
Module 1: Wage-Earner Math and Mathematics 10 Review

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Section 1

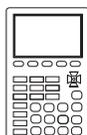
Consumer Mathematics

Introduction

In this section, you will learn various ways in which gross income is earned. You will examine the various deductions taken from gross income to give net pay. You will learn about property taxes and for what that revenue is used. Unit costs, comparison buying, foreign exchange, and buying on credit are also examined. You will learn about cash proofs and bank reconciliation practices. Time is also devoted to exponential functions and the mathematics behind investments. Budgeting is also investigated.

Section 1 — Outline

- Lesson 1 Earning an Income
- Lesson 2 Deductions from Gross Pay, and Net Pay
- Lesson 3 Property Taxes
- Lesson 4 Unit Costs, Comparison Buying, and Foreign Exchange
- Lesson 5 Bank Accounts and Chequebook Registers
- Lesson 6 Buying on Credit
- Lesson 7 Budget Preparation
- Lesson 8 Exponential Functions and Investments
- Review



Calculators

Some activities in Module 1 suggest that you use a graphing calculator like the TI-83. Don't have one yet? That is OK—you don't need a graphing calculator until the last module of the course, Module 4. Module 1 is easy to complete without a graphing calculator.

Even if you have a graphing calculator, it's your choice to use it or not in Module 1. If you find it frustrating, just do the Module 1 activities by hand using a normal scientific calculator.

In the beginning of Module 2, and again in Module 4, we will include some instructions for using a graphing calculator.

Lesson 1

Earning an Income

Outcome

When you complete this lesson, you will be able to

- calculate gross pay based on the way a person earns an income

Overview

There are various ways in which you can earn an income. Some of these include:

1. Wage Earner

This is probably the most common method. You are paid an hourly wage according to some wage scale, overtime hours worked, and the length of time you worked for the company. Wages may also be paid at a daily, weekly, or biweekly (every two weeks) rate of pay. People who work in the service industry, construction industry, manufacturing industry, and/or have part-time jobs are paid a wage.

2. Salary

This form of payment is usually a yearly amount of money that is paid weekly, biweekly, or monthly. Professions such as teachers, engineers, accountants, and administrators are usually paid a salary.

3. Commission

Some salespeople are paid a percentage of the value of the articles sold. This encourages them to sell as much of their company's product as they can.

4. Contract

A person agrees to complete a specific project for which a sum of money is paid when the task is completed.

5. Tips and Gratuities

Workers in service industries such as restaurants and hotels are given tips and gratuities for their service. People who tip use their discretion, but it is usually 10% to 15% of the bill before taxes. At present, some people leave a tip equivalent to the PST and GST (14%).

6. Piecework

Payment by piecework is a method in which an employee is paid for each piece of work produced. Payment is made when the completed article passes an inspection.

7. Self-Employed

People such as farmers and business owners pay themselves as the need arises.

8. Fees-for-Service

This is a fee which is paid for attending a meeting, delivering a speech, or completing a small job in a brief period of time.

The income earned in any one or some combination of the ways outlined determines an employee's **gross income**.

Example 1

Jean worked 25 hours at \$6.80 per hour and earned tips of 15% of customers' food bills. The value of the meals served was \$2000. Find Jean's gross income.

Solution

Regular pay:	25 hours x \$6.80 per hour =	\$170.00
Tips:	2000 x 15% =	<u>\$300.00</u>
Gross pay:		\$470.00

The number of hours worked per week varies. Part-time workers usually work less than 40 hours per week at a specific job, whereas full-time workers usually work an 8-hour shift for 5 days a week amounting to 40 hours. If they work more hours then they are paid overtime. Others may work four 12-hour shifts for 4 days and then get 4 days off.

Overtime rates include time and a half (1.5), double (2), and double time and one half (2.5). The 2.5 rate usually applies to those employees having to work on statutory holidays such as Christmas.

Example 2

John worked 46 hours at \$13.50 per hour. Calculate his gross earnings for the week if overtime is paid after 40 hours and his overtime rate is 1.5 times the regular rate of pay.

Solution

Regular earnings:	40 hours x \$13.50 per hour =	\$540.00
Overtime hours	46 - 40 =	6 hours
Overtime earnings:	6 hours x 13.50 x 1.5 =	<u>\$121.50</u>
Gross earnings:		\$661.50

Example 3

Melissa works an 8-hour day at \$12.60 per hour and is paid time and a half for all hours over eight in a given day. Last week she worked the following hours.

Monday — 9

Tuesday — 7

Wednesday — 9

Thursday — 11

Friday — 8

Calculate her gross wage.

Solution

Total regular hours:	8 + 7 + 8 + 8 + 8 =	39 hours
Total overtime hours:	1 + 0 + 1 + 3 + 0 =	5 hours
Regular earnings:	39 hours x \$12.60 =	\$491.40
Overtime earnings:	5 hours x \$12.60 x 1.5 =	<u>\$ 94.50</u>
Gross earnings:		\$585.90



Note: You do not take overtime hours to make up the regular hours that were not worked on a particular day.

When a salesperson earns a **straight commission**, payment consists of a single percent commission on all sales.

Example 4

A salesperson receives a straight commission of 7% on all sales. If sales total \$40 500 for the month, calculate the salesperson's gross income.

Solution

Gross income: $\$40\,500 \times 0.07 = \2835

A salesperson may also earn a graduated commission. The rate of commission is graduated or increased as the amount of sales becomes higher. You calculate the commission for each amount of sales, and your gross wage is the total of the individual parts.

Example 5

A salesperson receives an 8% commission on the first \$1000 of sales, and 14% on all sales in excess of \$1000. If the sales for the past week were \$5000, find the salesperson's gross earning.

Solution

8% Commission: $\$1000 \times 8\% = \80.00

14% Commission: $\$4000 \times 14\% = \underline{\$560.00}$

$(\$5000 - \$1000 = \$4000)$

Gross earnings: $\$640.00$

Some companies pay their salespeople a salary plus commission. The salary is often set low to encourage the employees to sell. The person gets the salary even if they do not sell any products.

Example 6

Joanna is a furniture salesperson who is guaranteed a salary of \$900 a month plus a commission of 6% of all sales. Her total sales for November was \$35 600. Find her gross wage.

Solution

Gross wages = salary + commission
 $= \$900 + \$35\,600 \times 6\%$
 $= \$900 + \2136
 $= \$3036$

Tip: when studying examples, cover the solution and see if you can find the answer yourself first. That can help you to learn more quickly.

Another method of payment is based on a salary plus commission with a quota. The salesperson has a guaranteed salary and receives a commission on sales only after selling a specified amount of the company's products, referred to as a quota. The amount of the quota is subtracted from the employee's total sales before commission is calculated.

Example 7

Joanna is paid a monthly salary of \$1000 and a commission of 10% on all sales over a monthly quota of \$15 000. Calculate her gross earnings for November if she sold \$35 600 worth of furniture.

Solution

Gross wage: = salary + commission on sales over \$15 000

Commission: = $(\$35\,600 - \$15\,000) \times 10\%$
= $20\,600 \times 10\%$
= \$2060

Gross earnings: = $\$1000 + \$2060 = \$3060$

When employees earn income based on piecework, they have to produce work and have it pass an inspection before they get paid.

Example 8

Tim assembles packets of cutlery for the airline industry. He earns 5 cents for each packet assembled. If he assembles 3870 packets per week but 14 of them do not pass the inspection, what is his gross income for the week?

Solution

Number of acceptable packets: $3870 - 14 = 3856$

Gross income: $3856 \times \$0.05 = \192.80

Some companies pay employees on a differentiated piecework arrangement. An employee is paid on a scale where the amount paid per piece increases as the employee's production increases. You multiply the number of acceptable pieces by the amount that applies.

Example 9

Jim is paid on a piecework basis. During a 1-week period, he produces 405 units. Seven units are rejected. He is paid according to the following scale:

Number of Units	Rate per Unit
1 – 90	\$0.55
91 – 180	\$0.75
181 and over	\$0.95

Calculate his gross earnings.

Solution

Number of acceptable units:	$405 - 7 = 398$
Amount earned on the first 90 units:	$90 \times \$0.55 = \$ 49.50$
Amount earned on the next 90 units:	$90 \times \$0.75 = \$ 67.50$
Amount earned on the next 218 units:	$218 \times \$0.95 = \underline{\$207.10}$
Total gross earnings:	$\$324.10$

Self-Marking Activity

1. A waiter earns \$6.25 an hour for a 40-hour week. He makes time and a half for overtime. He worked 46 hours and made \$125 in tips. Find his gross pay.
2. Gina works an 8-hour day at \$11.80 per hour and is paid time and a half for all hours over eight in a given day. Last week she worked the following hours:

Monday — 9

Tuesday — 7

Wednesday — 8

Thursday — 10

Friday — 6

Calculate her gross income.



3. Russell and Sean work for two different companies A and B, respectively. Company A pays employees overtime after 40 hours per week. Company B pays employees overtime after 8 hours in a day. Any overtime is paid at time and a half. Both workers earn \$12.40 per hour and both worked the following hours in the week.

Monday — 10

Tuesday — 6

Wednesday — 10

Thursday — 11

Friday — 10

Determine each employee's gross earnings.

4. Shauna owns a real estate company that charges straight commission of 7% on all house sales. She sold houses valued at \$97 000, \$45 000, and \$108 000. Find the company's gross pay for these sales for the month.
5. Tim sold \$7500 worth of goods. He earned 5% on the first \$3500 and $7\frac{1}{2}\%$ on the remainder. Find his total commission for the week.
6. a) If Patti's commission was \$780 and the rate of commission was 5%, find the amount of her sales.
b) If Patrick received \$95 in commission based on \$3800 sales, what was the rate of commission?
7. One particular week an assembly line worker put in 53 hours (40 were regular hours, 6 hours were paid at time and a half, and the remainder at double time). Find the worker's gross pay if the regular rate of pay was \$17.20 per hour.
8. June's monthly salary is \$650. In addition, she receives 5% commission on the first \$1200 of her sales and 7% on all sales over \$1200. Last month, June sold \$2700 worth of products. What was her gross pay?
9. Tamara receives a monthly salary of \$875 plus $7\frac{1}{4}\%$ on all sales over a monthly quota of \$400. Calculate her monthly gross pay if her sales were \$2180.

10. Paul works for a manufacturing company where he assembles containers. One week he produces 401 containers of which 19 are defective. Using the scale below, calculate his gross earnings.

Number of Containers	Rate per Container
1 – 100	1.35
101 – 300	1.60
over 300	1.80

Check your answers in the Module 1 Answer Key.



Lesson 2

Deductions from Gross Pay, and Net Pay

Outcomes

When you complete this lesson, you will be able to

- calculate deductions from gross wages
- calculate net income

Overview

In Lesson 1, you learned how to calculate gross wages based on a variety of different situations. Gross pay is not the amount of money that you actually take home because certain basic deductions are required by law.

Three basic deductions are as follows:

1. Income Tax

The amount of income tax paid is the sum of federal and provincial income taxes. Provincial income tax is about 50% of the federal income tax. This is a progressive tax because the tax rate increases as more money is earned. There are tax tables available that indicate the amount of income tax paid for weekly, bimonthly, and monthly wages.

The following tax rate table is a general idea of the percentage of taxable income that was deducted in 1998 towards income tax.

Taxable Income	Percent for Income Tax
\$0 - \$569	25.5%
\$569 - \$1138	39%
over \$1138	43.5%

2. Canadian Pension Plan (CPP)

This has a rate set at 3.2% of gross pay to a maximum contribution of \$1068.80 per year. This amount is matched by the employer. The following is an example similar to the Canadian Pension Plan table.

Canada Pension Plan Contributions					
Weekly (52 pay periods a year)					
Pay Rémunération		CPP RPC	Pay Rémunération		CPP RPC
From – De	To – À		From – De	To – À	
428.13	- 434.38	13.80	653.14	- 659.38	21.00
434.39	- 440.63	14.00	659.39	- 665.63	21.20
440.64	- 446.88	14.20	665.64	- 671.88	21.40
446.89	- 453.13	14.40	671.89	- 678.13	21.60
453.14	- 459.38	14.60	678.14	- 684.38	21.80
459.39	- 465.63	14.80	684.39	- 690.63	22.00
465.64	- 471.88	15.00	690.64	- 696.88	22.20
471.89	- 478.13	15.20	696.89	- 703.13	22.40
478.14	- 484.38	15.40	703.14	- 709.38	22.60
484.39	- 490.63	15.60	709.39	- 715.63	22.80
490.64	- 496.88	15.80	715.64	- 721.88	23.00
496.89	- 503.13	16.00	721.89	- 728.13	23.20
503.14	- 509.38	16.20	728.14	- 734.38	23.40
509.39	- 515.63	16.40	734.39	- 740.63	23.60
515.64	- 521.88	16.60	740.64	- 746.88	23.80
521.89	- 528.13	16.80	746.89	- 753.13	24.00
528.14	- 534.38	17.00	753.14	- 759.38	24.20
534.39	- 540.63	17.20	759.39	- 765.63	24.40
540.64	- 546.88	17.40	765.64	- 771.88	24.60
546.89	- 553.13	17.60	771.89	- 778.13	24.80
553.14	- 559.38	17.80	778.14	- 784.38	25.00
559.39	- 565.63	18.00	784.39	- 790.63	25.20
565.64	- 571.88	18.20	790.64	- 796.88	25.40
571.89	- 578.13	18.40	796.89	- 803.13	25.60
578.14	- 584.38	18.60	803.14	- 809.38	25.80
584.39	- 590.63	18.80	809.39	- 815.63	26.00
590.64	- 596.88	19.00	815.64	- 821.88	26.20
596.89	- 603.13	19.20	821.89	- 828.13	26.40
603.14	- 609.38	19.40	828.14	- 834.38	26.60
609.39	- 615.63	19.60	834.39	- 840.63	26.80
615.64	- 621.88	19.80	840.64	- 846.88	27.00
621.89	- 628.13	20.00	846.89	- 853.13	27.20
628.14	- 634.38	20.20	853.14	- 859.38	27.40
634.39	- 640.63	20.40	859.39	- 865.63	27.60
640.64	- 646.88	20.60	865.64	- 871.88	27.80
646.89	- 653.13	20.80	871.89	- 878.13	28.00

Note: CPP tables vary. Use this table for module activities, but not for your 'official' income tax filing.

3. Employment Insurance Premiums (EI)

For 1998, the rate had been set at 2.7% of gross pay to a maximum employee contribution of \$1053.00. The employee has to have worked at least 15 hours per week or had gross earnings of \$156.00 or more per week. The employer has to match the amount paid by the employee. The following is an example of the table for determining Employment Insurance Premiums.

Note: This table is not to be used for income tax calculations outside this module.

Employment Insurance Premiums					
Insurable Earnings Rémunération insurable		EI premium Cotisation d'AE	Insurable Earnings Rémunération insurable		EI premium Cotisation d'AE
From - De	To - À		From - De	To - À	
418.52	- 425.93	11.40	685.20	- 692.59	18.60
425.94	- 433.33	11.60	692.60	- 700.00	18.80
433.33	- 440.74	11.80	700.01	- 707.41	19.00
440.75	- 448.15	12.00	707.42	- 714.81	19.20
448.15	- 455.56	12.20	714.82	- 722.22	19.40
455.57	- 462.96	12.40	722.23	- 729.63	19.60
462.96	- 470.37	12.60	729.64	- 737.04	19.80
470.38	- 477.78	12.80	737.05	- 744.44	20.00
477.78	- 485.19	13.00	744.45	- 751.85	20.20
485.20	- 492.59	13.20	751.86	- 759.26	20.40
492.59	- 500.00	13.40	759.27	- 766.67	20.60
500.01	- 507.41	13.60	766.68	- 774.07	20.80
507.41	- 514.81	13.80	774.08	- 781.48	21.00
514.82	- 522.22	14.00	781.49	- 788.89	21.20
522.22	- 529.63	14.20	788.90	- 796.30	21.40
529.64	- 537.04	14.40	796.31	- 803.70	21.60
537.04	- 544.44	14.60	803.71	- 811.11	21.80
544.45	- 551.85	14.80	811.12	- 818.52	22.00
551.85	- 559.26	15.00	818.53	- 825.93	22.20
559.27	- 566.67	15.20	825.94	- 833.33	22.40
566.67	- 574.07	15.40	833.34	- 840.74	22.60
574.08	- 581.48	15.60	840.75	- 848.15	22.80
581.48	- 588.89	15.80	848.16	- 855.56	23.00
588.90	- 596.30	16.00	855.57	- 862.96	23.20
596.30	- 603.70	16.20	862.97	- 870.37	23.40
603.71	- 611.11	16.40	870.38	- 877.78	23.60
611.11	- 618.52	16.60	877.79	- 885.19	23.80
618.53	- 625.93	16.80	885.20	- 892.59	24.00
625.93	- 633.33	17.00	892.60	- 900.00	24.20
633.34	- 640.74	17.20	900.01	- 907.41	24.40
640.74	- 648.15	17.40	907.42	- 914.81	24.60
648.16	- 655.56	17.60	914.82	- 922.22	24.80
655.56	- 662.96	17.80	922.23	- 929.63	25.00
662.97	- 670.37	18.00	929.64	- 937.04	25.20
670.37	- 677.78	18.20	937.05	- 944.44	25.40
677.79	- 685.19	18.40	944.45	- 951.85	25.60

The appropriate tables are on pages 13-15.

