$I = (\$6390.14)(0.032)(1)$ $= \$204.48$	$A = \$6390.14 + \204.48 $= \$6594.62$

2. Islay is a jeweller in Fort McMurray.

- Islay uses Canadian diamonds mined in Lac de Gras.
- She makes an annual trip to Yellowknife to buy stock at wholesale prices.
- To save money for her next trip, she bought a \$12 000 GIC for 1 yr. It paid 2.1%/yr.

How much money will Islay have after 1 yr?

$$\text{e.g., } A = \$12\,000(1 + 0.021)^1$$

$$= \$12\,252$$

Islay will have \$12 252 after 1 yr.

3. Darby is a cabinetmaker in Watson Lake. She used \$1500 profit from the sale of a cabinet to buy a GIC. It is a 3 yr GIC with an interest rate of 2.2%/yr, compounded annually.

- a) How much money will Darby have at the end of the 3 yr?

$$\text{e.g., } A = \$1500.00(1 + 0.022)^3$$

$$= \$1601.193\dots$$

Darby will have \$1601.19 after 3 yr.

- b) How much interest will Darby earn?

$$\$1601.19 - \$1500.00 = \$101.19$$

Darby will earn \$101.19 in interest.

4. Gordon manages a recreation facility. He wants to upgrade the gym equipment. He needs \$32 000. He is reviewing the facility's investments that are up for renewal.

Complete the chart. Is there enough money for the upgrades?

Savings account	Principal (P)	Interest rate per compounding period (i)	Number of compounding periods (n)	Amount (A)
1	\$4200	2.7%	3	$\$4200(1 + 0.027)^3 = \4549.47
2	\$9500	4.3%	6	$\$9500(1 + 0.043)^6 = \12230.08
3	\$6800	1.9%	2	$\$6800(1 + 0.019)^2 = \7060.85
4	\$7400	3.9%	5	$\$7400(1 + 0.039)^5 = \8960.03

Total savings: $\$4549.47 + \$12230.08 + \$7060.85 + \$8960.03 = \$32800.43$

Is there enough money for the upgrades to the gym equipment? yes

5. Henny is a plumber in Kamloops. She installed 17 toilets in a new townhouse complex.

- She charged \$50 per toilet installed.
- She invested the money for 2 yr into a savings account.
- The account paid 1.3%/yr, compounded annually.

How much will Henny have after 2 yr?

e.g., Principal (amount earned): $17 \times \$50 = \850

$$A = \$850.00(1 + 0.013)^2$$

$$= \$872.243\dots$$

Henny will have \$872.24 after 2 yr.

Hint

The interest is compounded annually, which means once each year. So, the interest earned is added to the principal.

6. Suppose you have these choices for saving money. Both accounts have the same interest rate. Which would you choose? Explain.

- One account uses simple interest.
- The other account uses compound interest.

e.g., I would choose the compound interest account. I would earn more interest, because both the principal and interest earn interest. In a simple interest account, only the principal earns interest.

7. Describe a situation where someone might need to use the compound interest formula in their job.

e.g., A financial advisor might use the compound interest formula to help a client determine the value of an investment.

Mid-Chapter Review

1. Describe each term in your own words.

a) interest e.g., amount of money earned on an investment

b) annual interest rate e.g., percent earned on an investment each year

c) principal e.g., the money invested, the starting amount

2. Renée runs a hair salon in Flin Flon. She was saving for new salon chairs. She earned \$75.25 in simple interest on a 3 yr investment. The interest rate was 2.4%/yr.

a) How much did Renée invest?

$$\text{e.g., } \$75.25 = P(0.024)(3)$$

$$\$1045.138... = P$$

Renée invested \$1045.14.

b) How much does Renée have to spend on new chairs?

$$\text{e.g., } A = \$1045.14 + \$75.25, \text{ or } \$1120.39$$

Renée has \$1120.39 to spend on new chairs.

3. Darryl is a rock climber. He needs to buy some new gear for an upcoming climbing trip. He cashed in a 2 yr \$1500 investment. It paid 2.75%/yr, compounded annually. How much money does he have to buy the gear?

$$\text{e.g., } A = \$1500(1 + 0.0275)^2$$

$$= \$1583.634... \quad \text{Darryl has } \$1583.63 \text{ to buy the gear.}$$

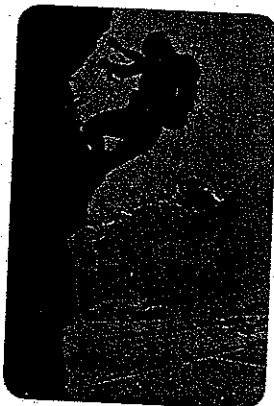
4. Giacomo earned \$12.17 in simple interest on his investment of \$1000. The interest rate was 1.5%/yr. How long did he invest the money? Round up the number of days.

$$\text{e.g., } \$12.17 = (\$1000)(0.015)(t)$$

$$\frac{\$12.17}{(\$1000)(0.015)} = t$$

$$\text{So } t = 0.811... \text{ yr} \times 365 \text{ d/yr} = 296.136... \text{ d, or } 297 \text{ d}$$

He invested the money for 297 d.



