

Unit D: Income and Debt

Half Course III

HALF COURSE III

Unit D: Income and Debt

Hours: 14

General Learning Outcome:

Demonstrate an awareness of selected forms of personal income and debt.

This unit looks at performance-based income and varieties of personal debt.

Specific Outcomes

- D-1 Solve problems involving performance-based income.
- D-2 Use simple and compound interest calculations to solve problems.
- D-3 Solve problems involving credit-card buying.
- D-4 Solve problems involving personal loans.

INCOME AND DEBT

Instructional Materials

- Class set of Revenue Canada Payroll Deduction Charts
- Use of spreadsheets will enhance the unit
- Current retail promotions
- Class set of *Money and Youth* booklets
- Blackline Masters from Appendix I
- *Essentials of Mathematics 11*

Connections with Problem Analysis and Analysis of Games and Numbers

Any of the Problem Analysis and Analysis of Games and Numbers activities may be interspersed with problems from the Income and Debt unit.

Designing a Work Schedule

**PRESCRIBED LEARNING
OUTCOMES**

General Outcome

Demonstrate an awareness of selected forms of personal income and debt.

Specific Outcome(s)

D-1 solve problems involving performance-based income

SUGGESTIONS FOR INSTRUCTION

Commissions

Discussion Questions

1. What are commissions?

Possible Answer: A percent of sales that is paid to the salesperson.

2. Which jobs include commissions?

Some Possibilities: real-estate agent, car salesperson, appliance salesperson, clothing salesperson, insurance salesperson

3. Why pay with a commission rather than an hourly wage or salary?

Possible Answer: To encourage salespeople to work harder to sell the merchandise.

Review hourly wages from *Senior 2 Consumer Mathematics*.

Example

Bob earns \$11.76 per hour and worked 37 hours last week. Find his gross pay.

Solution

$$11.76 \times 37 = \$435.12$$

Present three types of commission:

1. **Straight Commission**

Jenna sells insurance and earns 30% commission on the first-year premiums of each policy she sells. Jenna sold three policies last week with first-year premiums of \$350, \$400, and \$440. What is Jenna's gross pay this week?

Solution

$$\text{Total sales: } \$350 + \$400 + \$440 = \$1190$$

$$\text{Gross pay: } \$1190 \times 30\% = \$357.00$$

Communications	Patterns
✓ Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	Technology Visualization

(continued)

SUGGESTIONS FOR ASSESSMENT

Mental Math

If you earned 15% commission on your sales, what would your gross pay be if you sold \$2000 worth of goods?

Journal Entry

What would be the benefit of paying straight commissions?
Would this be a good way for you to be paid? Why or why not?

**SUGGESTED LEARNING
RESOURCES**

Print

Senior 3 Consumer Mathematics (35S) Part III: A Course for Distance Learning. Winnipeg, MB: Manitoba Education, Training and Youth, 2001.
— Module 1, Lessons 1,2,3

Baron, C., et al. *Essentials of Mathematics 11.* Victoria, BC: British Columbia Ministry of Education, 2002.

Rabbior, Gary. *Money and Youth.* Toronto, ON: Canadian Foundation for Economic Education. Phone: 1-800-263-1138 Website: <www.rc.gc.ca>

Payroll deduction tables can be downloaded from Canada Customs and Revenue Agency website at <www.ccr-aadrc.gc.ca>. Once on the site, do a search for TOD (Tables On Diskette) and follow onscreen instructions.

**PRESCRIBED LEARNING
OUTCOMES**

D-1 solve problems involving performance-based income
– *continued*

SUGGESTIONS FOR INSTRUCTION

Commissions (continued)

2. Salary Plus Commission

Sara sells new cars and earns \$350 per week plus a commission of 6% on any amount over \$20 000. If she sold \$62 000 worth of vehicles this week, what is her gross pay?