Example 1

For gross weekly wages of \$460, find the following:

- a) CPP contribution
- b) EI premium
- c) income tax deductions (claim code 4)

Solution

- a) CPP contribution

Go to the CPP Table for weekly deductions and find the category that contains \$460. Answer: $(459.39 - 465.63) = \$14.80$

- b) EI premium

Similarly in the EI Premium Table, find the category that contains \$460. Answer: $(\$455.57 - \$462.96) = \$12.40$.

- c) Income Tax

Go to the Tax Rate Table. \$460 is in the \$0—\$569 range.
 $\$460 \times 25.5\% = 117.3$. Answer: \$117.30 is deducted.

Other deductions that may be deducted by your employer are life insurance premiums, Canada Savings Bonds, union dues, registered savings plan (RSP), and others.

The steps involved in computing your net wages are:

1. Find the CPP contribution.
2. Find the EI premium.
3. Deduct union dues and RSP contribution, if any, from gross wages to obtain the taxable income.
4. Find the income tax on the taxable income found in step 3.
5. From gross wages, subtract CPP contribution, EI premium, union dues (if any), RSP contribution (if any), income tax, and all other deductions.

The resulting figure is the net income.

Example 2

Jim works 40 hours and earns \$13.30 per hour. He pays \$10.40 per week in union dues and contributes \$25.40 per week to a registered savings plan. Using tax, CPP, and EI tables, find his

- gross wage
- CPP contribution
- EI premium
- taxable income
- income tax deductions
- net income

Solution

- Gross weekly wage: $40 \text{ hours} \times \$13.30 = \$532$
- CPP: $(\$528.14 - \$534.38) = \$17.00$
- EI: $(\$529.64 - \$537.04) = \$14.40$
- Taxable income:
$$\begin{aligned} &= \text{gross wages} - \text{registered pension} \\ &\quad \text{plan} - \text{union dues} \\ &= \$532 - \$25.40 - \$10.40 \\ &= \$496.20 \end{aligned}$$
- When using the income tax tables, remember to look up the **taxable income** not the gross weekly wage.
Income tax = $\$496.20 \times 25.5\% = \126.53
- Net income:
$$\begin{aligned} &= \text{gross wage} - \text{CPP} - \text{EI} - \text{union dues} - \\ &\quad \text{RSP contribution} - \text{income tax} \\ &= \$532 - \$17.00 - \$14.40 - \$10.40 - \$25.40 - \$126.53 \\ &= \$338.27 \end{aligned}$$

Self-Marking Activity

In Lesson 1 Self-Marking Activity, you determined gross pay. This activity builds on those questions so you can determine net pay. This lesson refers to questions 1, 2, 3, 5, 8, 9, and 10 of Lesson 1 Self-Marking Activity.

For CPP and EI, use tables on pages 14 and 15.

1. The waiter's gross pay was \$431.25. He paid union dues of \$12.50 per week and contributed \$18.20 to an RSP. Find his net pay.
2. Gina's gross income was \$489.70. She paid \$42 per week in union dues. Determine her net pay.
3. Russell's gross earnings with Company A was \$626.20. Sean's gross income was \$638.60 with Company B. Who has the greater net income and by how much?
4. June's gross pay was \$815.00. Find her net pay.
5. Tamara's gross pay was \$1004.05. Her union dues for the week were \$51.20 and her registered pension plan contribution was \$75.00. Determine her net income. Since the CPP and EI tables do not include income over \$1000, use the percentage rates above each of those tables to calculate net income for this question.

6. The following percentages are given to represent the amount deducted for income tax, CPP, and EI.

Taxable Income	Percent for Income Tax
\$0 – \$569	25.5%
\$569 – \$1138	39%
over \$1138	43.5%

CPP: 3.2% of gross pay to a maximum of \$1068.80 per year

EI: 2.7% of gross pay to a maximum of \$1053.00 per year

Complete the following table using those percentages

Gross Income	Income Tax	CPP	EI	Net Income
a) \$428				
b) \$749				
c) \$1523				



Check your answers in the Module 1 Answer Key.

Notes

Lesson 3

Property Tax

Outcome

When you complete this lesson, you will be able to

- calculate property taxes for municipal property owners

Overview

You have learned how to calculate gross income based on fixed employment. Some deductions were federal and provincial income taxes. This money is used by these governments to pay for services provided under their jurisdictions.

The third level of government in Canada is the municipal government. The only form of income from taxes for municipal governments are through grants from federal and provincial governments and property tax. This is paid by all people and businesses that own their own property.

Municipalities are obligated to build and maintain roads, bridges, and schools, to provide fire and police protection, and social and welfare services.

Federal, provincial, and municipal governments prepare yearly budgets outlining their expected revenues and expenditures. For the municipal government the general property tax is a major source of revenue. To determine each person's or business' share of the taxes to be paid, the total amount in taxes that must be raised is divided among all the property owners according to the value of the property each one owns.

The percentage of the total that each property owner must pay is called the **tax rate**. To calculate the taxes, all property in a municipality is **assessed** or valued at a certain percent of its retail value. This assessed value of property is determined by a **tax assessor**. The assessed value of property is usually less than the market value. For example, if a house has a market value of \$120 000, its assessed value may be around \$100 000.

The assessed values are reviewed every three years. If you do not agree with the tax assessor's opinion of the assessed value, you may appeal the decision.

Once a municipality knows its total assessed value and its total budget requirements for the year, the municipal government can determine its tax rate.

The tax rate can be expressed in one of three ways:

1. Cents per dollar, e.g., \$0.05 for every dollar of assessed value
2. Percent rate, e.g., 5% for every dollar of assessed value
3. Mills, e.g., 50 mills per dollar of assessed value. There are 1000 mills in a dollar. Therefore, if the rate is 0.05, the mill rate would be $1000 \times 0.05 = 50$ mills. This is the most common method of expressing property taxes.

$$\text{Rate of Property Tax} = \frac{\text{Total Tax to Be Raised}}{\text{Total Assessed Value of Property}}$$

Example 1

A city has a total assessment of \$425 000 000 for the value of its property. The city has prepared its budget for the year and determines that the amount of revenue that must be raised through property taxes is \$21 250 000. Find the tax rate that the city must set to collect the necessary amount of revenue, expressed in

- a) cents per dollar
- b) percent rate
- c) mills

Solution

$$\begin{aligned} \text{a) Rate of property tax} &= \frac{\text{total tax to be raised}}{\text{total assessed value of property}} \\ &= \frac{21\,250\,000}{425\,000\,000} \\ &= 0.05 \end{aligned}$$

This means \$0.05 for every dollar of assessed value.

- b) As a percent 0.05 means $\frac{5}{100} = 5\%$ for every dollar of assessed value.
- c) As mills, $0.05 \times 1000 = 50$ mills per dollar of assessed value. You could use the following formula to find the mill rate directly.

$$\text{Rate in mills} = \frac{\text{total tax to be raised}}{\text{total assessed value of the property}} \times 1000$$

In the above example,

$$\begin{aligned} \text{Mill rate} &= \frac{21\,250\,000}{425\,000\,000} \times 1000 \\ &= 50 \text{ mills} \end{aligned}$$

Example 2

Tom Smith owns a home assessed at \$30 500. The current tax rate in his town is 43 mills per dollar. What amount must he pay in property taxes.

Solution

$$\begin{aligned} \text{Tax payable} &= \text{assessed value} \times \text{mill rate} \\ &= 30\,500 \times \frac{43}{1000} \\ &= \$1311.50 \end{aligned}$$

Other tax levies that the municipal taxpayer may have to pay are a school or education levy, hospital levy, library levy, and local improvement levies. When sidewalks, paved roads, street lights, sewers, and water mains are built, these facilities are usually paid for by the property owner benefiting directly from them. These facilities are called **local improvements**. Their cost is charged against the land facing or fronting on the improved area, and can be levied as a dollar amount per metre of frontage or as a separate mill rate levy. Usually the taxpayer has the option of paying for local improvements in one lump sum or in installments over a period of years. If the taxpayer chooses installments, he/she will be assessed interest.

Example 3

Jean Evans has a house with an assessed value of \$20 400. The lot has an 18-metre frontage. Local improvements are charged at an annual rate per metre of frontage as follows: sewer at \$2.07/m and sidewalks at \$2.86/m. Find the total taxes if the general tax rate is 76 mills.

Solution

$$\begin{array}{l} \text{General taxes:} \quad \$20\,400 \times \frac{76}{1000} = \$1550.40 \\ \text{Sewer:} \quad \quad \quad \$2.07 \times 18 \text{ m} = \$ 37.26 \\ \text{Sidewalk:} \quad \quad \$2.86 \times 18 \text{ m} = \$ 51.48 \\ \text{Total taxes:} \quad \quad \quad = \underline{\$1639.14} \end{array}$$

Statement and Demand for Taxes

Tax notices themselves will vary in style from municipality to municipality. However, the information supplied on the notice is the same. The following tax notice form is about as detailed as you would see. If you understand the figures on this type of form, you should be able to adjust to any other taxation notice form.

PROPERTY DESCRIPTION						
ROLL NUMBER	WARD	Lot/Section	Blk/Twp	Plan/Range	Frontage/Area	Dwell. Units
						1
Civic Address						
Title or Deed No.	Current Assessment Land	Buildings	Status Code	Total Assessment	Portion %	Total Port Assessment
			T			?

- ERRORS AND OMISSIONS EXCEPTED
- ALL LAND IN ARREARS FOR MORE THAN ONE YEAR SHALL BE SOLD FOR TAXES
- ALL CHEQUES MADE IN CANADIAN FUNDS
- BANK RECEIPT CONSTITUTES OFFICIAL RECEIPT
- RETAIN COPY FOR INCOME TAX PURPOSES

ASSESSMENT SUBJECT TO LOCAL IMPROVEMENT LEVY
15 000

MUNICIPAL TAXES	Description			Assessment	Mill Rate	Levy
	General Municipal			?		?
	By-Law No.	Term	Type	Frontage Levy	Mill Rate	Levy
			Sewer and Water Sidewalk Street			? ? ?

EDUCATIONAL TAXES	Description			Assessment	Mill Rate	Levy
	Provincial Education 1			?		?
	Provincial Education 2			?		?

PROVINCIAL TAX CREDITS	(See Manitoba Enclosure for Additional Information)	Assessment	Levy
		Manitoba Resident Homeowner Tax Assistance	\$250.00

TOTAL TAXES DUE							
Municipal Tax	Education Tax	Total Taxes	Prov. Credits	Net Taxes	Arrears/Credits	Added Taxes	Taxes Due
?	?	?	?	?	?	?	?

Property Description

The property description section simply describes where the property is situated, the dimensions of the front of the lot, and the make of the dwellings that are on the property. An apartment block, for example, may have 10 dwelling units, whereas the normal property will have one. In the second part of the property description, information or assessments are stated. The land is assessed, the buildings are assessed, and the two totalled gives the ***Total Assessment***. The portion percentage indicates the amount of the total assessment used for tax calculations. This figure will be reflected on the Total Portion Assessment. The Assessment Subject to Local Improvement Levy, unless otherwise stated, is the same as the Total Portion Assessment.

Municipal Taxes

In this area of the notice, the calculations begin to show the actual taxes to be paid. The general municipal are the basic taxes to be paid. Any hospital, library, or local improvement taxes will be indicated along with their by-law numbers that have legislated the tax levy.

Educational Taxes

The notice also shows the education taxes that are levied.

Provincial Tax Credit

Any provincial tax credits that may apply are also shown here. These, of course, will reduce the taxes to be paid.

Total Taxes Due

This offers a summary of all taxes levied and credits to be applied. When all calculations are complete the Total Taxes Due indicate what is owing for this property.

Example 4

Examine the tax notice below, compare to the completed notice following, and note how all figures are arrived at.

PROPERTY DESCRIPTION							<ul style="list-style-type: none"> • ERRORS AND OMISSIONS EXCEPTED • ALL LAND IN ARREARS FOR MORE THAN ONE YEAR SHALL BE SOLD FOR TAXES • ALL CHEQUES MADE IN CANADIAN FUNDS • BANK RECEIPT CONSTITUTES OFFICIAL RECEIPT • RETAIN COPY FOR INCOME TAX PURPOSES
ROLL NUMBER	WARD	Lot/Section	Blk/Twp	Plan/Range	Frontage/Area	Dwell. Units	
630		5	9	120	73.1 ft	1	
Civic Address							
Title or Deed No.	Current Assessment Land	Buildings	Status Code	Total Assessment	Prop. Class	Portion %	Total Port Assessment
A589	8700	54 200	T	62 900	10	30%	?
ASSESSMENT SUBJECT TO LOCAL IMPROVEMENT LEVY							15 000

MUNICIPAL TAXES	Description			Assessment	Mill Rate	Levy
	General Municipal			?	47.320	?
	By-Law No.	Term	Type	Frontage Levy	Mill Rate	Levy
	412 506 508	98 99 99	Sewer and Water Sidewalk Street	85.00	0.035 3.450 5.100	? ? ?

EDUCATIONAL TAXES	Description			Assessment	Mill Rate	Levy
	Provincial Education 1			?	6.3	?
	Provincial Education 2			?	14.865	?

PROVINCIAL TAX CREDITS	Assessment		Levy
	(See Manitoba Enclosure for Additional Information)	Manitoba Resident Homeowner Tax Assistance	\$250.00

TOTAL TAXES DUE							
Municipal Tax	Education Tax	Total Taxes	Prov. Credits	Net Taxes	Arrears/Credits	Added Taxes	Taxes Due
?	?	?	?	?	?	?	?

PROPERTY DESCRIPTION							<ul style="list-style-type: none"> • ERRORS AND OMISSIONS EXCEPTED • ALL LAND IN ARREARS FOR MORE THAN ONE YEAR SHALL BE SOLD FOR TAXES • ALL CHEQUES MADE IN CANADIAN FUNDS • BANK RECEIPT CONSTITUTES OFFICIAL RECEIPT • RETAIN COPY FOR INCOME TAX PURPOSES
ROLL NUMBER	WARD	Lot/Section	Blk/Twp	Plan/Range	Frontage/Area	Dwell. Units	
630		5	9	120	73.1 ft	1	
Civic Address							
Title or Deed No.	Current Assessment Land	Buildings	Status Code	Total Assessment	Prop. Class	Portion %	Total Port Assessment
A589	8700	54 200	T	62 900	10	30%	\$18 870
ASSESSMENT SUBJECT TO LOCAL IMPROVEMENT LEVY							15 000

Description		Assessment	Mill Rate	Levy	
General Municipal		\$18 870	47.320	\$892.93	
By-Law No.	Term	Type	Frontage Levy	Mill Rate	Levy
412	98	Sewer and Water	85.00	0.035	\$85.53
506	99	Sidewalk		3.450	\$51.75
508	99	Street		5.100	\$76.50

Description		Assessment	Mill Rate	Levy
Provincial Education 1		\$18 870	6.3	\$118.88
Provincial Education 2		\$18 870	14.865	\$280.50

(See Manitoba Enclosure for Additional Information)	Assessment		Levy
	Manitoba Resident Homeowner Tax Assistance		\$250.00

TOTAL TAXES DUE							
Municipal Tax	Education Tax	Total Taxes	Prov. Credits	Net Taxes	Arrears/Credits	Added Taxes	Taxes Due
\$1106.71	\$399.38	\$1506.09	\$250.00	\$1256.09			\$1256.09

Solution

$$\text{Total portion assessment} = \$62\,900 \times 30\% = \$18\,870.00$$

$$\text{General municipal} = \$18\,870 \times 47.32/1000 = \$ 892.93$$

Local improvements:

$$\text{Sewer and water} = \$85.00 + \$15\,000 \times .035/1000 = \$ 85.53$$

$$\text{Sidewalk} = \$15\,000 \times 3.45/1000 = \$ 51.75$$

$$\text{Street} = \$15\,000 \times 5.1/1000 = \$ 76.50$$

Education:

$$\text{Education 1} = \$18\,870 \times 6.3/1000 = \$ 118.88$$

$$\text{Education 1} = \$18\,870 \times 14.865/1000 = \$ 280.50$$

Final:

$$\text{Municipal} = \$892.93 + \$85.53 + \$51.75 + \$76.50 = \$ 1106.71$$

$$\text{Education} = \$118.88 + \$280.50 = \$ 399.38$$

$$\text{Provincial credits} = \$ 250.00$$

Municipal + education = total – provincial credits = net taxes + arrears + added taxes = taxes due

$$\$1106.71 + \$399.38 = \$1506.09 - \$250.00 = \$1256.09 + \$0.00 + \$0.00 = \$1256.09$$

It is possible for you to create a spreadsheet template to calculate the total tax bill. You can use the “what if” capabilities on the spreadsheet to answer such questions as:

1. What happens to the tax bill if the mill rate increases or decreases?
2. What happens to the tax bill if the assessed value increases but the mill rate decreases?