Practice

1. An investment earns interest at 9%/yr. Calculate i and n .

a) semi-annually for 6 yr b) weekly for 2 yr

$$i = \frac{0.09}{2} \quad n = \underline{6} \times 2 \quad i = \frac{0.09}{52} \quad n = 2 \times 52$$

$$i = \underline{0.045} \quad n = \underline{12} \quad i = 0.00173\dots \quad n = 104$$

2. Brynn is an assistant to an investment banker. Brynn is preparing a presentation on investments made at 3.2%/yr.

a) Complete the chart.

Frequency of compounding	Principal (P)	Interest rate per compounding period (i)	Number of compounding periods (n)	Compound interest formula	Amount (A)
annually (1 time/yr)	\$100 000	$\frac{0.032}{1}$	1	$A = P(1 + i)^n$ $= \$100\,000 (1 + 0.032)^1$	\$103 200.00
semi-annually (2 times/yr)	\$100 000	$\frac{0.032}{2}$	2	$A = P(1 + i)^n$ $= \$100\,000 \left(1 + \frac{0.032}{2}\right)^2$	\$103 225.60
monthly (12 times/yr)	\$100 000	$\frac{0.032}{12}$	12	$A = P(1 + i)^n$ $= \$100\,000 \left(1 + \frac{0.032}{12}\right)^{12}$	\$103 247.35
daily (365 times/yr)	\$100 000	$\frac{0.032}{365}$	365	$A = P(1 + i)^n$ $= \$100\,000 \left(1 + \frac{0.032}{365}\right)^{365}$	\$103 251.61

b) What frequency of compounding pays the most interest? How can you tell?

daily compounding, e.g., because the total amount is higher but the principal is the same

3. Haley invests \$10 000 for 2 yr. The interest rate is 2.3%/yr, compounded daily. How much money will Haley have?

$$A = P \left(1 + \frac{0.023}{365}\right)^{2 \times 365}$$

$$\text{e.g., } A = \$10\,000 \left(1 + \frac{0.023}{365}\right)^{730}$$

$$= \$10\,470.728\dots \quad \text{Haley will have } \$10\,470.73.$$

4. Kwame invests \$1600 at 3.2%/yr, compounded quarterly.
How much money will Kwame have after 18 mo?

$$18 \text{ mo} = \frac{18}{12}, \text{ or } 1.5 \text{ yr.}$$

$$\text{e.g., } A = \$1600 \left(1 + \frac{0.032}{4} \right)^{15 \times 4}$$

$$= \$1678.352\dots$$

Kwame will have \$1678.35.

5. Gwyneth's family sold their restaurant in Saskatoon. They plan to move to Victoria and open a bookstore in a year. During this year, they have \$150 000 to invest.

- Gwyneth suggests a no-fee, high-interest savings account. The interest rate is 2.8%/yr, compounded semi-annually.
- Martin suggests a high-interest savings account with an interest rate of 2.8%/yr, compounded daily. The account has a \$40 annual service fee.

- a) Suppose they invest as Gwyneth suggests. What would be the value of the investment after 1 yr?

$$\text{e.g., } A = P(1 + i)^n$$

$$= \$150\,000 \left(1 + \frac{0.028}{2} \right)^2$$

$$= \$154\,229.40$$

The value of the investment would be \$154 229.40.

- b) Suppose they invest as Martin suggests. What would be the value of the investment after 1 yr?

$$\text{e.g., } A = P(1 + i)^n$$

$$= \$150\,000 \left(1 + \frac{0.028}{365} \right)^{365}$$

$$= \$154\,259.187\dots$$

$$\$154\,259.187\dots - \$40.00 = \$154\,219.187\dots$$

The value of the investment would be \$154 219.19.

- c) What savings account should they use? Why?

They should invest as Gwyneth suggests. e.g., The investment would be worth \$10.21 more.

REFLECTING

When might someone who owns a bookstore use the compound interest formula?

Hint

Subtract service fees from the investment.

Practice



REFLECTING

Would it be better for Pearl if her investment was compounded monthly? Explain.

Hint

Use the Rule of 72. Round up to the nearest whole number of years because the investment is compounded annually.