Solution

$$\$62\,000 - \$20\,000 = \$42\,000$$

$$\$42\,000 \times 6\% = \$2520$$

$$\$2520 + \$350 = \$2870$$

3. Graduated Commission

Amanda sells computers and gets 4% on the first \$5000, 5% on the next \$10 000, and 6% on any sales over \$15 000. Calculate her gross pay if she sold \$32 000 worth of computers.

Solution

On the first \$5000: $\$5000 \times 4\% = \200

On the next \$10 000: $\$10\,000 \times 5\% = \500

On the remainder: $\$17\,000 \times 6\% = \1020

Total: $\$200 + \$500 + \$1020 = \1720

Emphasize that these payments exist in levels. Once a level is paid, you move to the next level.

Review deductions (CPP, EI, Income tax) and net pay in the Payroll Deduction Booklet or by using Tables on Diskette.

Piece Work

Understand the meaning and definition of piecework.

Discussion Questions

1. What is piecework? (*Answer:* Paying a specific amount of money per unit produced.)
2. What are the types of jobs where piecework is used? (*Possible Answers:* roofing, garments, bricklaying)

Calculate a gross or net wage of someone who earns a living by doing piecework.

Example

The garment industry pays \$20 per 100 zippers sewn. If a worker can sew zippers into 400 coats per day, how much would he make in a five-day week?

Solution

$$400 \div 100 = 4$$

$$4 \times 20 \times 5 = \$400$$

Communications	Patterns
✓ Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	Technology Visualization

SUGGESTIONS FOR ASSESSMENT

Paper-and-pencil testing is appropriate.

Problem

Mahwash has a choice between two jobs. In Job #1 she gets \$7.75 per hour plus 7% commission on her sales; in Job #2 she gets a straight 15% commission. If she is confident she could sell \$3000 worth of product for either job, which job should she take if she works 25 hours per week? Provide mathematical proof for your answer.

**SUGGESTED LEARNING
RESOURCES**

**PRESCRIBED LEARNING
OUTCOMES**

D-2 use simple and compound interest calculations to solve problems

SUGGESTIONS FOR INSTRUCTION

Simple Interest

Given the formula:

$$I = prt, \text{ where } I = \text{amount of interest}$$

$$p = \text{amount of principal or loan or deposit}$$

$$r = \text{rate per year, expressed as a decimal}$$

$$t = \text{time in years.}$$

It may be beneficial to teach the conversion of percents to decimals and decimals to percents.

Students should be able to calculate:

- the amount of simple interest.

Example

Ross deposited \$400 earning simple interest of 4% per year. Calculate the simple interest at the end of one year and at the end of five months.

Solution

$$I = prt$$

$$I = \$400 \times 0.04 \times 1 = \$16.00$$

There is \$16.00 interest after one year.

Recall: Interest rates are based on 12 months. Therefore, to find the interest after five months:

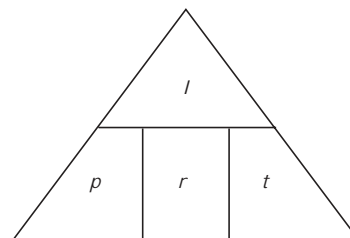
$$t = \frac{5}{12} = 0.417$$

$$I = prt$$

$$I = \$400 \times 0.04 \times 0.417 = \$6.67$$

- the principal, rate, or time, given the other three variables.

This model helps some students to derive other formulae.



If students are asked to find what the principal is, they cover the "p" and use the formula: $p = I/rt$.

If students are asked to find what the rate is, they cover the "r" and use the formula: $r = I/pt$.

If students are asked to find what the time is, they cover the "t" and use the formula: $t = I/pr$.

(continued)

Communications	Patterns
Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	✓ Technology Visualization

SUGGESTIONS FOR ASSESSMENT

**SUGGESTED LEARNING
RESOURCES**

**PRESCRIBED LEARNING
OUTCOMES**

D-2 use simple and compound interest calculations to solve problems
– *continued*

SUGGESTIONS FOR INSTRUCTION

Simple Interest (continued)

Example

What rate does Phoebe have to get if she has \$5000 to invest and she wants to get \$5500 back after five years?