Self-Marking Activity



1. Calculate the rate of assessment, in terms of cents on the dollar, percent rate, and mills (round answers to nearest tenth of a cent, nearest tenth of a percent, and the nearest whole mill).

Year	Assessed Value of Real Property	Budget Requirement	Cents on the Dollar	Percent Rate	Mills
1996	\$750 000 000	\$65 000 000			
1997	\$848 000 000	\$81 000 000			
1998	\$955 000 000	\$94 600 000			

2. The Smiths own a home assessed at \$50 000. The rate of assessment is 55%. The mill rate is 53 mills and there was a local improvement tax of \$98.00 for a sewage disposal plant. What is the total tax bill for the family?
3. The Timmons bought a \$125 000 home. At the time of the purchase, the home was assessed at \$75 000 and the rate of assessment was 45%. It was reassessed at \$85 000 but the rate of assessment remained the same. Assuming the mill rate was 57 mills, find the increase in general tax resulting from the reassessment.
4. A ratepayer has a house assessed at \$36 000. The rate of assessment is 30%. The lot has a frontage of 25.6 m. Local improvements are charted at an annual rate per metre of frontage as follows: sewer at \$2.83/m and sidewalks at \$1.35/m. Find the ratepayer's tax bill disregarding education taxes if the municipal mill rate is 57.9 mills.

5. The following is a partially completed Statement and Demand for Taxes. Given the information provided on the form, complete the amount of Total Taxes Due by the homeowner. Fill in all spaces marked by “?”.

PROPERTY DESCRIPTION							• ERRORS AND OMISSIONS EXCEPTED • ALL LAND IN ARREARS FOR MORE THAN ONE YEAR SHALL BE SOLD FOR TAXES • ALL CHEQUES MADE IN CANADIAN FUNDS • BANK RECEIPT CONSTITUTES OFFICIAL RECEIPT • RETAIN COPY FOR INCOME TAX PURPOSES
ROLL NUMBER	WARD	Lot/Section	Blk/Twp	Plan/Range	Frontage/Area	Dwell. Units	
F546	8	9	9	CR1094	25.5 m	1	
Civic Address							
Title or Deed No.	Current Assessment Land	Assessment Buildings	Status Code	Total Assessment	Prop. Class	Portion %	Total Port Assessment
254	17 500	68 200	T	?	10	45%	?
ASSESSMENT SUBJECT TO LOCAL IMPROVEMENT LEVY							?

MUNICIPAL TAXES	Description			Assessment	Mill Rate	Levy
	General Municipal			?	43.8	?
	By-Law No.	Term	Type	Frontage Levy	Mill Rate	Levy
	487 1235 568	96 97 97	Sewer and Water Sidewalk Street	85	.268 2.54 3.8	? ? ?

EDUCATIONAL TAXES	Description			Assessment	Mill Rate	Levy
	Provincial Education 1			?	5.6	?
	Provincial Education 2			?	12.8	?

PROVINCIAL TAX CREDITS	(See Manitoba Enclosure for Additional Information)		Assessment	Levy
	Manitoba Resident Homeowner Tax Assistance			\$250.00

TOTAL TAXES DUE							
Municipal Tax	Education Tax	Total Taxes	Prov. Credits	Net Taxes	Arrears/Credits	Added Taxes	Taxes Due
?	?	?	?	?	?	?	?

Note: Be careful when calculating the levy on sewers and water. The amount is \$85.00 plus 0.268 mills on the Local Improvement Levy Assessment. The other local improvements are calculated only on the Total Port. Assessment.

6. On the following Statement and Demand for Taxes, fill in the spaces marked by “?”.

What would the effect be on the total taxes owing if the general mill rate was increased to 63.5 mills?

PROPERTY DESCRIPTION							• ERRORS AND OMISSIONS EXCEPTED • ALL LAND IN ARREARS FOR MORE THAN ONE YEAR SHALL BE SOLD FOR TAXES • ALL CHEQUES MADE IN CANADIAN FUNDS • BANK RECEIPT CONSTITUTES OFFICIAL RECEIPT • RETAIN COPY FOR INCOME TAX PURPOSES
ROLL NUMBER	WARD	Lot/Section	Blk/Twp	Plan/Range	Frontage/Area	Dwell. Units	
58	7	12	14	AW54	17.9 m	1	
Civic Address							
Title or Deed No.	Current Assessment Land Buildings		Status Code	Total Assessment	Prop. Class	Portion %	Total Port Assessment
478	23 000	58 000	T	?	10	30%	?
ASSESSMENT SUBJECT TO LOCAL IMPROVEMENT LEVY							?

MUNICIPAL TAXES	Description			Assessment	Mill Rate	Levy
	General Municipal			?	52.7	?
	By-Law No.	Term	Type	Frontage Levy	Mill Rate	Levy
	163 217 897	95 96 96	Sewer and Water Sidewalk Street	\$95.00	1.1 3.5 4.7	? ? ?

EDUCATIONAL TAXES	Description			Assessment	Mill Rate	Levy
	Provincial Education 1			?	3.8	?
	Provincial Education 2			?	15.6	?

PROVINCIAL TAX CREDITS	(See Manitoba Enclosure for Additional Information)	Assessment		Levy
		Manitoba Resident Homeowner Tax Assistance		\$250.00

TOTAL TAXES DUE							
Municipal Tax	Education Tax	Total Taxes	Prov. Credits	Net Taxes	Arrears/Credits	Added Taxes	Taxes Due
?	?	?	?	?	?	?	?

Check your answers in the Module 1 Answer Key.



Lesson 4

Unit Costs, Comparison Buying, and Foreign Exchange**Outcomes**

When you complete this lesson, you will be able to

- find unit costs
- use the unit costs for comparison shopping
- determine the costs or rate of return of foreign currency

Overview**Unit Costs and Comparison Buying**

An important source of useful consumer information is unit pricing. Unit pricing is the system that indicates the cost of a unit of a product. To do unit pricing for comparison purposes, you must first find some quantity of each item that is convenient to use. This could be millilitres, litres, grams, kilograms, 100 mL, 100 g, etc. It makes price comparisons between sizes, brands, and stores easier and quicker.

$$\text{Unit Cost} = \frac{\text{Price of Item}}{\text{Number of Units of the Item}}$$

When you decide on which purchase is the best buy, you must analyze:

- Unit size — Which costs less?
- Size of the package — If it is bigger than you need, will it keep?
- Your preference — If you buy a brand you do not like, will it be wasted?
- Quality — Will a high quality product last longer or do a better job than a low-quality product?
- Quantity — How much of a product do you wish to buy?

Example 1

Soft drinks are being sold in the following sizes and costs:

2-L bottle for \$2.19

500-mL bottle for \$0.99

24 – 355-mL cans for \$10.75

12 – 355-mL cans for \$5.50

- Find the unit cost for each size.
- What other factors do you consider when you buy soft drinks?

Solution

- Cost per litre:

For 2 L — $\$2.19 \div 2 = \1.095

For 500 mL — $\$0.99 \times 2 = \1.98

For 24 – 355 mL cans — $\$10.75 \div (24 \times 355 \div 1000) = \1.2617

For 12 – 355 mL cans — $\$5.50 \div (12 \times 355 \div 1000) = \1.291

Based on the unit price, the 2 L container would be the cheapest.

- You would have to consider the quantity that you could drink, whether there would be waste if the drinks went “flat” and whether you have adequate storage for the drinks.

Foreign Exchange

Any time you travel outside Canada or make a purchase of some product outside of Canada, foreign exchange is a factor in the amount you will pay. If you have foreign currency and would like to sell it to a bank, a foreign currency exchange rate will be applied.

Foreign exchange rate lists are available from chartered banks, credit unions, and the Internet. The way in which foreign exchange rates are stated varies, but all are stated with a buying rate and a selling rate. **The higher rate is always the rate at which the bank charges the customer when providing some foreign currency. The lower rate is the rate at which the bank buys the currency back.**

The foreign currency rates for selected countries in August 1997 are as follows:

Canadian Dollar		
Bank Buying Rate	Country	Bank Selling Rate
1.3633	USA – dollar	1.4168
2.1902	U K – pound	2.2902
0.2411	Finland – markka	0.2637
0.9956	Australia – dollar	1.1072
0.10360	Austria – schilling	0.11226
0.7325	Germany – mark	0.7934
2.1902	Scotland – pound	2.2902
1.9758	Ireland – pound	2.0838

To calculate the exchange on an amount of money from another country, you multiply the amount purchased or sold by the corresponding exchange rate.

Example 2

You are planning a trip to the UK this summer. You estimate that you require £800 for the trip. Using the exchange rate given, state how much it will cost to buy these funds.

Solution

Value in Canadian currency = £800 × 2.2902 = \$1832.16.

Note: Remember that the bank is selling you the currency, so you must use the Bank Selling Rate.

If you have an amount of Canadian money and you want to know how much of a foreign currency you can purchase with it, multiply the Canadian amount by the reciprocal of the corresponding exchange rate.

Example 3

You have \$4000.00 Canadian with which to buy American dollars. How many American dollars can you buy?

Solution

From the chart, the value in American dollars is

$$\frac{4000}{1.4168} = \$2823.26 \text{ (American)}$$

Sometimes the information is given as in Example 4.



Example 4

The value of a Canadian dollar in terms of the American dollar is given as 65.5¢.

- a) If you exchange \$450 for American dollars, how much would you receive?
- b) If you have \$500 American dollars and you want the corresponding value in Canadian dollars, what value would you expect to receive?

Solution

a) Value in American dollars = $\$450 \times \$0.655 = \$294.75$

b) Value in Canadian dollars = $\frac{\$500}{0.655} = \763.36

Remember, this doesn't take into account the buying and selling prices.

Self-Marking Activity

1. For each of the following, calculate the unit price:
 - a) 4 tins of chocolate pudding for \$2.38
 - b) 5 packages of pre-mixed pizzas for \$3.69
 - c) a case of eight 1-L cans of oil for \$9.95
 - d) a 4-roll package of toilet paper for \$1.69
 - e) a 24-can case of soft drinks for \$5.95
2. If a 5.2-kg box of soap costs \$12.49 and an 8.7-kg box of soap costs \$17.85, which is the better deal. Defend your answer.
3. The cost of six grapefruit is 89 cents. Find the cost of 10 grapefruit.
4. John can pick four baskets of apples in 30 minutes. At this rate, how many baskets can he pick in 5 hours?
5. A band travelled 1980 km in 4 days. At this rate, how far could they travel in 9 days?
6. Another way to compare prices is a price per 100 mL.
Type A: \$7.49 for 355 mL
Type B: \$6.49 for 240 mL
Determine the unit cost per 100 mL.



7. The value of the Canadian dollar in terms of the American dollar is 64.2 cents.
- If you change \$850 Canadian for American dollars, how much would you receive?
 - If you decide to buy a sweater in Seattle with a price tag of \$45.99, how much is it worth in Canadian dollars?
 - A hotel in San Francisco has a room rate of \$213 per night. What is the equivalent rate in Canadian currency?
8. The value of the Canadian dollar in terms of the American dollar in the 1970s was approximately \$1.09. In the late 1990s, the value of the Canadian dollar had fallen to 58.2¢. Calculate the American equivalent for \$1000 in both time periods.
9. Using the accompanying currency table, answer the following questions:

Canadian Dollar		
Bank Buying Rate	Country	Bank Selling Rate
1.3633	USA – dollar	1.4168
2.1902	U K – pound	2.2902
0.2411	Finland – markka	0.2637
0.9956	Australia – dollar	1.1072
0.10360	Austria – schilling	0.11226
0.7325	Germany – mark	0.7934
2.1902	Scotland – pound	2.2902
1.9758	Ireland – pound	2.0838

- Your friend works in Finland for a 6-week term. He makes 4500 markkas a week and it costs 1500 markkas a week for living expenses. How much would he have deposited in his Canadian bank at the end of the 6-week period?
- A gift company wishes to purchase a product that is made in Germany and Ireland. The manager has two choices:
 Company A: Sells the product for 20 German marks.
 Company B: Sells the product for 7.5 Irish pounds
 Which company should receive the business if price is the deciding factor?

- c) John ordered an article in an American catalogue, selling for U.S. \$800. He bought a money order to pay for it. Unfortunately, it was not a satisfactory purchase and the article had to be returned to the United States. He was refunded the U.S. \$800. Explain the result of these two transactions.

Check your answers in the Module 1 Answer Key.



Lesson 5

Bank Accounts and Chequebook Registers

Outcomes

When you complete this lesson, you will be able to

- balance a chequing account with an account statement
- complete a statement of reconciliation where the cheque register contains errors and/or omissions

Overview

Financial institutions like banks, trust companies, and credit unions handle money transactions. When you deposit money in one of those institutions, you are lending them your money. When you take out a loan from a bank, trust company, or credit union, you are borrowing money. Financial institutions borrow from you to lend to other customers. They charge lenders a fee, known as *interest* for lending them money and pay you part of that interest for the use of your money. If the institution does not use your money to lend to others, it will still pay you interest.

Although financial institutions offer many different types of accounts (personal savings, investments and bonds, chequing, charge card, and loans) the two most common are the chequing and savings account or a combination of the two.

With a chequing account, usually no interest is paid on the balance in the account. Money can be withdrawn in person, by writing a cheque, using a debit card, or an automated teller machine (ATM), or by Internet, or telephone banking. You pay a charge for every cheque written, or a flat monthly rate. This account is used to pay bills or personal expenses.

With a savings account, interest is paid on the balance of the account annually, semi-annually, quarterly, or daily. Money can be withdrawn as you would with a chequing account, *except* you cannot write a cheque on the account. A combination chequing/savings account has interest being paid on the balance in the account if the balance is over a certain amount. Money can be withdrawn from it in the same way as from a chequing account. There is still a charge for writing cheques.

With a chequing account, you are given a chequebook, a debit card, and account record book called a cheque register. With a cheque register, you can keep a personal record of the written cheques, debit card payments, cash withdrawals, service charges, overdraft interest charges (interest charges on cheques where there are insufficient funds in the account to cover the cheque), and loan payments. These are withdrawals. The deposits include cash and cheques. When you record these in your chequing account register, the balance is always known.

The balance of the account is calculated by either subtracting the amount of the cheque or adding the amount of the deposit to the previous balance. The chequing account register also provides a column for the date of the cheque, the cheque number, a description of the purpose of the cheque or to whom it is written, and a column to check off (✓) each cheque that has gone through the account.

The following is an example of a cheque book record or register.

DATE	NO.	PARTICULARS	✓	CHEQUES	DEPOSITS	BALANCE

Example 1

Complete the following chequebook record for all transactions for the following chequing account.

May 3	Balance	\$196.13
May 4	Pay Cheque	\$300.00
May 6	Cheque No. 002 to Nick's Fashions	\$42.15
May 7	Cheque No. 003 to Manitoba Hydro	\$41.11
May 8	Deposit	\$650.00
May 8	Cash Withdrawal from ATM	\$100.00
May 10	Debit Card Payment to Ada's Gifts	\$52.80
May 11	Service Charges	\$9.50

Solution

Enter transactions in the order that they occur. Calculate the balance in the account after each transaction.

DATE	NO.	PARTICULARS	✓	CHEQUES	DEPOSITS	BALANCE
May 3		Balance forwarded				196 13
May 4		Pay Cheque			300 00	496 13
May 6	002	Nick's Fashions		42 15		453 98
May 7	003	Manitoba Hydro		41 11		412 87
May 8		Deposit			650 00	1062 87
May 8		Cash Withdrawal		100 00		962 87
May 10		Ada's Gifts		52 80		910 07
May 11		Service Charges		9 50		900 57

When you have a chequing account, it is extremely important to keep records of all transactions and check them periodically. Every month the financial institution that you use sends a statement. The statement lists the deposits, cheques, authorized deductions, and service charges on your account. It is important to check carefully the entries of your monthly account statement against your entries in the cheque register.

It is usually not possible to just check the final balances of both the monthly account statement and the cheque register. Almost always they do not balance. Some of the entries in your chequebook may not yet appear on your account statement. Entries that have not yet been processed by your financial institution are called **outstanding**.

To make sure that the balances on your monthly account statement and your cheque register correspond, complete an account reconciliation form. This form enables you to check that the entries on the two forms agree.

(If you use Internet banking or personal finance software, you can do this at your computer. The computer will do the additions but the other steps are much the same.)