- Pearl, a refrigeration mechanic, wants to open her own shop in 3 yr.
 - She needs a \$20 000 down payment to start the business.
 - She plans to invest at a rate of 2.9%/yr, compounded annually.

How much does Pearl need to invest now to have \$20 000 in 3 yr?

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

$$\$20\,000 = P(1 + 0.029)^3$$

$$\$20\,000 = P \times 1.089\dots$$

$$\$18\,356.246\dots = P$$

Pearl needs to invest \$18 356.25 now.

- Lorraine invested \$2300 at a rate of 2.9%/yr, compounded annually.
 - Estimate how long it will take for her to double her money.

$$\text{e.g., } \frac{72}{2.9} = 24.827\dots \text{ yr}$$

It will take her 25 yr.

- Lorraine used the estimation from Part a) to determine how much she would have at the end of that time period. These are Lorraine's calculations.

$$A = \$2300(1 + 0.29)^{25}$$

$$= \$2300(1.29)^{25}$$

$$= \$1\,338\,044.612, \text{ or } \$1\,338\,044.61$$

She knows the total amount should be about double her original investment. Where is Lorraine's error?

$$2.9\% = 0.029, \text{ not } 0.29$$

- Determine the correct amount of money Lorraine will have at the end of her investment.

$$\text{e.g., } A = \$2300(1 + 0.029)^{25}$$

$$= \$2300(1.029)^{25}$$

$$= \$4700.155\dots$$

Lorraine will have \$4700.16.

3. Khameron has created a "Double Your Money with Us" campaign for a bank.

What is the annual interest rate clients will need so they can double their money in about 8 yr?

$$\underline{8} \text{ yr to double} = \frac{72}{\text{annual interest rate (\%)}} = \boxed{9}$$

The interest rate clients will need is 9%.

4. Mishak plans on retiring from his job as a gas fitter in 25 yr. This year, he invests \$10000 in his retirement plan at 3.2%/yr. Will Mishak double this investment before he retires?

e.g., $\frac{72}{3.2} = 22.5 \text{ yr}$

Yes. He will be able to double this investment in 22.5 yr.



5. Theresa is investing \$7100 in a 3 yr savings plan. It pays 3.15%/yr, compounded semi-annually. How much money will Theresa have after 3 yr?

e.g., $A = \$7100.00 \left(1 + \frac{0.0315}{2}\right)^6$
 $= \$7797.930\dots$

Theresa will have \$7797.93 after 3 yr.

6. Create and solve a word problem using these values:

Amount = \$5500

Interest rate = 2.7%/yr, compounded semi-annually

Time = 4 yr

e.g., Herman invested some savings at 2.7%/yr, compounded semi-annually. At the end of 4 yr, he needed to have \$5500.

How much did he need to invest?

$$\$5500 = P \left(1 + \frac{0.027}{2}\right)^{4 \times 2}$$

$$\$5500 = P(1.113\dots)$$

$$\frac{\$5500}{1.113\dots} = \frac{P(1.113\dots)}{1.113\dots}$$

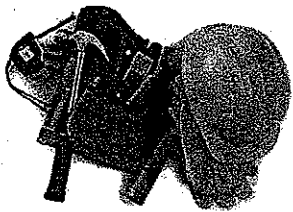
$$\$4940.52\dots = P$$

Herman needed to invest \$4940.52.

REFLECTING

When might someone use the Rule of 72 in their job?

Chapter Review



1. Allie is a carpenter. She is saving for new tools. She invested \$1200, at 1.9%/yr simple interest, for 2 yr. How much will she have at the end of 2 yr to spend on tools?

$$\begin{aligned} \text{e.g., } I &= \$1200 \times 0.019/\text{yr} \times 2 \text{ yr} \\ &= \$45.60 \end{aligned}$$

$$\begin{aligned} A &= \$1200 + \$45.60 \\ &= \$1245.60 \end{aligned}$$

Allie will have \$1245.60 to spend on tools.

2. Carlos earned \$19.83 in simple interest on his investment of \$1280. The interest rate was 1.2%/yr. He wanted to calculate the number of days he invested for. Here are his calculations.

$$\$19.83 = \$1280(0.012)(t)$$

$$\$19.83 = \$15.36(t)$$

$$\frac{\$19.83}{\$15.36} = t \quad \text{So } t = 1.291... \text{ d}$$

- a) Where did Carlos make an error?

Carlos left the investment time of 1.291 in years. He should have converted the time to days.

- b) For how many days did Carlos invest?

$$\text{e.g., } t = 1.291... \text{ yr} \times 365 \text{ d/yr, or } 472 \text{ d}$$

Carlos invested for 472 d.

3. Karim earned \$93.26 in simple interest in 1 yr on a \$2900 investment. What was the interest rate on Karim's investment? Round to one decimal place.

$$\text{e.g., } I = Prt$$

$$\$93.26 = \$2900 \times r \times 1$$

$$\frac{\$93.26}{\$2900} = r$$

$$0.0321... = r \quad \text{So } r = 0.0321... \times 100\%, \text{ or about } 3.2\%$$

The interest rate on Karim's investment was 3.2%/yr.

4. Ming is a realtor. She earned \$6200 in commission from the sale of a property. Ming invested the commission in a 5 yr GIC that paid 2.7%/yr, compounded annually. How much will Ming have after 5 yr?

$$\begin{aligned} \text{e.g., } A &= \$6200.00(1 + 0.027)^5 \\ &= \$7083.434\dots \end{aligned}$$

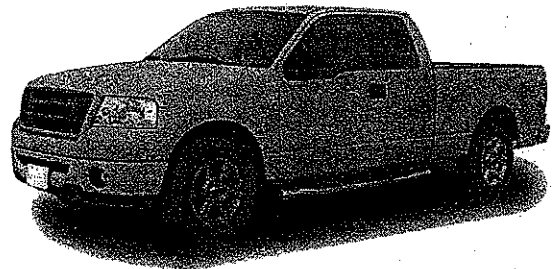
Ming will have \$7083.43.

5. Complete the chart.

Compounding	Principal (P)	Interest rate	Number of years	Number of compounding periods (n)	Compound interest formula	Amount (A)
semi-annually	\$4000	3.1%/yr	3	6	$A = P(1 + i)^n$ $= \$4000 \left(1 + \frac{0.031}{2}\right)^6$	\$4386.72
monthly	\$9800	1.9%/yr	2	24	$A = P(1 + i)^n$ $= \$9800 \left(1 + \frac{0.019}{12}\right)^{24}$	\$10179.26

6. Susie is a landscaper. She leases a truck for her business. She plans to buy out the lease in 6 yr. She has half the money now.

At what interest rate, compounded annually, does Susie need to invest now in order to double her money in 6 yr?



$$\text{e.g., } 6 \text{ yr} = \frac{72}{\text{annual interest rate (\%)}} \text{, or } \frac{72}{12}$$

Susie will need to find an interest rate of 12%.

7. Gair will need \$10000 in 2 yr to upgrade his farm equipment. He is investing at a rate of 2.4%/yr, compounded quarterly. How much does Gair need to invest now to have \$10000 in 2 yr?

$$\text{e.g., } \$10\,000 = P \left(1 + \frac{0.024}{4}\right)^{2 \times 4}$$

$$\$10\,000 = P(1.0490\dots)$$

$$\frac{\$10\,000}{1.0490\dots} = P$$

$$\$9532.705\dots = P \quad \text{Gair needs to invest } \$9532.71 \text{ now.}$$

Chapter Test

1. Use the simple interest formula. Complete the chart. Round interest rates to the nearest tenth of a percent.

Principal	Interest rate	Time	Interest Formula: $I = Prt$	Amount at end of investment Formula: $A = P + I$
\$7500	<u>1.6</u> %/yr	30 wk	\$69.23	\$ <u>7569.23</u>
\$23 000	2.5%/yr	<u>285</u> d	\$447.65	\$ <u>23 447.65</u>

2. José invested \$2600 in a 5 yr GIC that paid 2.95%/yr, compounded annually. How much will José have?

$$\text{e.g., } A = \$2600.00(1 + 0.0295)^5$$

$$= \$3006.803... \quad \text{José will have } \$3006.80.$$

3. Marie and her brother Damien work for their family's auto repair shop. They each invested all of their first paycheque, \$1473.92, for 1 yr at an interest rate of 3.7%/yr.

- Marie's investment compounded interest daily.
- Damien's investment paid simple interest.

- a) How much interest did Marie earn in 1 yr?

$$\text{e.g., } A = \$1473.92 \left(1 + \frac{0.037}{365} \right)^{365} \quad I = \$1529.473... - \$1473.92$$

$$= \$1529.473...$$

$$= \$55.553...$$

Marie earned \$55.55 in interest.

- b) How much interest did Damien earn in 1 yr?

$$\text{e.g., } I = \$1473.92(0.037)(1)$$

$$= \$54.535... \quad \text{Damien earned } \$54.54 \text{ in interest.}$$

- c) Who earned more interest? How much more was it?

e.g., Marie earned more interest. She earned \$1.01 more than Damien.

4. Estimate how many years it will take for an investment to double at the following interest rates. Round up.

a) 3.3%: 22 yr

b) 6.1%: 12 yr

c) 9.2%: 8 yr