Solution

$$r = I/pt$$

Define: $I = \$5500 - \$5000 = \$500$

$$p = \$5000$$

$$t = 5$$

$$r = 500/5000(5)$$

$$r = 500/25\ 000$$

$$r = 0.02 = 2\%$$

Demonstrate other problems involving principal, time, and the interest as the variable.

Compound Interest

Discuss the formula

$$A = P \left[1 + \frac{r}{n} \right]^n$$

where: A = total amount, including principal and interest

P = the amount of principal, loan, or deposit

r = rate expressed as a decimal

n = number of compounding periods per year

t = time in years

Students must understand the terms “annually,” “semi-annually,” “quarterly,” and “daily” as they relate to n and t in the formula.

It may also be beneficial to remind students of the order of operations.

Communications	Patterns
Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	✓ Technology
	Visualization

(continued)

SUGGESTIONS FOR ASSESSMENT

**SUGGESTED LEARNING
RESOURCES**

**PRESCRIBED LEARNING
OUTCOMES**

D-2 use simple and compound interest calculations to solve problems
– *continued*

SUGGESTIONS FOR INSTRUCTION

Compound Interest (continued)

Example

Monica wants to deposit \$1000 at 7½% for three years compounded quarterly. What is her total amount?

Solution

$$P = \$1000; r = 0.075; t = 3; n = 4$$

$$A = 1000 \left[1 + \frac{0.075}{4} \right]^{(4)(3)}$$

$$A = 1000(1 + 0.01875)^{12}$$

$$A = 1000(1.01875)^{12}$$

$$A = 1000(1.2497164)$$

$$A = \$1249.72$$

Introduce the *Rule of 72* as a quick way to estimate the time it takes for an investment to double in value for a specific rate of interest.

To calculate the doubling time, divide 72 by the rate given.

Example

How long would it take for an investment to double if the rate is 12%?

Solution

$$\frac{72}{12} = 6 \text{ years}$$

If spreadsheet programs are available, it could be used to find answers by either of the above methods.

Communications	Patterns
Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	✓ Technology
	Visualization

SUGGESTIONS FOR ASSESSMENT

**SUGGESTED LEARNING
RESOURCES**

**PRESCRIBED LEARNING
OUTCOMES**

D-3 solve problems involving credit-card buying

SUGGESTIONS FOR INSTRUCTION

Credit Cards

Students should be able to explain and complete credit-card application forms and to calculate the outstanding balance, interest, and minimum payment on a credit-card bill.

Discussion Question

What would be some benefits of having a credit card?

Possible Answers

- avoid carrying large amounts of cash
- necessary to reserve hotel rooms, car rentals, or purchases over the Internet
- various cards have certain perks (e.g., Air Miles, cash back, down payment on a new car)
- advance payments versus cash advances (you can deposit early to eliminate cash advances)
- credit cards are accepted almost anywhere; many businesses that don't like to accept personal cheques will accept credit cards

Discussion Question

What are some of the drawbacks of owning a credit card?

Possible Answers

- high interest rates are charged on unpaid balances
- impulse buying is too easy
- high balances that can't be paid off are easily accumulated
- credit-card number can be used by unauthorized people

OR

You can partner up the class and distribute copies of "The Evaluation Page" (found on page III-D-29 in the Appendix) and have them brainstorm the pros and cons of credit cards.

Use the Blackline Master (found on page III-D-25 in the Appendix), distribute a copy of the "Canadian Express" credit-card bill, and discuss the features with the class.

Bring in a variety of credit-card pamphlets and have students complete "Comparing Credit Cards" (found on page III-D-28 in the Appendix).

Communications	Patterns
✓ Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	Technology Visualization

(continued)

SUGGESTIONS FOR ASSESSMENT**SUGGESTED LEARNING
RESOURCES****Journal Entry**

You have the opportunity to get a credit card. How would this benefit you and what hazards would there be?