Example 2

Prepare a reconciliation statement for the following:

Present chequebook balance	\$1765.42
Account statement balance	\$596.12
Account service charge	\$10.00
Safety deposit box rental	\$12.00
Outstanding cheques: No. 45	\$35.80
No. 47	\$76.10
No. 50	\$225.80
Deposits not shown on statement	\$1485.00

<p>(1) CHEQUEBOOK BALANCE \$ <u>1765.42</u></p> <p>DEDUCT ACCOUNT CHARGES</p> <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left; font-size: small;">Description</th> <th style="text-align: right; font-size: small;">Amount</th> </tr> </thead> <tbody> <tr> <td style="font-size: small;">Service charge</td> <td style="text-align: right; font-size: small;">10 00</td> </tr> <tr> <td style="font-size: small;">Safety deposit box</td> <td style="text-align: right; font-size: small;">12 00</td> </tr> <tr> <td style="font-size: small;"> </td> <td style="font-size: small;"> </td> </tr> <tr> <td style="font-size: small;"> </td> <td style="font-size: small;"> </td> </tr> <tr> <td style="font-size: small;"> </td> <td style="font-size: small;"> </td> </tr> </tbody> </table> <p>(2) TOTAL ACCOUNT CHARGES \$ <u>22.00</u></p> <p>(3) ADJUSTED CHEQUEBOOK BALANCE \$ <u>1743.42</u></p>	Description	Amount	Service charge	10 00	Safety deposit box	12 00							<p>(4) ACCOUNT BALANCE \$ <u>596.12</u></p> <p>OUTSTANDING DEPOSITS</p> <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left; font-size: small;">Date</th> <th style="text-align: right; font-size: small;">Amount</th> </tr> </thead> <tbody> <tr> <td style="font-size: small;">June</td> <td style="text-align: right; font-size: small;">1485 00</td> </tr> <tr> <td style="font-size: small;"> </td> <td style="font-size: small;"> </td> </tr> <tr> <td style="font-size: small;"> </td> <td style="font-size: small;"> </td> </tr> </tbody> </table> <p>(5) TOTAL OUTSTANDING DEPOSITS \$ <u>1485.00</u></p> <p>(6) TOTAL \$ <u>2081.12</u></p> <p>OUTSTANDING CHEQUES</p> <table style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left; font-size: small;">Ch. No.</th> <th style="text-align: right; font-size: small;">Amount</th> </tr> </thead> <tbody> <tr> <td style="font-size: small;">#45</td> <td style="text-align: right; font-size: small;">35 80</td> </tr> <tr> <td style="font-size: small;">#47</td> <td style="text-align: right; font-size: small;">76 10</td> </tr> <tr> <td style="font-size: small;">#50</td> <td style="text-align: right; font-size: small;">225 80</td> </tr> </tbody> </table> <p>(7) TOTAL OUTSTANDING CHEQUES \$ <u>337.70</u></p> <p>(8) ADJUSTED ACCOUNT BALANCE \$ <u>1743.42</u></p>	Date	Amount	June	1485 00					Ch. No.	Amount	#45	35 80	#47	76 10	#50	225 80
Description	Amount																												
Service charge	10 00																												
Safety deposit box	12 00																												
Date	Amount																												
June	1485 00																												
Ch. No.	Amount																												
#45	35 80																												
#47	76 10																												
#50	225 80																												

Example 3

Reconcile the following account statement with the chequebook register.

You received the following account statement.

V.R.Student Box 123, Somewhere, Man		Bank of Montreal		Acct #555
Date	Description	Debits	Credits	Balance
May 1	Balance forward			127.18
May 1	Deposit		520.15	647.33
May 3	Cheque — 346	425.00		222.33
May 8	Cheque — 347	57.66		164.67
May 10	Deposit		80.89	245.56
May 13	Cheque — 348	42.38		203.18
May 14	Cheque — 350	103.56		99.62
May 15	Deposit		420.15	519.77
May 19	Cheque — 349	144.34		375.43
May 23	Cheque — 351	125.00		250.43
May 28	Cheque — 353	36.15		214.28
May 31	Service Charge	4.75		209.53

Your chequebook record for the month of May is as follows:

DATE	NO.	PARTICULARS	✓	CHEQUES	DEPOSITS	BALANCE
May 1		Balance forwarded				127 18
May 1		Deposit			520 15	647 33
May 1	346	Acc Holdings-Rent		425 00		222 33
May 6	347	Mario's-Groceries		57 66		164 67
May 10	348	Manitoba Hydro-Power		42 38		122 29
May 10		Deposit			80 89	203 18
May 12	349	Bill's Auto Repair-Car		144 34		58 84
May 12		Deposit-Paycheque			420 15	478 99
May 15	350	Hubert's-Clothes		103 56		375 43
May 18	351	Dr. Howie-Dentist		125 00		250 43
May 20	352	Active Sporting Goods-Golf		17 86		232 57
May 25	353	Footlocker-Sweatshirt		36 15		196 42
May 31	354	Wilson's-Groceries		54 76		141 66
May 31		Deposit			45 00	186 66

Reconcile the account statement information with the chequebook record balance.

Solution

Check off all entries in your record book.

DATE	NO.	PARTICULARS	✓	CHEQUES	DEPOSITS	BALANCE
May 1		Balance forwarded	✓			127 18
May 1		Deposit	✓		520 15	647 33
May 1	346	Ace Holdings-Rent	✓	425 00		222 33
May 6	347	Mario's-Groceries	✓	57 66		164 67
May 10	348	Manitoba Hydro-Power	✓	42 38		122 29
May 10		Deposit	✓		80 89	203 18
May 12	349	Bill's Auto Repair-Car	✓	144 34		58 84
May 12		Deposit-Paycheque	✓		420 15	478 99
May 15	350	Hubert's-Clothes	✓	103 56		375 43
May 18	351	Dr. Howie-Dentist	✓	125 00		250 43
May 20	352	Active Sporting Goods-Golf		17 86		232 57
May 25	353	Foollocker-Sweatshirt	✓	36 15		196 42
May 31	354	Wilson's-Groceries		54 76		141 66
May 31		Deposit			45 00	186 66

Fill out a reconciliation form.

(1) CHEQUEBOOK BALANCE	\$ 186.66	(4) ACCOUNT BALANCE	\$ 209.53
DEDUCT ACCOUNT CHARGES		OUTSTANDING DEPOSITS	
Description	Amount	Date	Amount
Service charge	4 75	May 31	45 00
(2) TOTAL ACCOUNT CHARGES	\$ 4.75	(5) TOTAL OUTSTANDING DEPOSITS	\$ 45.00
		(6) TOTAL	\$ 254.53
		OUTSTANDING CHEQUES	
		Ch. No.	Amount
		352	17 86
		354	54 76
(3) ADJUSTED CHEQUEBOOK BALANCE	\$ 181.91	(7) TOTAL OUTSTANDING CHEQUES	\$ 72.62
		(8) ADJUSTED ACCOUNT BALANCE	\$ 181.91

One of the main advantages of completing a statement of reconciliation is to help you correct any errors and/or omissions in your cheque register. The following is an example of correcting the errors and/or omissions that appear in the cheque register.

Example 4

Reconcile the following monthly account statement with its cheque register. There are three errors and/or omissions in the cheque register. Before filling out the statement of reconciliation, make the necessary changes in the cheque register. Debits are withdrawals. Credits are deposits.

Bank Statement

Date	Description	Debits	Credits	Balance
5/3	Balance			825.43
5/4	Deposit		85.00	910.43
5/4	Cash	100.00		810.43
5/9	A. Wiebe	139.09		671.34
5/15	Deposit		450.00	1121.34
5/21	Ed's Garage	217.87		903.47
5/23	Rent	450.00		453.47
5/30	Groceries	48.93		404.54
5/31	Service Charge	5.00		399.54

Cheque Register

DATE	NO.	PARTICULARS	✓	CHEQUES	DEPOSITS	BALANCE
5/3		<i>Balance</i>				825 43
5/4		<i>Deposit</i>			85 00	910 43
5/4	237	<i>Cash</i>		100 00		810 43
5/8	239	<i>Manitoba Charities</i>		75 00		735 43
5/15		<i>Deposit</i>			400 00	1135 43
5/16	240	<i>Ed's Garage</i>		217 87		917 56
5/21	241	<i>L. Binks</i>		25 00		892 56
5/23	242	<i>Rent</i>		450 00		442 56
5/30	243	<i>Groceries</i>		48 39		394 17
6/1		<i>Deposit</i>			400 00	794 17

Solution

First check the cheque register against the monthly account statement for errors and/or omissions. Did you find the following?

1. Cheque No. 238 was omitted in the cheque register.
2. The deposit on May 15 was incorrectly entered as \$400 rather than \$450.
3. The cheque for groceries was entered as \$48.39 rather than \$48.93.

The following three entries will correct the cheque register:

1. Since cheque 238 was omitted from the chequebook register, the balance is 139.09 greater than it should be. Add \$139.09 to the cheque column.
2. The deposit on May 15 was incorrectly entered as \$400 rather than \$450. Therefore, the balance is \$50 less than it should be. Add the amount of \$50 in the deposit column.
3. Since the cheque for groceries on 5/30 was incorrectly entered as \$48.39 rather than \$48.93, the balance is \$0.54 larger than it should be. Add \$0.54 to the cheque column.

DATE	NO.	PARTICULARS	✓	CHEQUES	DEPOSITS	BALANCE
5/3		<i>Balance</i>				825 43
5/4		<i>Deposit</i>			85 00	910 43
5/4	237	<i>Cash</i>		100 00		810 43
5/8	239	<i>Manitoba Charities</i>		75 00		735 43
5/15		<i>Deposit</i>			400 00	1135 43
5/16	240	<i>Ed's Garage</i>		217 87		917 56
5/21	241	<i>L. Binks</i>		25 00		892 56
5/23	242	<i>Rent</i>		450 00		442 56
5/30	243	<i>Groceries</i>		48 39		394 17
6/1		<i>Deposit</i>			400 00	794 17
5/8		<i>Correction *238 omitted</i>		139 09		655 08
5/15		<i>Correct deposit is \$450</i>			50 00	705 08
5/30		<i>*243 should be \$48.93</i>		54		704 54

Now complete the reconciliation.

<p>(1) CHEQUEBOOK BALANCE \$ <u>704.54</u></p> <p>DEDUCT ACCOUNT CHARGES</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Description</th> <th style="text-align: right;">Amount</th> </tr> </thead> <tbody> <tr> <td>Service charge</td> <td style="text-align: right;">5 00</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <p>(2) TOTAL ACCOUNT CHARGES \$ <u>5.00</u></p> <p>(3) ADJUSTED CHEQUEBOOK BALANCE \$ <u>699.54</u></p>	Description	Amount	Service charge	5 00											<p>(4) ACCOUNT BALANCE \$ <u>399.54</u></p> <p>OUTSTANDING DEPOSITS</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Date</th> <th style="text-align: right;">Amount</th> </tr> </thead> <tbody> <tr> <td>6/1</td> <td style="text-align: right;">400 00</td> </tr> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <p>(5) TOTAL OUTSTANDING DEPOSITS \$ <u>400.00</u></p> <p>(6) TOTAL \$ <u>799.54</u></p> <p>OUTSTANDING CHEQUES</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-top: 10px;"> <thead> <tr> <th style="text-align: left;">Ch. No.</th> <th style="text-align: right;">Amount</th> </tr> </thead> <tbody> <tr> <td>239</td> <td style="text-align: right;">75 00</td> </tr> <tr> <td>241</td> <td style="text-align: right;">25 00</td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <p>(7) TOTAL OUTSTANDING CHEQUES \$ <u>100.00</u></p> <p>(8) ADJUSTED ACCOUNT BALANCE \$ <u>699.54</u></p>	Date	Amount	6/1	400 00					Ch. No.	Amount	239	75 00	241	25 00		
Description	Amount																														
Service charge	5 00																														
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6/1	400 00																														
Ch. No.	Amount																														
239	75 00																														
241	25 00																														

Cash Proofs

Another area where reconciliation is important is in the area of cash proofs. A cash proof is used in businesses to ensure the proper internal control of money. Cash register tapes show how a teller (such as a restaurant cashier or a grocery store checkout clerk) “cashes in” and “cashes out.” The tape has recorded all cash transactions and it indicates how much money should be in the cash drawer at the end of the teller’s shift. This is checked out by means of a cash proof. Each day the owner or supervisor should balance the cash received against the record of the cash transactions. By preparing this proof daily, any major shortages or overages can be dealt with immediately.

An example of a cash proof is shown below.

Date		Register Number		Total	
Nov. 2 111		18.00 Ca	35.00 Re	7.84 Ca	172.73 TCa
		75.00 TRe	247.73 TCr	2.00 TPd	
				Cash Sales	172 73
				Total Received on Account	75 00
				Total Cash Received	247 73
				Less: Cash Paid Out	2 00
				Net Cash Received	245 73
				Cash in Drawer	270 73
				Less: Change Fund	25 00
				Net Cash Received	245 73
				Clerk <i>Betty Lane</i>	
				Supervisor <i>John Miller</i>	

Example 5

The change fund or “float” for a gift shop at the start of the day is

Bills	Coins
1 x \$20	8 x 25¢
3 x \$5	9 x \$1.00
	2 x \$2.00

The cash on hand at the end of the business day consists of

Bills	Coins
4 x \$20	50 x 25 cents
14 x \$10	20 x 10 cents
20 x \$5	41 x 5 cents
	20 x \$2.00
	15 x \$1.00

The cash register tape total of the day's receipts consists of

Date:	November 30, 1998
Cash Sales:	\$331.55
Received on Account:	\$20.00
Cash Paid Out:	\$10.00

Prepare the daily cash proof using a cash proof form:

Cash Proof	
Date:	_____
Register No.	_____
Cash Sales:	
Received on Account:	
Total Cash Received:	
Less: Cash Paid Out:	
Net Cash Received:	
Cash in Drawer:	
Less: Change Fund:	
Net Cash Received:	

Solution

Cash Proof	
Date:	<i>November 30, 1998</i> _____
Register No.	_____
Cash Sales:	331.55
Received on Account:	20.00
Total Cash Received:	351.55
Less: Cash Paid Out:	10.00
Net Cash Received:	341.55
Cash in Drawer:	391.55
Less: Change Fund:	50.00
Net Cash Received:	341.55

3. Prepare a reconciliation statement for the following:

Present chequebook balance	\$751.19
Bank statement balance	\$615.44
Service charge	\$ 5.00
Outstanding cheques No. 90	\$ 94.25
Cash withdrawal	\$150.00
Deposit not shown on the statement	\$375.00

<p>(1) CHEQUEBOOK BALANCE \$ _____</p> <p>DEDUCT ACCOUNT CHARGES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Description</th> <th style="width: 15%;">Amount</th> <th style="width: 15%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(2) TOTAL ACCOUNT CHARGES \$ _____</p> <p>(3) ADJUSTED CHEQUEBOOK BALANCE \$ _____</p>	Description	Amount																				<p>(4) ACCOUNT BALANCE \$ _____</p> <p>OUTSTANDING DEPOSITS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Date</th> <th style="width: 40%;">Amount</th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(5) TOTAL OUTSTANDING DEPOSITS \$ _____</p> <p>(6) TOTAL \$ _____</p> <p>OUTSTANDING CHEQUES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Ch. No.</th> <th style="width: 40%;">Amount</th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(7) TOTAL OUTSTANDING CHEQUES \$ _____</p> <p>(8) ADJUSTED ACCOUNT BALANCE \$ _____</p>	Date	Amount											Ch. No.	Amount										
Description	Amount																																													
Date	Amount																																													
Ch. No.	Amount																																													

4. Complete a reconciliation statement form for this account.

ACCU CREDIT				Date				
Balance Forward				20	08	350	00	
Description	Debits		Credits		Day	Mo	Balance	
Deposit			452	51	21	08	802	51
Cheque No. 191	102	90			25	08	699	61
Cheque No. 192	141	12						
Cheque No. 193	24	88			27	08	558	49
Cheque No. 194	56	70					476	91
Deposit			215	00			691	91
Deposit			280	00	30	08	971	91
Cheque No. 195	125	45						
Service Charge	8	75			31	08	837	71

DATE	NO.	PARTICULARS	✓	CHEQUES		DEPOSITS		BALANCE	
<i>Aug. 20</i>		<i>Balance</i>						<i>350</i>	<i>00</i>
<i>21</i>		<i>Deposit</i>				<i>452</i>	<i>51</i>	<i>802</i>	<i>51</i>
<i>25</i>	<i>191</i>	<i>Gas</i>		<i>102</i>	<i>90</i>			<i>699</i>	<i>61</i>
<i>25</i>	<i>192</i>	<i>Tires</i>		<i>141</i>	<i>12</i>			<i>558</i>	<i>49</i>
<i>27</i>	<i>193</i>	<i>Telephone</i>		<i>24</i>	<i>88</i>			<i>533</i>	<i>61</i>
<i>27</i>	<i>194</i>	<i>Hydro</i>		<i>56</i>	<i>70</i>			<i>476</i>	<i>91</i>
<i>27</i>		<i>Deposit</i>				<i>215</i>	<i>00</i>	<i>691</i>	<i>91</i>
<i>30</i>		<i>Deposit</i>				<i>280</i>	<i>00</i>	<i>971</i>	<i>91</i>
<i>Sept. 1</i>	<i>195</i>	<i>Pete's Shack</i>		<i>125</i>	<i>45</i>			<i>846</i>	<i>46</i>
<i>3</i>	<i>196</i>	<i>Insurance</i>		<i>211</i>	<i>11</i>			<i>635</i>	<i>35</i>
<i>6</i>		<i>Deposit</i>				<i>2000</i>	<i>00</i>	<i>2635</i>	<i>35</i>
<i>7</i>	<i>197</i>	<i>UK Tools</i>		<i>854</i>	<i>00</i>			<i>1781</i>	<i>35</i>
<i>7</i>	<i>198</i>	<i>Gas</i>		<i>57</i>	<i>10</i>			<i>1724</i>	<i>25</i>
<i>8</i>	<i>199</i>	<i>Colby's Clothing</i>		<i>146</i>	<i>58</i>			<i>1577</i>	<i>67</i>

<p>(1) CHEQUEBOOK BALANCE \$ _____</p> <p>DEDUCT ACCOUNT CHARGES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Description</th> <th style="width: 15%;">Amount</th> <th style="width: 15%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(2) TOTAL ACCOUNT CHARGES \$ _____</p> <p>(3) ADJUSTED CHEQUEBOOK BALANCE \$ _____</p>	Description	Amount																				<p>(4) ACCOUNT BALANCE \$ _____</p> <p>OUTSTANDING DEPOSITS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Date</th> <th style="width: 40%;">Amount</th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(5) TOTAL OUTSTANDING DEPOSITS \$ _____</p> <p>(6) TOTAL \$ _____</p> <p>OUTSTANDING CHEQUES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Ch. No.</th> <th style="width: 40%;">Amount</th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(7) TOTAL OUTSTANDING CHEQUES \$ _____</p> <p>(8) ADJUSTED ACCOUNT BALANCE \$ _____</p>	Date	Amount											Ch. No.	Amount										
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5. Reconcile the following monthly account statement with its cheque register. There are two errors and/or omissions in the cheque register. Before filling out the statement of reconciliation, make the necessary changes in the cheque register.

Date	Description	Debits	Credits	Balance
Jul. 1	Balance Forward			1522.71
Jul. 4	Cheque No. 90	231.80		1290.91
Jul. 6	Cheque No. 92	25.00		1265.91
Jul. 9	Deposit		484.24	1750.15
Jul. 26	Cheque No. 94	36.12		
	Cheque No. 97	104.86		1609.17
Jul. 30	Cheque No. 96	42.73		1566.44
Jul. 31	Cheque No. 95	15.00		1551.44
	Service Charge	5.00		1546.44

<p>(1) CHEQUEBOOK BALANCE \$ _____</p> <p>DEDUCT ACCOUNT CHARGES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 70%;">Description</th> <th style="width: 15%;">Amount</th> <th style="width: 15%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(2) TOTAL ACCOUNT CHARGES \$ _____</p> <p>(3) ADJUSTED CHEQUEBOOK BALANCE \$ _____</p>	Description	Amount																				<p>(4) ACCOUNT BALANCE \$ _____</p> <p>OUTSTANDING DEPOSITS</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Date</th> <th style="width: 40%;">Amount</th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(5) TOTAL OUTSTANDING DEPOSITS \$ _____</p> <p>(6) TOTAL \$ _____</p> <p>OUTSTANDING CHEQUES</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Ch. No.</th> <th style="width: 40%;">Amount</th> <th style="width: 30%;"></th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> <tr><td> </td><td> </td><td> </td></tr> </tbody> </table> <p>(7) TOTAL OUTSTANDING CHEQUES \$ _____</p> <p>(8) ADJUSTED ACCOUNT BALANCE \$ _____</p>	Date	Amount											Ch. No.	Amount										
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6. The change fund for Maxim Wools at the start of the day consists of

Bills

- 1 x \$20
- 1 x \$10

Coins

- 25 x 25 cents
- 14 x 10 cents
- 7 x 5 cents
- 10 x \$2
- 2 x \$1

The cash on hand for Maxim Wools at the end of the day consists of

Bills

- 2 x \$100
- 2 x \$50
- 6 x \$20
- 10 x \$10

Coins

- 40 x 25 cents
- 20 x \$2
- 16 x \$1

The tape register total of the day's receipts consists of

Date: June 25, 1998
 Cash sales: \$529.00
 Received on account: \$22.00
 Cash paid out: \$25.00

Prepare the daily cash proof using a cash proof form:

Cash Proof	
Date:	_____
Register No.	_____
Cash Sales:	
Received on Account:	
Total Cash Received:	
Less: Cash Paid Out:	
Net Cash Received:	
Cash in Drawer:	
Less: Change Fund:	
Net Cash Received:	

7. The change fund for VIP Company at the start of the day consists of

Bills	Coins
2 x \$10	60 x 25 cents
3 x \$5	

The cash on hand for VIP Company at the end of the day consists of

Bills	Coins
7 x \$20	12 x 25 cents
10 x \$10	12 x 10 cents
4 x \$5	16 x 5 cents
	1 x \$1

The tape register total of the day's receipts consists of

Date: May 26, 1998
Cash sales: \$206.00
Received on account: \$20.00
Cash paid out: \$10.00

Prepare the daily cash proof using a cash proof form:

Cash Proof	
Date:	_____
Register No.	_____
Cash Sales:	
Received on Account:	
Total Cash Received:	
Less: Cash Paid Out:	
Net Cash Received:	
Cash in Drawer:	
Less: Change Fund:	
Net Cash Received:	



Check your answers in the Module 1 Answer Key.

Lesson 6

Buying on Credit

Outcomes

When you complete this lesson, you will be able to

- calculate the cost of buying on installments
- calculate the cost of a buy now, pay later policy
- calculate the cost of credit card buying
- solve problems involving personal loans

Overview

Credit may be defined as the advance of goods and/or services in exchange for a promise to pay at some future date. Canadians buy billions of dollars worth of goods and services on credit. As you can see, it is really a form of debt. Credit allows consumers to buy more goods and services than they normally could. You must be prudent in your use of credit or you will have financial difficulties.

Companies offer consumers credit in various ways to encourage them to buy their products. Installment buying is one such way. When you pay for a product such as furniture, appliances, and automobiles in installments, you pay a down payment at the time of purchase and then pay the rest of the purchase price in equal amounts called installment payments over a given number of equal-time payments.



The ***installment price*** is the sum of the down payment plus all installment payments. The difference between the cash-selling price and the installment price is the finance or carrying charge. This is equivalent to the cost of borrowing the money.

Example 1

A television has a cash price of \$899.99 plus tax. The installment terms are \$250 down plus \$125 per month for 7 months. (Do not forget to add 7% GST and 7% PST.)

- Calculate the installment price of the television.
- Calculate the finance charge or carrying charge.
- Calculate the percent rate at which the installment price exceeds the cash-selling price.

Solution

When tax is required in a question, assume this to be both PST (Provincial Sales Tax) and GST (Goods and Services Tax). PST in BC is 7%, the same as the federal GST.

$$\text{a) PST tax} = \$899.99 \times 7\% = \$63.00$$

$$\text{GST tax} = \$899.99 \times 7\% = \$63.00$$

Cash selling price of the television

$$= \$899.99 + \$63.00 + 63.00 = \$1025.99$$

Installment price = down payment + monthly payment \times number of months

$$= \$250 + \$125 \times 7$$

$$= \$250 + \$875$$

$$= \$1125$$

b) Finance or carrying charge

$$= \text{Installment price} - \text{cash selling price}$$

$$= \$1125 - \$1025.99$$

$$= \$99.01$$

$$\text{c) Percent rate} = \frac{\text{finance charge}}{\text{cash selling price}} \times 100$$

$$= \frac{\$99.01}{\$1025.99} \times 100 = 9.7\%$$

Another form of buying on credit offered primarily by companies selling furniture and appliances is a **buy-now, pay-later** option. This is a deferred payment plan where consumers do not pay for their purchases for a specified time period. During this time period, they also do not pay interest on the amount owing. However, companies can charge interest on amounts owing after the specific time period ends. With this plan, a company usually requires you to pay taxes on the purchase, any delivery charges, and an administration fee, which is the amount a company charges its customers for the work involved in administering the plan. The buy-now price is often significantly lower than the pay-later price.



Example 2

The Furniture Haven offers the following buy-now, pay-later option. At the time of purchase, customers must pay taxes (GST and PST), a delivery charge, and an administration fee.

Customers have a one-year period to pay for their purchases. If they pay during the year, no interest charges are added.

Rosemary purchased a sofa from this company on a buy-now, pay-later plan. The pay-later price was \$899.95 (plus tax). If she were to pay for the sofa at the time of purchase, the price would have been \$814.95 (plus tax). The administration fee was \$39.99 and the delivery charge was \$31.00.

- How much will Rosemary pay at the time of purchase?
- If Rosemary pays for the sofa within one year, calculate her total pay-later price for the sofa.
- If Rosemary pays for the sofa at the time of purchase, calculate her total pay-now price for the sofa.
- Calculate the difference between the total pay-later price and the total pay-now price.
- Express as a percentage rate the difference in the two prices in part (d) compared to the total pay-now price.

Solution

$$\text{a) PST} = \$899.95 \times 7\% = \$63$$

$$\text{GST} = \$899.95 \times 7\% = \$63$$

At the time of purchase Rosemary will pay taxes, a delivery charge, and an administration fee.

\therefore The amount paid at time of purchase on the buy-now, pay-later plan is $\$63.00 + \$63.00 + \$31.00 + \$39.99 = \$196.99$.

$$\begin{aligned} \text{b) Total pay-later price} \\ = \$899.95 + \$63.00 + 63.00 + \$31.00 + \$39.99 = \$1096.94 \end{aligned}$$

$$\begin{aligned} \text{c) Total pay-now price:} \\ = \$814.94 + \$57.05 + \$57.05 + \$31.00 = \$960.05 \end{aligned}$$

$$\text{d) The difference between the pay-now and pay-later prices is } \$1096.94 - \$960.05 = \$136.89.$$

$$\begin{aligned} \text{e) \%} &= \frac{\text{difference between pay-now and pay-later prices}}{\text{total pay-now price}} \times 100 \\ &= \frac{\$136.89}{\$960.05} \times 100 = 14.3\% \end{aligned}$$

Another form of debt is the credit card. It is convenient because you can make a purchase without carrying the cash to pay for it. The majority of credit cards are issued by financial institutions under a Visa or Mastercard logo. In addition, department stores, oil companies, travel, and entertainment credit cards are issued.

When you use a credit card, you receive a statement each month listing your transactions for that month. It states the new balance owing as well as the minimum monthly payment or minimum amount due. The minimum monthly payment is the amount you have to pay your lending institution to maintain your account in good standing. If you do not pay the entire balance by the indicated due date and instead pay only the minimum monthly payment, your lending institution will charge you interest on the balance owing. The interest rate you are charged is relatively high. It can be between 15% to 25% annually.

You may also be charged interest on your new purchases. It is important that you understand the conditions of your credit card so you are able to make wise decisions. Assume that when a balance is not paid in full by the indicated due date, daily interest is charged on each item from the date of purchase. This may result in cumbersome calculations but computer and spreadsheet applications make the calculations possible.

Example 3

On July 5, John made a purchase of \$400.00 on his credit card. It appears on the monthly statement issued July 20. He does not pay for the purchase until August 20. Calculate the interest he is charged on his August statement. Assume the credit card company charges an annual interest rate of 21%.

Solution

John is charged daily interest from July 20 to August 20.

Number of days = 31 days

$$\text{Daily interest} = \frac{21\%}{365} = 0.058\%$$

$$\begin{aligned}\therefore \text{Interest charge on purchase} &= 31 \times 0.00058 \times 400 \\ &= \$7.19\end{aligned}$$

To compute a new balance, subtract the monthly payment from the previous monthly balance, add the purchases charged to get the balance due. Calculate the credit charges to get the new balance or ending balance. One way to calculate the minimum monthly payment is to determine whichever is larger — at least 5% of the ending balance or \$10.

Example 4

June's monthly statement shows a previous balance of \$874.25. It indicates that during the month, June made a payment of \$450 and purchased goods valued at \$462.50. If credit charges are 1.4% of balance due, determine the balance due and the minimum monthly payment (at least 5% of the ending balance or balance due or \$10, whichever is greater).

$$\begin{aligned}\text{Balance due} &= \text{previous balance} - \text{payment made} + \text{purchase} \\ &\quad \text{charged} \\ &= \$874.25 - \$450 + \$462.50 = \$886.75\end{aligned}$$

$$\text{Credit charge} = \text{Balance due} \times \text{monthly credit rate}$$

$$\text{Credit charge} = \$886.75 \times 1.4\% = \$12.41$$

$$\begin{aligned}\text{New balance} &= \text{Balance due} + \text{credit charge} \\ &= \$886.75 + 12.41 = \$899.16\end{aligned}$$

$$\begin{aligned}\text{Minimum monthly payment} &= 5\% \text{ of new balance} \\ &= 5\% \text{ of } \$899.16 \\ &= \$44.96\end{aligned}$$

Because \$44.96 is greater than \$10.00, the minimum monthly payment is \$44.96.

Another form of credit is the personal loan. Many individuals require a personal loan to finance larger purchases such as a car or appliances. A personal loan allows them to borrow a specified sum of money from a financial institution and to repay it over a certain period of time.

The cost of borrowing from a financial institution depends upon the interest rate, the term (length) of the loan, and the way the loan is to be repaid. The institution usually requires that the product purchased by the loan be used as security or collateral. Individuals can choose loans in which the interest rates are fixed for the term or ones in which the rate is variable.

The term of the loan is the amount of time during which the conditions of the loan are in effect. Although an individual may choose to take a longer time to repay or amortize a loan in full, a loan is negotiated only up to a period of five years. On the last day of a term, a loan must be paid in full or renewed.

This lesson involves problems with personal loans having fixed interest rate. You will first use amortization tables (see next page) or a graphing calculator to solve.

Example 5

John requires a personal loan of \$10 000 for home renovations. His financial institution offers him a 3-year loan at a fixed rate of 8.5%.

- How much will John pay per month to repay the loan?
- How much will John pay in interest at the end of 3 years?

You may need to refer to the amortization table on the next page to answer these questions.

Solution

- This table gives the monthly payments required to repay a loan of \$1000 at 6% to 14% from 1 year to 5 years.

Move down the first column on the left, under Annual Rate, until you find 8.5%. Then move across that row until you come to 3 years. The monthly payment required for \$1000 is \$31.57. Since John's loan is for \$10 000, then the monthly payment is

$$\frac{10\,000}{1000} \times \$31.57 = \$315.70$$

- Since John is repaying the loan in 3 years and there are 12 months in a year, he makes 36 payments.

\therefore The total amount paid at the end of 36 months is

$$\$315.70 \times 36 = \$11\,365.20.$$

The interest is $\$11\,365.20 - \$10\,000 = \$1365.20$.

Amortization Period Monthly Payment Per \$1000 Loan Proceeds					
Annual Rate	1 Year Monthly	2 Years Monthly	3 Years Monthly	4 Years Monthly	5 Years Monthly
6.00%	\$86.07	\$44.33	\$30.43	\$23.49	\$19.34
6.25%	\$86.18	\$44.44	\$30.54	\$23.61	\$19.46
6.50%	\$86.30	\$44.56	\$30.66	\$23.72	\$19.57
6.75%	\$86.41	\$44.67	\$30.77	\$23.84	\$19.69
7.00%	\$86.53	\$44.78	\$30.88	\$23.95	\$19.81
7.25%	\$86.64	\$44.89	\$31.00	\$24.07	\$19.93
7.50%	\$86.76	\$45.01	\$31.11	\$24.19	\$20.05
7.75%	\$86.87	\$45.12	\$31.23	\$24.30	\$20.16
8.00%	\$86.99	\$45.24	\$31.34	\$24.42	\$20.28
8.25%	\$87.10	\$45.34	\$31.45	\$24.53	\$20.40
8.50%	\$87.22	\$45.46	\$31.57	\$24.65	\$20.52
8.75%	\$87.34	\$45.57	\$31.68	\$24.71	\$20.64
9.00%	\$87.45	\$45.68	\$31.80	\$24.89	\$20.76
9.25%	\$87.57	\$45.80	\$31.92	\$25.00	\$20.88
9.50%	\$87.68	\$45.91	\$32.03	\$25.12	\$21.00
9.75%	\$87.80	\$46.03	\$32.15	\$25.24	\$21.12
10.00%	\$87.92	\$46.14	\$32.27	\$25.36	\$21.25
10.25%	\$88.03	\$46.26	\$32.38	\$25.48	\$21.37
10.50%	\$88.15	\$46.38	\$32.50	\$25.60	\$21.49
10.75%	\$88.27	\$46.49	\$32.62	\$25.72	\$21.62
11.00%	\$88.38	\$46.61	\$32.74	\$25.85	\$21.74
11.25%	\$88.50	\$46.72	\$32.86	\$25.97	\$21.87
11.50%	\$88.62	\$46.84	\$32.98	\$26.09	\$21.99
11.75%	\$88.73	\$46.96	\$33.10	\$26.21	\$22.12
12.00%	\$88.85	\$47.07	\$33.21	\$26.33	\$22.24
12.25%	\$88.97	\$47.19	\$33.33	\$26.46	\$22.37
12.50%	\$89.08	\$47.31	\$33.45	\$26.58	\$22.50
12.75%	\$89.20	\$47.42	\$33.57	\$26.70	\$22.63
13.00%	\$89.32	\$47.54	\$33.69	\$26.83	\$22.75
13.25%	\$89.43	\$47.66	\$33.81	\$26.95	\$22.88
13.50%	\$89.55	\$47.78	\$33.94	\$27.08	\$23.01
13.75%	\$89.67	\$47.89	\$34.06	\$27.20	\$23.14
14.00%	\$89.79	\$48.01	\$34.18	\$27.33	\$23.27

Alternate solution using the TI-83 (graphing calculator) if you have one:

1. Press (Finance). Choose 1: TVM Solver

2. Enter $N = 36$
 $I\% = 8.5$
 $PV = 10000$
 $FV = 0$
 $P/Y = 12$
 $C/Y = 12$

N is 12 payments per year for 3 years (36 payments). PV is entered as a positive number since \$10 000 is received from a financial institution.

Place the cursor after $PMT =$

3. Press (Solve) to find PMT (payment).

The payment is \$315.68.

4. If you wish to find the amount of interest, return to the home screen.

Press (Quit)

5. Press (Finance). Scroll down to A: ΣInt (and press

to read A: ΣInt (A, B).

6. On the home screen, enter ,) and press

.

Total interest = \$1364.31

More useful than the graphing calculator for interest calculations is a computer spreadsheet. This course does not teach spreadsheet use, but you can learn how to do it via the spreadsheet's onscreen "help" function under "interest" or "payment."



Self-Marking Activity

1. Copy and complete the following chart.

Cash-Selling Price Without Tax	PST	GST	Cash-Selling Price With Tax	Down Payment	Monthly Payment	Months	Installment Price	Finance Charge
a) \$760	_____	_____	_____	\$75	\$110	8	_____	_____
b) \$279.98	_____	_____	_____	_____	\$45	6	\$355.00	_____
c) \$850	_____	_____	_____	\$0	\$80	13	_____	_____
d) \$1195.99	_____	_____	_____	\$200	\$150	_____	\$2000	_____

2. Calculate the percent rate by which the installment price exceeds the cash-selling price for items (a) to (d) in question 1.
3. City Electronics offers its customers a buy-now, pay-later option. Using this option, customers pay taxes, a delivery charge at the time of purchase, as well as an administration fee per item. Customers have 6 months to pay for their purchases. They pay no interest charges during this time. After 6 months, the company charges customers 2% per month on any outstanding amount.

On October 1, Michael purchased a television from this company for \$798.98 (plus tax) on the company's buy-now, pay-later plan. The pay-now price was \$729.98 (plus tax). He has to pay an administration fee of \$49.99 and a \$30 delivery charge.

- Calculate Michael's total cost if he pays for the purchase on April 1 of the following year.
- Calculate Michael's total cost if he pays for the purchase on June 1 of the following year.
- Calculate Michael's total cost if he had paid for the television at the time of purchase.
- Express as a percent the difference in the two prices compared to the total pay-now price.

4. Company Furniture Plus offers its customers a buy-now, pay-later plan. The customer pays taxes, a delivery charge of \$25, and a \$40 administration fee at the time of purchase. Customers have 1 year to pay for their purchases. After 12 months, customers are charged 2.25% interest per month on any outstanding amount.

Lucy and Peter purchased a bedroom suite for \$1995.95 (plus tax) on a buy-now, pay-later plan on August 15. How much will they pay if the entire amount is paid on September 15 of the following year?

5. Complete the table below to determine the cost of credit for using a department store charge account for the period shown. Monthly credit charges are 1.4% of the balance due.

Month	Previous Balance	- Payment Made	+ Purchases Charged	⇒ Balance Due	+ Credit Charges	⇒ New Balance
February	\$314.65	\$100.00	\$193.75		\$5.72	\$414.12
March		\$150.00	\$59.60			
April		\$140.00	\$421.83			\$618.62
May	\$618.62	\$200.00	\$39.65			
June		\$250.00	\$58.11			
July		\$150.00	\$77.21			
August	\$206.68	\$120.00	\$163.09		\$3.50	\$253.27

6. John requires a personal loan of \$5500 to purchase furniture and appliances. His financial institution offers him a fixed interest loan of $7\frac{3}{4}\%$ for this 5-year loan.
- How much will his monthly payment be?
 - How much will he pay in interest over the 5 years?
 - How much less interest would he pay if the loan was for 3 years?
7. Julie wants to pay off her credit card balances of \$3500, \$6850, and \$1775. Financial Institution A offers her a fixed rate of 8% for a 4-year loan and Financial Institution B offers her a fixed rate of $8\frac{1}{2}\%$ for a 4-year period. What is the difference in interest over the 4 years between the two financial institutions?

Check your answers in the Module 1 Answer Key.



Lesson 7

Budget Preparation

Outcome

When you complete this lesson, you will be able to

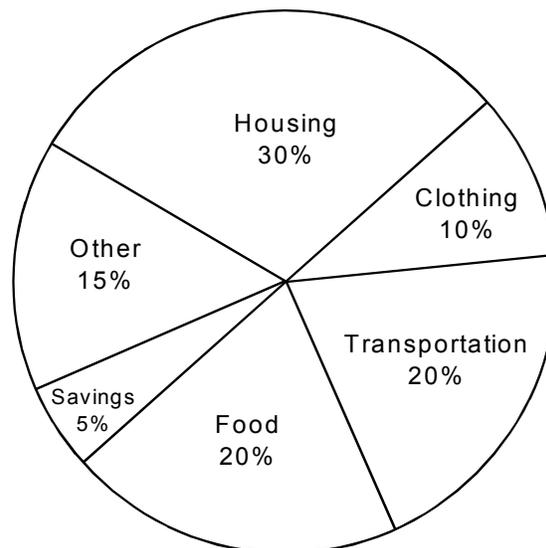
- prepare a monthly budget

Overview

Budgeting could be simply defined as a plan for spending your money. It is a financial plan for assisting people or businesses to manage their expenses relative to their total earnings. It enables you to buy what you need and want within the limits of your income. It gives you control over your spending and lets you know where your money is being spent.

There are many suggestions by financial experts as to what percentage of income should be allotted to each expenditure. One of these suggestions indicates that you should pay yourself (or save) 5-10% of your take-home pay or net income. This money should be used for RSPs and other investments like mutual funds. Once you have paid yourself, you then use the rest of your net income for your expenses.

Experts in the field of budgeting have not recommended levels for spending in the various categories of consumer spending. The following graph provides general guidelines only. A budget must meet the goals and needs of one's own particular situation.



A good guideline for total housing costs is 30% of your take-home pay. This includes all costs related to living in a home — rent or mortgage payments, utility bills (gas, hydro, telephone, etc.), maintenance and repair costs, taxes, etc. A budget allocating more than 30% of income to housing may result in financial difficulties for a family.

Example 1

The take-home pay of a telephone company employee is \$32 500. Using the percentages on the graph, calculate the amounts that should be allotted to each of these items in a budget: housing, clothing, transportation, food, savings, other.

Solution

Housing	$\$32\,500 \times 30\%$	=	\$9750
Clothing	$\$32\,500 \times 10\%$	=	\$3250
Transportation	$\$32\,500 \times 20\%$	=	\$6500
Food	$\$32\,500 \times 20\%$	=	\$6500
Savings	$\$32\,500 \times 5\%$	=	\$1625
Other	$\$32\,500 \times 15\%$	=	\$4875
	Total	=	<u>\$32 500</u>

Many different forms are created for budgeting but they will all have similar entries.

The first step when setting up a budget is to estimate accurately your income. You must be careful not to overestimate your income. Otherwise, this will invalidate the rest of the budget.

Income may be categorized into one of three broad categories:

1. Regular Income — This is your take-home pay or net income after deductions. Remember that gross income is before deductions. That is why it is necessary to base your income on your actual take-home pay.
2. Additional Income — This is any income you expect to receive on a regular basis, for example,
 - child tax benefits
 - pensions
 - insurance benefits
 - interest payments

3. **Other Income** — This includes such items as

- bonuses
- tips and gratuities
- overtime payments
- tax refunds

To estimate your expenses, you will analyze your current regular spending habits. These expenses are separated into two major categories:

- **Fixed Expenses** — Fixed expenses are definite amounts that must be paid at regular intervals. They will not change from month to month. Examples of fixed monthly expenses include mortgage or rent payments, telephone, and hydro.

There are annual expenses such as car insurance, home insurance, and property taxes that are usually paid once a year. The cost of these items can be spread over 12 months if you want to include them in a monthly budget. There may also be monthly expenses such as credit card payments and loan payments.

- **Variable Expenses** — Variable expenses are expenses that vary from month to month. Expenditures such as food, clothing, recreation, and automobile maintenance will vary.
- **Reserve Funds** — Savings is one part of the budget that is often overlooked or left out altogether. Financial planners suggest that you have a cash reserve of two month's pay to meet unexpected expenses that might occur. If your expenses for a particular month exceed the monthly income, the reserve fund will be reduced accordingly.

Budgets can be set up weekly, biweekly, monthly, or yearly. It is recommended that a budget be set up to match your pay period. In this lesson, all budgets will be set up on a monthly basis.

When preparing a budget, you should complete the following steps:

1. Determine your average monthly income
2. Determine your monthly fixed and variable expenses
3. Determine a reserve fund
4. Prepare a monthly budget statement

Example 2

Allan Smythe, an administrative assistant, receives a salary of \$450 a week. After his employer makes deductions from his gross weekly salary, his net weekly salary is \$360 a week. His wife receives a child tax benefit of \$52.25 monthly for their two children.

Their fixed expenses include:

- a) a home on which they are making mortgage payments of \$425 per month
- b) payments on a car of \$180 a month
- c) average monthly telephone bill of \$9.60
- d) average monthly hydro bill of \$70.00
- e) yearly car insurance premium of \$258.00
- f) yearly life insurance premium of \$240.00
- g) yearly home insurance on a \$40 000 home at a premium rate of \$0.42 per \$100 of insurance
- h) property taxes on the home. The home is assessed for property tax purposes at \$13 000 and the mill rate is 54 mills.

The family estimates its variable expenses to be:

- a) groceries of \$400 per month
- b) clothing of \$480 per year
- c) car maintenance of \$300 per year
- d) gasoline of \$70 per month
- e) entertainment of \$450 per year
- f) vacation of \$600 per year
- g) newspapers and periodicals of \$90 per year

Prepare a monthly budget for the Smythe family for the month of June.

Solution

Notes:

- To be consistent, whenever a person's take-home pay is paid weekly, this amount should be multiplied by 52 and then divided by 12 to get the average monthly income.
- The same logic would apply to any expenses that are paid on a weekly basis.
- All yearly expenses should be divided by 12 to get the average monthly expense.

The complete budget form for the Smythe family is shown on the following page. Explanations for this form are found below.

Explanations

$$\text{Monthly take-home pay: } \frac{\$360 \times 52}{12} = \$1560$$

$$\text{Monthly family allowance: } \$52.25$$

$$\text{Monthly car insurance: } \frac{\$258.00}{12} = \$21.50$$

$$\text{Monthly life insurance: } \frac{\$240.00}{12} = \$20.00$$

$$\text{Home insurance: } \frac{\$40\,000}{100} \times 0.42 = \frac{168}{12} = \$14.00$$

$$\text{Property taxes: } \frac{\$13\,000}{1000} \times 54 = \frac{702}{12} = \$58.50$$

$$\text{Clothing: } \frac{\$480}{12} = \$40$$

$$\text{Car maintenance: } \frac{\$300}{12} = \$25$$

$$\text{Entertainment: } \frac{\$450}{12} = \$37.50$$

$$\text{Vacation: } \frac{\$600}{12} = \$50.00$$

$$\text{Newspapers: } \frac{\$90}{12} = \$7.50$$

$$\text{Reserve fund: } \frac{2 \times (\$1560 + \$52.25)}{12} = \frac{2 \times \$1612.25}{12} = \$268.71$$

1. Income		5. Personal Finances	
a) Regular Monthly Income	\$ <u>1560.00</u>	a) Personal Loan	\$ _____
b) Spouse's Regular Monthly Income	\$ _____	b) Investments	\$ _____
c) Additional Income	\$ <u>52.25</u>	c) RRSP*	\$ _____
d) Other Income	\$ _____	d) Life Insurance	\$ <u>20.00</u>
Total Monthly Income	#1 \$ <u>1612.25</u>	e) Charities	\$ _____
2. Housing Expenses		f) Credit Card Payments	\$ _____
a) Mortgage or Rent	\$ <u>425.00</u>	g) Service Charges	\$ _____
b) Property Tax	\$ <u>58.50</u>	h) Savings**	\$ <u>268.71</u>
c) Home/Property Insurance	\$ <u>14.00</u>	i) Other Personal Finances	\$ _____
d) Repairs/Maintenance	\$ _____	Total Personal Finances	#5 \$ <u>288.71</u>
e) Other Housing Expenses	\$ _____	6. Personal Expenses	
Total Housing Expenses	#2 \$ <u>497.50</u>	a) Groceries	\$ <u>400.00</u>
3. Utilities		b) Clothing	\$ <u>40.00</u>
a) Hydro	\$ <u>70.00</u>	c) Entertainment	\$ <u>37.50</u>
b) Gas	\$ _____	d) Gifts	\$ _____
c) Phone	\$ <u>9.60</u>	e) Vacations	\$ <u>50.00</u>
d) Water	\$ _____	f) Other Personal Expenses	\$ _____
e) Other	\$ _____	Total Personal Expenses	#6 \$ <u>527.50</u>
Total Utilities	#3 \$ <u>79.60</u>	7. Other Expenses	
4. Transportation		a) Newspapers	\$ <u>7.50</u>
a) Public Transport	\$ _____	b)	\$ _____
b) Car Loan	\$ <u>180.00</u>	c)	\$ _____
c) Car Fuel	\$ <u>70.00</u>	Total Other Expenses	#7 \$ <u>7.50</u>
d) Car Maintenance	\$ <u>25.00</u>	Total Monthly Expenses	
e) Car Insurance	\$ <u>21.50</u>	Total Monthly Expenses	#8 \$ <u>1697.31</u>
f) Other Transportation	\$ _____	Income Minus Expenses (#1-#8)	#9 \$ <u>(85.06)</u>
Total Transportation	#4 \$ <u>296.50</u>	Comments: <i>This family is spending \$85.06 per month over their income.</i>	

* Note 1: Financial Analysts advise that RSP contributions should start early in one's working life.

** Note 2: Financial Analysts advise that a reserve fund of two or three months of income should be saved for emergencies. Generally, it could take several years to build up a reserve fund. Reserve Fund calculation: Calculate two months of income and divide by the number of months it will take to achieve it.



Self-Marking Activity

1. The following chart suggests what percent rate of take-home pay is recommended for various expenses:

Shelter — 25%

Food — 30%

Clothing — 10%

Transportation — $12\frac{1}{2}\%$

Health and Personal Care — $7\frac{1}{2}\%$

Recreation — 5%

Insurance — 5%

Savings — 5%

- a) Draw a circle graph representing the above percentages. Remember to use your knowledge of central angles to draw the various sectors.
- b) How much would a person whose annual take-home pay is \$65 500 allot for each category.
2. Dean Charles earns a net weekly salary of \$645.25. The family receives a monthly child tax benefit cheque that amounts to \$42.50 **per child**. There are four children in the family.

Fixed expenses for the family include:

- a) monthly mortgage payment \$625.00
- b) monthly car payment 213.50
- c) average monthly telephone bill 17.40
- d) average monthly hydro bill 120.00
- e) yearly car insurance premium 822.00
- f) monthly life insurance premium 18.00
- g) property taxes for the year 1925.00
- h) yearly home insurance premium 275.00

Variable expenses for the family include:

- a) food (average per month) \$425.00
- b) clothing expenses for the year 725.00
- c) average car maintenance for the year 340.00
- d) gasoline per month 80.00
- e) entertainment per year 750.00
- f) Christmas spending per year 630.00

- g) newspapers and periodicals (per year)210.00
- h) water bill (paid quarterly)115.00

Prepare an estimated monthly budget for the Charles family using a blank budget form found at the end of the lesson.

3. Bob McKenzie has a weekly take home pay of \$265.00. His wife has a weekly net income of \$535.00. The McKenzies have two children for whom they receive monthly child tax benefits of \$23.50 per child.

Fixed expenses for the family include:

- a) monthly mortgage payment \$680.00
- b) monthly car payment295.00
- c) average monthly telephone bill85.30
- d) total utilities for the month168.90
- e) yearly Autopac premium587.00
- f) home is assessed for property tax purposes
at \$55 000; the mill rate is 60 mills
- g) home insurance (yearly premium)296.00
- h) monthly Home Improvement loan payment312.00

Variable expenses for the family include:

- a) food (average per month) \$574.00
- b) clothing expenses for the year885.00
- c) average car maintenance per month55.00
- d) gasoline per month125.00
- e) entertainment per year1850.00
- f) yearly vacation4260.00
- g) newspapers and periodicals (per year)158.00
- h) average monthly credit card payment200.00
- i) Holiday gift spending per year620.00
- j) average babysitting per year780.00

Prepare an estimated monthly budget for the McKenzie family (see blank budget found at the end of the lesson).

1. Income		5. Personal Finances	
a) Regular Monthly Income	\$ _____	a) Personal Loan	\$ _____
b) Spouse's Regular Monthly Income	\$ _____	b) Investments	\$ _____
c) Additional Income	\$ _____	c) RRSP*	\$ _____
d) Other Income	\$ _____	d) Life Insurance	\$ _____
Total Monthly Income	#1 \$ _____	e) Charities	\$ _____
2. Housing Expenses		f) Credit Card Payments	\$ _____
a) Mortgage or Rent	\$ _____	g) Service Charges	\$ _____
b) Property Tax	\$ _____	h) Savings**	\$ _____
c) Home/Property Insurance	\$ _____	i) Other Personal Finances	\$ _____
d) Repairs/Maintenance	\$ _____	Total Personal Finances	#5 \$ _____
e) Other Housing Expenses	\$ _____	6. Personal Expenses	
Total Housing Expenses	#2 \$ _____	a) Groceries	\$ _____
3. Utilities		b) Clothing	\$ _____
a) Hydro	\$ _____	c) Entertainment	\$ _____
b) Gas	\$ _____	d) Gifts	\$ _____
c) Phone	\$ _____	e) Vacations	\$ _____
d) Water	\$ _____	f) Other Personal Expenses	\$ _____
e) Other	\$ _____	Total Personal Expenses	#6 \$ _____
Total Utilities	#3 \$ _____	7. Other Expenses	
4. Transportation		a)	\$ _____
a) Public Transport	\$ _____	b)	\$ _____
b) Car Loan	\$ _____	c)	\$ _____
c) Car Fuel	\$ _____	Total Other Expenses	#7 \$ _____
d) Car Maintenance	\$ _____	Total Monthly Expenses	
e) Car Insurance	\$ _____	Total Monthly Expenses	#8 \$ _____
f) Other Transportation	\$ _____	Income Minus Expenses (#1-#8)	#9 \$ _____
Total Transportation	#4 \$ _____	Comments:	

* Note 1: Financial Analysts advise that RSP contributions should start early in one's life.

** Note 2: Financial Analysts advise that a reserve fund of two or three months of income should be saved for emergencies. Generally, it could take several years to build up a reserve fund. Reserve Fund calculation: Calculate two months of income and divide by the number of months it will take to achieve it.

The savings entry is for the Reserve Fund. Reserve Fund Payment – Deficit = New Reserve Payment.

1. Income		5. Personal Finances	
a) Regular Monthly Income	\$ _____	a) Personal Loan	\$ _____
b) Spouse's Regular Monthly Income	\$ _____	b) Investments	\$ _____
c) Additional Income	\$ _____	c) RRSP*	\$ _____
d) Other Income	\$ _____	d) Life Insurance	\$ _____
Total Monthly Income	#1 \$ _____	e) Charities	\$ _____
2. Housing Expenses		f) Credit Card Payments	\$ _____
a) Mortgage or Rent	\$ _____	g) Service Charges	\$ _____
b) Property Tax	\$ _____	h) Savings**	\$ _____
c) Home/Property Insurance	\$ _____	i) Other Personal Finances	\$ _____
d) Repairs/Maintenance	\$ _____	Total Personal Finances	#5 \$ _____
e) Other Housing Expenses	\$ _____	6. Personal Expenses	
Total Housing Expenses	#2 \$ _____	a) Groceries	\$ _____
3. Utilities		b) Clothing	\$ _____
a) Hydro	\$ _____	c) Entertainment	\$ _____
b) Gas	\$ _____	d) Gifts	\$ _____
c) Phone	\$ _____	e) Vacations	\$ _____
d) Water	\$ _____	f) Other Personal Expenses	\$ _____
e) Other	\$ _____	Total Personal Expenses	#6 \$ _____
Total Utilities	#3 \$ _____	7. Other Expenses	
4. Transportation		a)	\$ _____
a) Public Transport	\$ _____	b)	\$ _____
b) Car Loan	\$ _____	c)	\$ _____
c) Car Fuel	\$ _____	Total Other Expenses	#7 \$ _____
d) Car Maintenance	\$ _____	Total Monthly Expenses	#8 \$ _____
e) Car Insurance	\$ _____	Income Minus Expenses (#1-#8)	#9 \$ _____
f) Other Transportation	\$ _____	Comments:	
Total Transportation	#4 \$ _____		

* Note 1: Financial Analysts advise that RSP contributions should start early in one's life.

** Note 2: Financial Analysts advise that a reserve fund of two or three months of income should be saved for emergencies. Generally, it could take several years to build up a reserve fund. Reserve Fund calculation: Calculate two months of income and divide by the number of months it will take to achieve it.

The savings entry is for the Reserve Fund. Reserve Fund Payment – Deficit = New Reserve Payment.



Check your answers in the Module 1 Answer Key.

Lesson 8

Exponential Functions and Investments

Outcomes

When you complete this lesson, you will be able to

- calculate simple interest
- investigate statistical plots involving compound situations
- calculate compound interest

Overview

Financial institutions borrow and lend money. When you invest in a financial institution, you are lending them money for a period of time. The financial institution lends your money to individuals who need it. These individuals are charged interest on the money they borrow. The interest rate they pay for the loan to the financial institution is higher than the interest rate you receive from the same institution in return for your investment.

The mathematical formula for calculating interest is $I = prt$ where

I = interest

p = principal or present value which is the amount invested or borrowed

r = annual rate of interest expressed as a percent

t = length of time in years.



Note: The time must always be in years. If t is given in months, divide by 12 and if given in days divide by 365.

This is the formula for calculating simple interest. Interest is paid at the end of the term or length of time involved.

The amount (A) is always the amount in the bank after the interest has been added to the principal.

Amount = Principal + Interest

$$\therefore A = p + prt$$

Example 1

Len invested \$2400 at an interest rate of 4% per annum. Calculate the interest he will earn at the end of

- a) 2 years
- b) 8 months
- c) 200 days

Solution

$$p = \$2400, r = 4\%$$

a) $t = 2$ years

$$I = prt = \$2400 \times 0.04 \times 2 = \$192.00$$

b) $t = 8$ months or $\frac{8}{12}$ years

$$I = prt = \$2400 \times 0.04 \times \frac{8}{12} = \$64.00$$

c) $t = 200$ days or $\frac{200}{365}$ years

$$I = prt = \$2400 \times 0.04 \times \frac{200}{365} = \$52.60$$

The formula $I = prt$ involves four variables. As long as you are given three of the four values, you may use this formula.

**Example 2**

Jean lent \$600 to her friend 4 months ago. Her friend paid Jean \$607 in return. What rate of interest was involved?

Solution

$$p = 600, t = 4 \text{ months, and } a = \$607$$

$$\text{The interest} = \$607 - \$600 = \$7.00.$$

$$I = prt$$

$$7 = 600r \left(\frac{4}{12} \right)$$

$$\frac{7}{600 \times \frac{4}{12}} = r$$

$$r = 0.035 \text{ or } 3.5\%$$

Example 3

Jane deposits \$6000 into her account, earning interest at the rate of $4\frac{1}{2}\%$. After a certain period of time, her balance shows \$6073.97. What length of time in days was involved?

Solution

$$p = 6000, r = 4\frac{1}{2}\%, I = \$73.97, t = ?$$

$$I = prt$$

$$73.97 = 6000(0.045)t$$

$$t = \frac{73.97}{6000 \times (0.045)}$$

$$= 0.273963 \text{ years}$$

$$t \text{ (in days)} = 0.273963 \times 365$$

$$= 100 \text{ days}$$

Most investments involve compound interest. An investment earns compound interest when the interest from each time period is reinvested into the principal and earns interest in subsequent time periods.

Example 4

If Jason invested \$1000 at 6% per annum (per year), compounded annually (interest is calculated each year), calculate his interest at the end of 4 years.

Solution

Interest Period	$I = prt$	\$ Amount
0		1000.00
1	$I = 1000 \times 0.06 \times 1 = \60	1060.00
2	$I = 1060 \times 0.06 \times 1 = \63.60	1123.60
3	$I = 1123.60 \times 0.06 \times 1 = \67.42	1191.02
4	$I = 1191.02 \times 0.06 \times 1 = \71.46	1262.48

To find the interest in the first year, use the formula $I = prt$ where $p = 1000$, $r = 6\% = 0.06$, and $t = 1$. The interest is \$60. The interest is added to the principal to give you the amount at the end of the first year. Therefore, $\$1000 + \$60 = \$1060$. The amount of \$1060 becomes the new principal and it is used to calculate the interest in the second year. The process then repeats itself as shown in the table.

A generalization may be reached using the following chart:

Number of Interest Periods	Interest Calculation	Amount
0		p
1	$I = pr$	$p + pr = p(1 + r)$
2	$I = p(1 + r)r$	$p(1 + r) + p(1 + r)r = p(1 + r)(1 + r) = p(1 + r)^2$
3	$I = p(1 + r)^2r$	$p(1 + r)^2 + p(1 + r)^2r = p(1 + r)^2(1 + r) = p(1 + r)^3$
4	$I = p(1 + r)^3r$	$p(1 + r)^3 + p(1 + r)^3r = p(1 + r)^3(1 + r) = p(1 + r)^4$

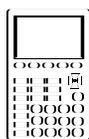
After n periods, amount = $p(1 + r)^n$.

$$A = p(1 + r)^n$$

Compound interest is a percentage of the balance that is added periodically to the preceding balance, resulting in a new, larger balance. Each time interest is compounded, the amount of interest added is based on the latest balance. Compound interest payments are often referred to as interest paid on interest.

The following chart represents the growth of the value of a \$7000 RSP at a 9% annual interest rate.

Time (years)	Value (\$)
0	7000
1	7630
2	8317
3	9065
4	9881
5	10770
6	11740
7	12796
8	13948
9	15203
10	16572



You can use your graphing calculator or spreadsheet software to plot this table as a graph. Consult the calculator's user manual or the spreadsheet on-screen help for directions on producing a "plot" or "graph."

Definition of an Exponential Function

A function $f(x) = ab^x$ where a and b are real numbers such that $a \neq 0$, $b > 0$, and $b \neq 1$, and $x \in \mathbb{R}$ is an exponential function. The domain is $(-\infty, \infty)$.

Previously the formula $A = p(1 + r)^n$ was used to find the amount of the investment at a rate, r , for a specific term of one year. The interest was determined once a year and then added to the principal for interest calculation the following year. It was interest that was compounded annually.

Suppose you invest p dollars at 12% compounded semiannually. Your money grows by 6% for each half year. At the end of the year, you would have $p(1.06)^2$ dollars. If the interest were compounded quarterly (four times a year), the money would grow by 3% per quarter. At the end of the year, you would have $p(1.03)^4$. The value of $p(1.01)^{12}$ indicates a money growth of 1% per month for 12 months. This can be put into a table to show the pattern involved when the 12% annual rate is compounded differently and the investment is \$1.

Interest Period	% Growth Rate Per Period	Growth Factor Per Period	Amount (A) = $p(1 + r)^n$
Annual	$\frac{12\%}{1} = 12\%$	$1 + \frac{0.12}{1}$	$1(1.12)^1 = 1.12$
Semiannually	$\frac{12\%}{2} = 6\%$	$1 + \frac{0.12}{2}$	$1(1.06)^2 = 1.1236$
Quarterly	$\frac{12\%}{3} = 4\%$	$1 + \frac{0.12}{4}$	$1(1.03)^4 \approx 1.1255$
Monthly	$\frac{12\%}{12} = 1\%$	$1 + \frac{0.12}{12}$	$1(1.01)^{12} \approx 1.1268$
Daily	$\frac{12\%}{365} = \frac{12}{365}\%$	$1 + \frac{0.12}{365}$	$1\left(1 + \frac{0.12}{365}\right)^{365} \approx 1.1275$

$$A = p(1 + r)^n \text{ can be adapted to } A = p\left(1 + \frac{r}{s}\right)^{n \cdot s}$$

where A = final value of the investment (future value)

p = present value or principal

r = rate of interest or percent growth rate

n = number of years

s = number of compounding periods in a year

In the last column of the above table, you can see that daily compounding means more interest earned in a year.

The following example shows the effect of compounding on the amount of money invested.

Example 5

A present value of \$1000 is invested at 12% for 3 years. Find the amount at the end of the the 3-year period if the interest is compounded

- annually
- semiannually
- quarterly
- monthly
- daily

Solution

- a) $p = \$1000$, $r = 0.12$, $n = 3$ years,
 $s =$ one compounding period (annual) $= 1$

$$\begin{aligned} A &= p\left(1 + \frac{r}{s}\right)^{ns} \\ &= 1000\left(1 + \frac{0.12}{1}\right)^{3 \cdot 1} \\ &= 1000(1.12)^3 \\ &= 1000(1.404928) \\ &= \$1404.93 \end{aligned}$$



- b) $p = \$1000$, $r = 0.12$, $n = 3$,
 $s =$ two compounding periods (semiannual) $= 2$

$$\begin{aligned} A &= p \left(1 + \frac{r}{s} \right)^{ns} \\ &= 1000 \left(1 + \frac{0.12}{2} \right)^{3 \cdot 2} \\ &= 1000(1.06)^6 \\ &= 1000(1.418519112) \\ &= \$1418.52 \end{aligned}$$

- c) $p = \$1000$, $r = 0.12$, $n = 3$,
 $s = 4$ compounding period (quarterly)

$$\begin{aligned} A &= p \left(1 + \frac{r}{s} \right)^{ns} \\ &= 1000 \left(1 + \frac{0.12}{4} \right)^{3 \cdot 4} \\ &= 1000(1.03)^{12} \\ &= 1000(1.425760887) \\ &= \$1425.76 \end{aligned}$$

- d) $p = \$1000$, $r = 0.12$, $n = 3$,
 $s = 12$ compounding period (monthly)

$$\begin{aligned} A &= p \left(1 + \frac{r}{s} \right)^{ns} \\ &= 1000 \left(1 + \frac{0.12}{12} \right)^{3 \cdot 12} \\ &= 1000(1.01)^{36} \\ &= 1000(1.430768784) \\ &= \$1430.77 \end{aligned}$$

- e) $p = \$1000$, $r = 0.12$, $n = 3$,
 $s = 365$ compounding period (daily)

$$\begin{aligned} A &= p \left(1 + \frac{r}{s} \right)^{ns} \\ &= 1000 \left(1 + \frac{0.12}{365} \right)^{3 \cdot 365} \\ &= 1000(1.000328767)^{1095} \\ &= 1000(1.433244614) \\ &= \$1433.24 \end{aligned}$$

In each case, the principal or present value subtracted from the amount gives you the interest.

In part (e), $\$1433.24 - \$1000 = \$433.24$ is the interest.

Sometimes the interest and the future value are known and you have to solve for one of the other components as shown in the following examples.

Example 6

If the money is invested at 6%, compounded semiannually for 6 years, find the principal that is invested to end up with \$8000.

Solution

$$A = 8000, r = 0.06, n = 6$$

$$\begin{aligned} A &= p \left(1 + \frac{r}{s} \right)^{ns} \\ \$8000 &= p \left(1 + \frac{0.06}{2} \right)^{6 \cdot 2} \end{aligned}$$

$$\frac{\$8000}{(1.03)^{12}} = p$$

$$\$5611.04 = p$$

The effective annual rate is the amount of simple interest that is equivalent to an interest rate compounded during a year.

Example 7

Determine the effective rate on a loan of \$2000 at 8% per year compounded semiannually.

Solution

The effective rate is the simple interest rate.

$$A = p\left(1 + \frac{r}{s}\right)^{ns}$$

$$\begin{aligned} A &= 2000\left(1 + \frac{0.08}{2}\right)^{1 \cdot 2} \\ &= 2000(1.04)^2 \\ &= \$2163.20 \end{aligned}$$

$$\text{Interest} = \$2163.20 - \$2000.00 = \$163.20$$

Simple Interest = prt

$$163.20 = 2000r(1)$$

$$\frac{163.20}{2000} = r$$

$$r = 8.16\%$$

Self-Marking Activity

1. Complete the following chart.



Principal	Rate	Time	Interest	Amount
a) \$3000	4 %	2 years	_____	_____
b) \$1500	3½ %	_____ mo.	_____	\$1508.75
c) _____	10.5%	6 mo.	\$178.50	_____
d) \$650	_____	75 days	\$8.00	_____
e) \$800	11 %	_____	\$44.00	_____

2. The growth of the value of an RSP is shown below:

Time (years)	Value (\$)
0	6000
1	6360
2	6742
3	7146
4	7575
5	8029
6	8511

- Estimate the time needed to reach \$10 000.
 - Estimate the value of the RSP after 10 years.
- John invests \$4500 in a bond that pays interest at 6% compounded annually. Make a table showing the value of the investment for 5 years. Plot the data and estimate the value of the investment after 9 years.
 - A town has a present population of 2000. It is expected to grow exponentially over the next 10 years at 3% per year. What is the expected population at the end of that time?
 - Determine the effective rate on a loan of \$3000 at 10% per year, compounded quarterly.
 - Determine the effective rate on a loan of 2500 at 5% per year, compounded semiannually.

7. A bank offers an interest rate of 5% per year, compounded annually. A second bank offers an interest rate of 5% per year, compounded quarterly. If \$6000 were deposited in each bank for 10 years, how much more income would be earned from the second bank than from the first?
8. Find the compound amount at the end of 10 years on an original principal of \$1500 at 4%, compounded
 - a) annually
 - b) semiannually
 - c) quarterly
 - d) monthly
 - e) daily
9. Calculate the value of the investment and the interest earned after the given time period.
 - a) \$6000 for 4 years at 6%, compounded monthly
 - b) \$500 for 8 years at $4\frac{1}{2}\%$, compounded semiannually
 - c) \$4500 for 6 years at 5%, compounded semiannually
 - d) \$900 for 5 years at 4%, compounded quarterly



Check your answers in the Module 1 Answer Key.

Review Section 1 before attempting the **review** questions beginning on the next page. These questions should help you consolidate your knowledge as you prepare for the Module 1 Section 1 Assignment.

Notes

Review

1. Sam worked at a rate of \$11.56/hour. For all hours over 37.5 in a week, he received time and a half. Calculate his gross income if in one week he worked 47.25 hours.
2. Jean worked 35 hours at \$7.50 per hour and earned tips of 15% of customers' food bills. The value of the meals served was \$3500. Find her gross income.
3. Gina works as a sales person for \$7.00 per hour plus a 5% commission on the first \$1000, 7% commission on the next thousand, and 11% on anything over that. Last week she worked for 40 hours and had \$2659 in sales. Calculate her gross income.
4. Refer back to question 1. Use the deduction tables to calculate Sam's net pay for the week. He pays \$42.50 in union dues and \$52.15 for an RSP.
5. Anna has a gross income of \$1500 a month. Her rate of income tax is 43.5%, 3.2% of gross pay for CPP, and 2.7% for EI. Find her net income.
6. The Graham family home is assessed at \$85 000. The portion assessment is 45%. The lot has a 15 m frontage. Local improvements are charged as follows: sewer \$3.87/m and sidewalks \$2.50/m. The municipal tax rate is 70 mills. Education taxes are based on the total portion assessment at a mill rate of 19.5 mills. A provincial tax credit of \$250 is given. What is the tax bill?
7. Which is the better buy and by how much: 5 kg box of Soap A for \$7.99 or 3.5 kg of Soap B for \$4.99?
8. a) If you exchange \$350 Canadian for American dollars, how much would you receive if the Canadian dollar in terms of the American dollar is 68.5 cents?

b) A motel in Seattle advertises daily rates of \$39. How much is that in Canadian currency?

9. A television has a cash price of \$999.99 plus tax. The installment terms are \$350 down and \$135 per month for seven months.
- Calculate the installment price.
 - Calculate the finance or carrying charge.
 - Calculate the percent rate at which the installment price exceeds the cash-selling price.
10. Complete the table below for finding the cost of credit for using a department store charge account for the period shown. Monthly credit charges are 1.4% of the balance due.

Month	Previous Balance	Payment Made	Purchases Charged	Balance Due	Credit Charge	New Balance
February	\$586.00	\$100.00	\$93.00			
March		\$200.00	\$121.75			
April		\$275.00	\$13.17			
May		\$200.00	\$87.13			

11. Charlie and Bonny Wood are both employed. Bonny receives a weekly salary of \$391.82 after deductions. Charlie receives a weekly salary of \$381.42. The family's expenses are listed below:

- a) monthly first mortgage payment \$531.50
- b) monthly second mortgage payment 201.65
- c) monthly car payment 237.75
- d) average monthly telephone bill 20.20
- e) average monthly hydro bill 200.00
- f) yearly car insurance premium 770.00
- g) monthly life insurance premium 22.00
- h) home is assessed for property tax purposes
at \$80 000; the mill rate is 22.35
- i) annual home insurance based on a home value
of \$60 000 at a cost of \$0.42 per \$100
- j) food (average per month) 740.00
- k) clothing expenses for the year 1200.00
- l) average car maintenance for the year 460.00
- m) gasoline per month 140.00
- n) entertainment per month 180.00
- o) newspapers and periodicals (per year) 102.00
- p) average monthly credit card payment 200.00
- q) water bill — paid quarterly 135.00

Using the information provided, prepare an estimated monthly budget for the Wood family on the blank budget form on the following page.

1. Income		5. Personal Finances	
a) Regular Monthly Income	\$ _____	a) Personal Loan	\$ _____
b) Spouse's Regular Monthly Income	\$ _____	b) Investments	\$ _____
c) Additional Income	\$ _____	c) RRSP*	\$ _____
d) Other Income	\$ _____	d) Life Insurance	\$ _____
Total Monthly Income	#1 \$ _____	e) Charities	\$ _____
2. Housing Expenses		f) Credit Card Payments	\$ _____
a) Mortgage or Rent	\$ _____	g) Service Charges	\$ _____
b) Property Tax	\$ _____	h) Savings**	\$ _____
c) Home/Property Insurance	\$ _____	i) Other Personal Finances	\$ _____
d) Repairs/Maintenance	\$ _____	Total Personal Finances	#5 \$ _____
e) Other Housing Expenses	\$ _____	6. Personal Expenses	
Total Housing Expenses	#2 \$ _____	a) Groceries	\$ _____
3. Utilities		b) Clothing	\$ _____
a) Hydro	\$ _____	c) Entertainment	\$ _____
b) Gas	\$ _____	d) Gifts	\$ _____
c) Phone	\$ _____	e) Vacations	\$ _____
d) Water	\$ _____	f) Other Personal Expenses	\$ _____
e) Other	\$ _____	Total Personal Expenses	#6 \$ _____
Total Utilities	#3 \$ _____	7. Other Expenses	
4. Transportation		a)	\$ _____
a) Public Transport	\$ _____	b)	\$ _____
b) Car Loan	\$ _____	c)	\$ _____
c) Car Fuel	\$ _____	Total Other Expenses	#7 \$ _____
d) Car Maintenance	\$ _____	Total Monthly Expenses	
e) Car Insurance	\$ _____	Income Minus Expenses (#1–#8)	#9 \$ _____
f) Other Transportation	\$ _____	Comments:	
Total Transportation	#4 \$ _____		

* Note 1: Financial Analysts advise that RSP contributions should start early.

** Note 2: Financial Analysts advise that a reserve fund of two or three months of income should be saved for emergencies. Generally, it could take several years to build up a reserve fund. Reserve Fund calculation: Calculate two months of income and divide by the number of months it will take to achieve it.

The savings entry is for the Reserve Fund. Reserve Fund Payment – Deficit = New Reserve Payment.

12. The growth of the value of an RRSP is as shown in the table.

Time (years)	Value (\$)
0	5000
1	5400
2	5832
3	6299
4	6802
5	7347
6	7934

- a) Estimate the time needed to reach \$10 000.
b) Estimate the value of the RRSP after 10 years.
13. Sally invests \$4000 in a bond that pays 6% interest, compounded annually. Make a table showing the value of the investment over the 5 years. Plot the data and estimate the value of the investment after 9 years.
14. Find the compound amount and the interest at the end of 5 years on an original principal of \$2000 at 8% compounded:
- a) annually
b) semiannually
c) quarterly
d) monthly



Check your answers in the Module 1 Answer Key.

Now do the Section Assignment which begins on the next page.

May I Use My Graphing Calculator on this Assignment?

If you have a *hand-held* graphing calculator, you may! In fact, you may use a hand-held graphing calculator on *all* the assignments in this course.



PRINCIPLES OF MATHEMATICS 11

Section Assignment 1.1

General Instructions for Assignments

These instructions apply to all the Assignments, but will not be reprinted each time. Remember them for future sections.

- (1) Treat this assignment as a test, so do not refer to your Module or notes or other materials. A scientific calculator is permitted.
- (2) Where questions require computations or have several steps, show your work.
- (3) Always read the question carefully to ensure you answer what is asked. Often unnecessary work is done because a question has not been read correctly.

Section Assignment 1.1
Consumer Mathematics

Total Value: 50 marks

(Mark values in brackets)

1. Jim works 48 hours and earns \$9.50 per hour. Time and a half is earned on hours worked over 40. He pays \$11.40 per week in union dues and contributes \$27.60 per week to a registered savings plan. Find his:
- (2) a) gross wage
- (1) b) CPP contribution
- (1) c) EI contribution
- (2) d) taxable income
- (1) e) income tax deductions
- (1) f) net income

2. The Jones family bought a house for \$125 000. The house was assessed at \$95 000 and the rate of assessment was 45%. Assume a general mill rate of 52 mills, an education levy of 15.2 mills, and a hospital levy of 5.3 mills. The frontage of the lot is 26.5 m. Local improvements are charted at an annual rate per metre of frontage as follows: sewer at \$2.75/m and sidewalks at \$1.47/m. Find the ratepayer's tax bill if a \$250 tax credit is given.

(6)

- (3) 3. Describe three factors that you must consider when determining the best buy for a purchase.
- a) _____

- b) _____

- c) _____

- (2) 4. If a 5.2 kg box of Superclean soap costs \$12.99 and an 8.7 kg box of the same soap costs \$17.99, which is the better deal. Defend your answer.

5. a) You are planning a trip to Germany. You estimate that you require 5000 marks. From the table below, determine how much this will cost in Canadian currency. (1)

Canadian Dollar		
Bank Buying Rate	Country	Bank Selling Rate
1.3633	USA — dollar	1.4168
2.1902	UK — pound	2.2902
0.2411	Finland — markka	0.2637
0.9956	Australia — dollar	1.1072
0.10360	Austria — schilling	0.11226
0.7325	Germany — mark	0.7934
2.1902	Scotland — pound	2.2902
1.9758	Ireland — pound	2.0838

- b) Your uncle returned from Finland and had 3400 markkas. He goes to the bank to convert back to Canadian funds. How much money will he get? (1)
- c) How much American money will you get for \$3000 Canadian? (1)
6. The value of the Canadian dollar in terms of the American dollar was 65.5 cents.
- a) If you change \$750 Canadian to American funds how much will you receive? (1)
- b) A hotel room in Fargo has a room rate of \$39.95 American per night. What is the equivalent rate in Canadian currency? (1)

- (4) 7. Complete a reconciliation statement form for this account.

ACCU CREDIT				Date			
Balance Forward				20	08	350	00
Description	Debits		Credits		Day	Mo	Balance
Deposit			452	51	21	08	802 51
Cheque No. 191	102	90			25	08	699 61
Cheque No. 192	141	12					
Cheque No. 193	24	88			27	08	558 49
Cheque No. 194	56	70					476 91
Deposit			215	00			691 91
Deposit			280	00	30	08	971 91
Cheque No. 195	125	45					
Service Charge	8	75			31	08	837 71

DATE	NO.	PARTICULARS	3	CHEQUES	DEPOSITS	BALANCE
Aug. 20		Balance				350 00
21		Deposit			452 51	802 51
25	191	Gas		102 90		699 61
25	192	Tires		141 12		558 49
27	193	Telephone		24 88		533 61
27	194	Hydro		56 70		476 91
27		Deposit			215 00	691 91
30		Deposit			280 00	971 91
Sept. 1	195	Pete's Shack		125 45		846 46
3	196	Insurance		211 11		635 35
6		Deposit			2000 00	2635 35
7	197	UR Tools		854 00		1781 35
7	198	Gas		57 10		1724 25
8	199	Colby's Clothing		146 58		1577 67

(1) CHEQUEBOOK BALANCE \$ _____ (4) ACCOUNT BALANCE . . . \$ _____

DEDUCT ACCOUNT CHARGES

Description	Amount	

OUTSTANDING DEPOSITS

Date	Amount	

(2) TOTAL ACCOUNT CHARGES \$ _____

(5) TOTAL OUTSTANDING DEPOSITS \$ _____

(6) TOTAL \$ _____

OUTSTANDING CHEQUES

Ch. No.	Amount	

(3) ADJUSTED CHEQUEBOOK BALANCE \$ _____

(7) TOTAL OUTSTANDING CHEQUES \$ _____

(8) ADJUSTED ACCOUNT BALANCE \$ _____

- (4) 8. The change fund for VIP Company at the start of the day consists of

Bills	Coins
2 x \$10	60 x 25 cents
3 x \$5	

The cash on hand for VIP Company at the end of the day consists of

Bills	Coins
7 x \$20	12 x 25 cents
10 x \$10	12 x 10 cents
4 x \$5	16 x 5 cents
	1 x \$1

The tape register total of the day's receipts consists of

Date:	May 26, 1998
Cash sales:	\$206.00
Received on account:	\$20.00
Cash paid out:	\$10.00

Prepare the daily cash proof using a cash proof form:

Cash Proof	
Date:	_____
Register No.	_____
Cash Sales:	
Received on Account:	
Total Cash Received:	
Less: Cash Paid Out:	
Net Cash Received:	
Cash in Drawer:	
Less: Change Fund:	
Net Cash Received:	

9. A sofa bed has a cash price of \$999.99 plus tax. The installment terms are \$350 down plus \$125 per month for 8 months.

a) Calculate the cash price of the sofa bed.

(2)

b) Calculate the finance charge or carrying charge.

(2)

c) Calculate the percent rate at which the installment price exceeds the cash-selling price.

(2)

- (2) 10. Use the amortization table on page 113 to make the following calculations. The Camerons require a personal loan of \$15 000 for renovations. Their financial institution offers them a 5 year loan at 7.25%.
- a) How much will the Camerons pay per month to repay the loan?
- (2) b) How much will they have paid in interest at the end of the 5 years?
11. Find the compound amount at the end of 5 years on an original principal of \$2000 at 4% compounded
- (1) a) annually

b) semiannually

(1)

c) quarterly

(1)

d) monthly

(1)

(Total: 46)

Amortization Period					
Monthly Payment Per \$1000 Loan Proceeds					
Annual Rate	1 Year Monthly	2 Years Monthly	3 Years Monthly	4 Years Monthly	5 Years Monthly
6.00%	\$86.07	\$44.33	\$30.43	\$23.49	\$19.34
6.25%	\$86.18	\$44.44	\$30.54	\$23.61	\$19.46
6.50%	\$86.30	\$44.56	\$30.66	\$23.72	\$19.57
6.75%	\$86.41	\$44.67	\$30.77	\$23.84	\$19.69
7.00%	\$86.53	\$44.78	\$30.88	\$23.95	\$19.81
7.25%	\$86.64	\$44.89	\$31.00	\$24.07	\$19.93
7.50%	\$86.76	\$45.01	\$31.11	\$24.19	\$20.05
7.75%	\$86.87	\$45.12	\$31.23	\$24.30	\$20.16
8.00%	\$86.99	\$45.24	\$31.34	\$24.42	\$20.28
8.25%	\$87.10	\$45.34	\$31.45	\$24.53	\$20.40
8.50%	\$87.22	\$45.46	\$31.57	\$24.65	\$20.52
8.75%	\$87.34	\$45.57	\$31.68	\$24.71	\$20.64
9.00%	\$87.45	\$45.68	\$31.80	\$24.89	\$20.76
9.25%	\$87.57	\$45.80	\$31.92	\$25.00	\$20.88
9.50%	\$87.68	\$45.91	\$32.03	\$25.12	\$21.00
9.75%	\$87.80	\$46.03	\$32.15	\$25.24	\$21.12
10.00%	\$87.92	\$46.14	\$32.27	\$25.36	\$21.25
10.25%	\$88.03	\$46.26	\$32.38	\$25.48	\$21.37
10.50%	\$88.15	\$46.38	\$32.50	\$25.60	\$21.49
10.75%	\$88.27	\$46.49	\$32.62	\$25.72	\$21.62
11.00%	\$88.38	\$46.61	\$32.74	\$25.85	\$21.74
11.25%	\$88.50	\$46.72	\$32.86	\$25.97	\$21.87
11.50%	\$88.62	\$46.84	\$32.98	\$26.09	\$21.99
11.75%	\$88.73	\$46.96	\$33.10	\$26.21	\$22.12
12.00%	\$88.85	\$47.07	\$33.21	\$26.33	\$22.24
12.25%	\$88.97	\$47.19	\$33.33	\$26.46	\$22.37
12.50%	\$89.08	\$47.31	\$33.45	\$26.58	\$22.50
12.75%	\$89.20	\$47.42	\$33.57	\$26.70	\$22.63
13.00%	\$89.32	\$47.54	\$33.69	\$26.83	\$22.75
13.25%	\$89.43	\$47.66	\$33.81	\$26.95	\$22.88
13.50%	\$89.55	\$47.78	\$33.94	\$27.08	\$23.01
13.75%	\$89.67	\$47.89	\$34.06	\$27.20	\$23.14
14.00%	\$89.79	\$48.01	\$34.18	\$27.33	\$23.27

Notes