Assignment

- Use the “Canadian Express” credit-card printout to highlight features (page III-D-25 in the Appendix).
- Distribute a blank credit-card printout for students to create their own report (page III-D-26 in the Appendix).
- Have students fill out the application form (page III-D-27 in the Appendix).
- Have students fill out “The Evaluation Page” (page III-D-29 in the Appendix).

Group/Pairs Work

- Have students collect credit-card brochures and then fill out the “Comparing Credit Cards” form (page III-D-28 in the Appendix).

**PRESCRIBED LEARNING
OUTCOMES**

D-3 solve problems involving credit-card buying
– *continued*

SUGGESTIONS FOR INSTRUCTION

Credit Cards (continued)

Students should be able to convert from annual interest rates to daily interest rates and vice versa.

Example

What is the daily rate if the annual rate is 18%?

Solution

$$18\% \div 365 = 0.049315\%$$

Remember: This is still in percent form.

Example

What is the annual rate if the daily rate is 0.0739726027%?

Solution

$$0.0739726027\% \times 365 = 27\%$$

Emphasize that if people only pay the minimum monthly payment, they pay interest on the balance backdated to the **date of the purchase**, not the due date.

If you pay the entire balance on your credit card, then no interest is charged.

Paying bills on time, including at least the minimum monthly payment, helps establish a good credit rating at a credit bureau. The credit bureau provides this information to financial institutions when requested for loan applications.

Example

Michael Krauss had a previous balance of \$500 on his credit card. He made a \$300 payment during the month. He purchased more goods totalling \$190. If the interest is \$19.45, what would his minimum monthly payment be if it must correspond to 5% of the ending balance or \$10, whichever is more?

Solution

Previous balance	= \$500
Payment	= -\$300
Unpaid balance	= \$200
Interest	= +19.45
Purchases	= +\$190
New Balance	= \$409.45
5% of new balance = $\$409.45 \times 0.05$	= \$20.47
Minimum monthly payment	= \$20.47

(continued)

Communications	Patterns
✓ Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	Technology Visualization

SUGGESTIONS FOR ASSESSMENT**SUGGESTED LEARNING
RESOURCES****Credit-Card Project**

Have students choose among the following four projects related to credit cards.

- A. Design a credit card. Describe the places the card can be used, the terms of the credit card with respect to interest rates, payment options, and other specifics of credit cards. Design an advertising campaign to convince people to use the credit card you designed.
- B. Write a story or play about a family that has gotten into financial difficulties because of credit cards. Your story should describe the situation before the trouble begins, and then as the trouble becomes apparent. It should describe a way that the family could solve their credit problems.
- C. Write a story about a world where there is no credit. Consider the problems of society that would be solved and the new problems that could be presented.
- D. Prepare a debate for the topic: "Credit Is Overused in Canadian Society."

**PRESCRIBED LEARNING
OUTCOMES**

D-3 solve problems involving credit-card buying
– *continued*

SUGGESTIONS FOR INSTRUCTION

Promotions

Students should understand the costs included with store promotions. Bring in flyers and newspaper ads as examples.

What these promotions don't tell you is that there are some hidden costs like administration fees.

Students should also know that in some stores they have a cash price which is different from the time-payment price. In other words, you can get a discount if you choose to purchase the item with cash instead of requesting time payments.

Refer to Blackline Masters entitled Special Promotions: Terms and Conditions, pages III-D-30 and III-D-31. Do examples 1 and 2 together. Then have students work from examples they find.

Example

Anita Chesterfield wants a new couch. Deon's Furniture offers one for \$899.99. Anita can purchase the couch now or she can choose the pay-later plan. If she wants to pay now, she must pay the \$899.99, GST, PST, and a delivery charge of \$25 (taxes included). If she chooses the pay-later plan, she must pay the taxes, delivery charge, and a \$49.99 (plus taxes) administration fee now, and \$899.99 one year later.

- a) Calculate Anita's pay-now price.
- b) Calculate Anita's total pay-later price.
- c) How much more would she pay with the pay-later price?
- d) Express the difference as a percent rate of the total pay-now price.

Solution

a) Pay-now price:	= \$899.99
GST: $\$899.99 \times 0.07$	\$63.00
PST: $\$899.99 \times 0.07$	\$63.00
Delivery:	\$25.00
Total pay-now price:	\$1050.99

b) Pay-later price:	= \$899.99
GST: $\$899.99 \times 0.07$	\$63.00
PST: $\$899.99 \times 0.07$	\$63.00
Delivery:	\$25.00
Administration fee (including taxes):	\$56.99
Total pay-later price:	= \$1107.98

c) $\$1107.98 - \$1050.99 = \$56.99$

d) $\frac{\$56.99}{\$1050.99} \times 100 = 5.42\%$

Communications ✓ Connections ✓ Number Sense Organization and Structure	Patterns ✓ Problem Solving ✓ Reasoning Technology Visualization
---------------------------------------------------------------------------------	-----------------------------------------------------------------------------

SUGGESTIONS FOR ASSESSMENT

**SUGGESTED LEARNING
RESOURCES**

**PRESCRIBED LEARNING
OUTCOMES**

D-4 solve problems involving personal loans

SUGGESTIONS FOR INSTRUCTION

Loans

There are many different types of loans: car loans, personal loans, personal lines of credit, and mortgages.

Students need to become familiar with the different types of loans and with loan terminology. They should know how to determine loan rates based on the term and principal of the loan.

Invite a guest speaker from a financial institution.

Give examples of loan payments using charts.

Obtain loan application forms from various financial institutions for students to practise on.

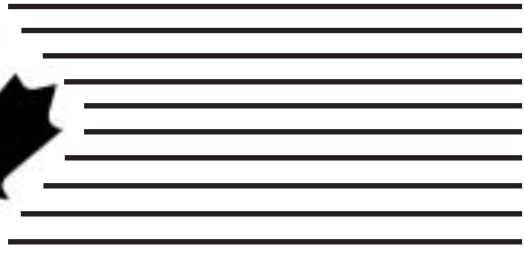
Communications	Patterns
✓ Connections	✓ Problem Solving
✓ Number Sense	✓ Reasoning
Organization and Structure	Technology Visualization

SUGGESTIONS FOR ASSESSMENT

**SUGGESTED LEARNING
RESOURCES**

Appendix

Canadian Express



ACCOUNT NUMBER
3400 1054 204

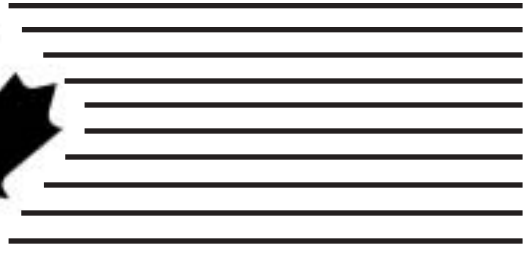
FOR ACCOUNT INQUIRIES, CALL
1-800-555-4366

DAILY
INTEREST RATE
0.0534%

ANNUAL
INTEREST RATE
19.50%

TRANSACTION	PARTICULARS			AMOUNT
MAY 18	BUD'S VEHICLE REPAIR			\$324.83
MAY 19	BISON GIFTWARE			\$45.27
MAY 20	FORT GARRY VIDEO			\$5.27
MAY 22	ROYAL BURGER			\$13.27
MAY 22	CO-OP GAS BAR			\$45.38
MAY 22	SCOTT'S FOOD MART			\$89.45
MAY 27	FASHOWAY'S CAFE			\$22.63
MAY 28	MEGAPLEX MOVIES			\$21.37
JUNE 1	PRAIRIE INSURANCE INC.			\$329.51
JUNE 2	CO-OP GAS BAR			\$42.79
JUNE 4	B + C SOUND			\$25.36
JUNE 8	SCOTT'S FOOD MART			\$49.64
CREDIT LINE \$5000	OPENING BALANCE 1209.76	TOTAL CREDITS 1209.76	TOTAL DEBITS \$1014.77	YOUR NEW BALANCE \$1014.77
AVAILABLE CREDIT \$3985.23	PAYMENT DUE DATE JUNE 30	PAST DUE \$0	CURRENT DUE \$1014.77	MIN. PAYMENT DUE \$50.74

Canadian Express



ACCOUNT NUMBER
3400 1054 204

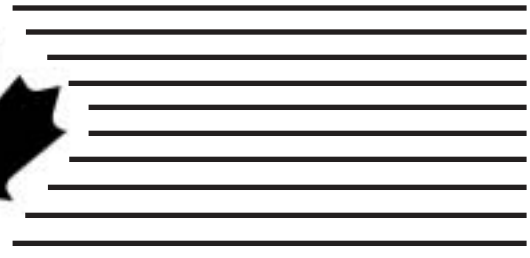
FOR ACCOUNT INQUIRIES, CALL
1-800-555-4366

DAILY
INTEREST RATE
0.0534%

ANNUAL
INTEREST RATE
19.50%

TRANSACTION	PARTICULARS			AMOUNT
CREDIT LINE	OPENING BALANCE	TOTAL CREDITS	TOTAL DEBITS	YOUR NEW BALANCE
AVAILABLE CREDIT	PAYMENT DUE DATE	PAST DUE	CURRENT DUE	MIN. PAYMENT DUE

Canadian Express Application Form



Canadian Express has these exclusive benefits:

- Dedicated customer service 24 hours a day, 7 days a week.
- Expressrental Collision Damage Waiver (CDW) for savings up to \$20 per day on car rentals.
- Express Roadassist provides 24-hour roadside assistance anywhere in Canada or the United States.
- Express Global Service for emergency card replacement and cash advances when travelling.

We thank you for your interest in the Canadian Express Credit Card. Please take a few minutes to complete this application.

Name _____ Address _____

Length of time at present address _____ m _____ y Monthly rent/mortgage amount
\$ _____

City _____ Province _____ Postal code _____

Phone: Home _____ Work _____ Cellular _____

Date of birth _____ m _____ d _____ y Social Insurance number _____

Primary annual income \$ _____ Other income \$ _____

Employer's name _____ Employer's number _____

Length of current employment _____ m _____ y

I understand that when I apply, Canadian Express will access my credit reports. Upon approval, Canadian Express and its affiliates and agents may from time to time obtain credit information and personal information about me from credit reporting agencies, credit bureaus, and others.

Applicant's signature

Date

Comparing Credit Cards			
Name	Annual % Rate	Fee	Special Features

The Evaluation Page

Name(s) _____

Concept

What Is It?

Benefits

Drawbacks

Evaluation

Special Promotions: Terms and Conditions

Example 1: Furniture Store

“Don’t Pay Until 20??”

“No Down Payment — No Monthly Payments”

- O.A.C. (On Approved Credit), on your Furniture Store Platinum Card only.
- Minimum purchase \$250. Balance due January 20??.
- Delivery (\$25, including taxes), applicable taxes, and \$49.95 administration fee (plus GST and PST) payable at time of purchase.
- Interest will accrue from date of purchase at a rate of 28.8% and will be waived if balance is paid by due date.

Leather sofa: \$1598.99 plus taxes (\$223.86)

Due at time of purchase:

Due at end of time period if paid on time:

Due at end of time period if not paid on time:

Administration fee:

Rate of interest:

Special Promotions: Terms and Conditions

Example 2: Appliance Store

“Pay No Interest Option Until 20??”

- O.A.C.
- Interest accrues from date of purchase at a rate of 30.3%. Accrued interest will be waived if purchase amount is paid in full on or before billing due date.
- Subject to credit approval, minimum monthly payments totalling \$587.33 on a \$1500 purchase must be made and the balance paid off in 6 months.
- Nominal administration fee of \$29.95 (plus GST and PST) is paid at time of purchase.

Washer and Dryer: \$999.99 plus taxes (\$140.00)

Due at time of purchase:

Due at end of time period if paid on time:

Due at end of time period if not paid on time:

Administration fee:

Rate of interest: