

Adult Basic Education

Mathematics

Mathematics 3109A

Income and Debt

Owning and Operating a Vehicle

Curriculum Guide

Prerequisite: Mathematics 2105A, 2105B, 2105C

Credit Value: 1

Mathematics Courses [General College Profile]

Mathematics 2105A

Mathematics 2105B

Mathematics 2105C

Mathematics 3107A

Mathematics 3107B

Mathematics 3107C

Mathematics 3109A

Mathematics 3109B

Mathematics 3109C

Table of Contents

To the Instructor	v
Introduction to Mathematics 3109A	v
Prerequisites	v
Textbook	v
Technology	vi
Curriculum Guides	vii
Study Guides	vii
Resources	viii
Recommended Evaluation	viii
Unit 1 - Income and Debt	Page 2
Unit 2 - Owning and Operating a Vehicle	Page 18
Appendix	Page 37

To the Instructor

I. Introduction to Mathematics 3109A

Unit 1 looks at calculating income which is based on commission and piecework. Students will use simple and compound interest calculations to solve problems. Credit cards and personal loans are explored and students will learn how to calculate the interest they would have to pay.

The second unit considers the very practical issues of owning, maintaining and operating a vehicle.

II. Prerequisites

Students should be able to convert decimals to percents and vice versa. They should also know the order of operations.

III. Textbook

Essentials of Mathematics 11 is designed to emphasize the skills needed in adult life as well as in the workplace. Students should appreciate that mathematics is practical and useful for accomplishing real-world activities. With this in mind, this resource has been developed with contents that are real and relevant to the lives of students.

Each chapter begins with an introduction which presents the key mathematical ideas that will be encountered. The following categories are in each chapter:

Chapter Goals: Located on the bottom of each introductory page, this section lists the major concepts to be learned.

Chapter Project and Project Activity: Each chapter contains a guided project. This type of group work is not well suited for the Adult Basic Education environment. Therefore, **these sections have been omitted from the course.** However, if there are several students working on the same chapter, instructors may use their discretion in assigning the **Chapter Project**, or some modification of it, for an assessment.

Exploration: Most of the concepts are introduced, developed and explained in these lessons. In this section, **Examples** and **Solutions** for typical problems are provided. The instructor should ensure that students carefully study and understand each **Example** before proceeding.

To the Instructor

Class Discussion, Small Group Discussion and Pairs Activities: As the titles imply, these activities are provided to give students an opportunity to work collaboratively. Some of these sections have been assigned in the Study Guide, especially if they can be completed by a student working alone.

Mental Math: The questions contained in these sections are often calculations that are similar to those required in the **Solutions** to the **Examples**. Although called **Mental Math**, students should not be required to complete these activities without pencil and paper. If students have difficulty with these problems, the instructor should provide practice worksheets. The solutions to **Mental Math** are found in the *Teacher Resource Book 10*.

Notebook Assignment: This section provides a series of problems similar to those in the **Exploration**. Students should attempt these problems only after the **Exploration** problems have been understood and all assigned **Mental Math** and practice worksheets have been completed. The textbook contains only answers to **Notebook Assignment**, but the *Teacher Resource Book 10* has solutions with workings and some explanations.

Chapter Review: This section contains a series of questions that review the chapter outcomes. Answers are in the textbook as well as the *Teacher Resource Book 11*.

Case Study: This part requires students to express their understanding of the skills they have learned. Answers are in the textbook as well as the *Teacher Resource Book 11*.

IV. Technology

The use of technology in our society is increasing and technological skills are becoming mandatory in the workplace. It is assumed that all students have a scientific calculator and its manual for their individual use. Ensure that the calculator used has “scientific” on it as there are calculators designed for business and statistics which would not have the functions needed for this course. Although students will sometimes use a calculator, they should first complete most problems using pencil and paper.

To the Instructor

V. Curriculum Guides

Each new ABE Mathematics course has a Curriculum Guide for the instructor and a Study Guide for the student. The Curriculum Guide includes the specific curriculum outcomes for the course. Suggestions for teaching, learning, and assessment are provided to support student achievement of the outcomes. Each course is divided into units. Each unit comprises a **two-page layout of four columns** as illustrated in the figure below. In some cases the four-column spread continues to the next two-page layout.

Curriculum Guide Organization: The Two-Page, Four-Column Spread

Unit Number - Unit Title		Unit Number - Unit Title	
Outcomes	Notes for Teaching and Learning	Suggestions for Assessment	Resources
Specific curriculum outcomes for the unit.	Suggested activities, elaboration of outcomes, and background information.	Suggestions for assessing students' achievement of outcomes.	Authorized and recommended resources that address outcomes.

VI. Study Guides

The Study Guide provides the student with the name of the text(s) required for the course and specifies the sections and pages that the student will need to refer to in order to complete the required work for the course. It guides the student through the course by assigning relevant reading and providing questions and/or assigning questions from the text or some other resource. Sometimes it also provides important points for students to note. (See the *To the Student* section of the Study Guide for a more detailed explanation of the use of the Study Guides.) The Study Guides are designed to give students some degree of independence in their work. Instructors should note, however, that there is much material in the Curriculum Guides in the *Notes for Teaching and Learning* and *Suggestions for Assessment* columns that is not included in the Study Guide and instructors will need to review this information and decide how to include it.

To the Instructor

VII. Resources

Essential Resources

Essentials of Mathematics 11, ISBN: 0-7726-4823-9

Essentials of Mathematics 11, Teacher Resource Book 11, ISBN: 0-7726-4878-6

Resources

<http://edHelper.com>

<http://mathforum.org>

<http://www.purplemath.com/index.htm>

<http://www.educationindex.com/math/>

<http://www.learner.org/exhibits/dailymath/resources.html>

<http://www.leaseguide.com>

<http://www.learner.org/exhibits/dailymath/car/>

<http://www.carfax.com>

VIII. Recommended Evaluation

Written Notes	10%
Assignments	10%
Test(s)	30%
Final Exam (<i>entire course</i>)	<u>50%</u> 100%

Income and Debt

Owning and Operating a Vehicle

Unit 1 - Income and Debt

Outcomes

1.1 Solve problems involving commission.

1.1.1 Determine the gross income of an individual who earns only straight commission.

1.1.2 Determine the gross income of an individual who is paid on a graduate commission basis.

1.1.3 Determine the gross income of an individual who is paid a base salary plus commission.

1.1.4 Compare the above methods of payment and determine the potential benefits and drawbacks of each one.

Notes for Teaching and Learning

In this **Exploration**, students will be introduced to earning income through commission.

The instructor should provide a review worksheet on changing a percent to a decimal.

Students should be encouraged to read through the solution given to each **Example** and also to work through each calculation using pencil, paper and a calculator.

Small Group Discussion questions can be completed by one student. However, if more than one student is working on this unit, they should be encouraged to work together on this particular activity.

Students may need to be reminded of the definitions of *gross pay* and *net pay* before completing **Notebook Assignment**, question 2 on page 18.

Students have been instructed in the Study Guide to ask the teacher for a copy of Practice Exercise 1, *Earning Commission*. This worksheet is found in the Appendix.

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.1 to 1.5 will meet the objectives of Outcome 1.1.

Resources

Essentials of Mathematics 11,
Performance-Based Income:
Commission, pages 11 - 20

Teacher Resource Book 11,
pages 17 - 22

Appendix, Practice
Exercise 1, *Earning
Commission*

Unit 1 - Income and Debt

Outcomes

1.2 Determine the gross income of an individual who earns income based on unit production when the rate and number of units have been identified.

Notes for Teaching and Learning

Students will look at a method of calculating income which is performance based. The instructor should discuss some of the advantages and disadvantages of this method of pay.

Practice Exercise 2, *Weekly Wages for Piecework*, is found in the Appendix.

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.6 and 1.7 will meet the objectives of Outcome 1.2.

Resources

Essentials of Mathematics 11,
Performance-Based Income:
Piecework, pages 22 - 27

Teacher Resource Book 11,
pages 23 - 25

Appendix, Practice
Exercise 2, *Weekly Wages for
Piecework*

Unit 1 - Income and Debt

Outcomes

1.3 Solve problems using simple interest.

1.3.1 Rearrange the formula $I = Prt$ to solve for any variable.

1.3.2 Calculate the interest paid when given the principal, interest rate and time.

1.3.3 Calculate the simple interest rate when given the principal, interest amount and time.

1.3.4 Calculate the principal given the interest rate, interest amount and time.

1.3.5 Calculate the time given the principal, interest amount and interest rate.

Notes for Teaching and Learning

Students will use the formula $I = Prt$ to calculate simple interest.

Examples 3, 4 and 5 on pages 30 and 31 do not rearrange the formula to solve for the required variable. The instructor should encourage students to rearrange the formula and solve for the unknown, before substituting values.

Students may need some extra practice in rearranging formulas.

Students should be reminded that r in the formula $I = Prt$ must be written as a decimal.

Time, t , is always expressed in years, so students must multiply by 12 to calculate the number of months and multiply by 365 to calculate the number of days.

Practice Exercise 3, *Calculating Simple Interest*, is in the Appendix.

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.8 to 1.11 will meet the objectives of Outcome 1.3.

Students can complete Practice Exercise 3, *Calculating Simple Interest*.

Examples to help students convert:

- months to years $6 \text{ months} \div 12 = 0.5 \text{ years}$
- years to months $0.5 \text{ years} \times 12 = 6 \text{ months}$
- weeks to years $13 \text{ weeks} \div 52 = 0.25 \text{ years}$
- years to weeks $0.25 \text{ years} \times 52 = 13 \text{ weeks}$
- days to years $30 \text{ days} \div 365 = 0.08 \text{ years}$
- years to days $0.08 \text{ years} \times 365 = 30 \text{ days}$

Resources

Essentials of Mathematics 11,
Simple Interest, pages 28 - 33

Teacher Resource Book 11,
pages 26 - 28

Appendix, Practice
Exercise 3, *Calculating
Simple Interest*

Unit 1 - Income and Debt

Outcomes

1.4 Solve compound interest problems.

1.4.1 Calculate compound interest manually.

1.4.2 Calculate compound interest using the formula

$$A = P \left(1 + \frac{r}{n}\right)^{nt}$$

1.4.3 Determine the time to double a given investment using the “Rule of 72”.

Notes for Teaching and Learning

At first, compound interest is calculated manually to demonstrate the progression of investment, and then the compound interest is calculated using the formula

$$A = P \left(1 + \frac{r}{n}\right)^{nt}.$$

* Formula is a shortcut for **Example 1**, textbook, page 35.

The instructor should spend some time with students discussing what each variable in the formula represents

A = total amount, including principal and interest

P = the amount of principal, loan, or deposit

r = interest rate expressed as a decimal

n = number of compounding periods per year

t = time in years

Order of operations should be reviewed before students use this formula.

Students should be shown how to evaluate a power, such as $(1.05)^4$, on a calculator.

All three of the **Examples** on pages 35 - 37 are problems which are compounded annually, so $n = 1$.

The instructor should provide some problems where interest is compounded daily ($n = 365$), quarterly ($n = 4$), semi-annually ($n = 2$) and monthly, ($n = 12$).

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.12 to 1.14 will meet the objectives of Outcome 1.4.

Resources

Essentials of Mathematics 11,
Compound Interest,
pages 34 - 39

Teacher Resource Book 11,
pages 29 - 31

Unit 1 - Income and Debt

Outcomes

1.5 Solve consumer problems involving credit cards.

1.5.1 Calculate the balance owing on a given credit card when the interest rate is given and full payment is not made.

1.5.2 List the benefits and drawbacks of using a credit card.

Notes for Teaching and Learning

Since the **Exploration** looks at shopping with a credit card, the instructor should ask students to list advantages and disadvantages of having a credit card.

The instructor should provide sample credit card statements for students to explain.

All problems which refer to a spreadsheet should be omitted.

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.15 and 1.16 will meet the objectives of Outcome 1.5.

Resources

Essentials of Mathematics 11,
Shopping with a Credit Card,
pages 40 - 46

Teacher Resource Book 11,
pages 33 and 34

Unit 1 - Income and Debt

Outcomes

1.6 Calculate the actual costs of in-store promotions.

1.6.1 Calculate the cost of a purchase when buying by installments.

1.6.2 Calculate the cost of a purchase when buying using a deferred payment plan.

Notes for Teaching and Learning

This **Exploration** encourages students to look closely at “special offers” that are often advertised.

Encourage students to read the “fine print” carefully when considering a special offer.

The instructor should ask students to find newspaper ads which have special offers.

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.17 and 1.18 will meet the objectives of Outcome 1.6.

The following example can be used for homework.

Anita Chesterfield wants a new couch. Deon's Furniture offers one for \$899.99. (Anita lives in Newfoundland and Labrador.)

Using the Pay-Now Plan, she must pay the \$899.99

HST

a delivery charge of \$25 (taxes included)

Using the Pay-Later Plan, she must pay the taxes

a delivery charge of \$25 (taxes included)

a \$49.99 (plus taxes) administration fee

\$899.99 one year later

- Calculate Anita's Pay-Now price.
- Calculate Anita's total Pay-Later price.
- How much more would she pay with the Pay-Later price?
- Express the difference as a percent rate of the total Pay-Now price.

Solution:

a) Pay-Now price: = \$899.99
HST: $\$899.99 \times 14\% = \126.00
Delivery = \$25.00
Total pay-now price = \$1050.99

b) Pay-Later price: = \$899.99
HST: $\$899.99 \times 14\% = 126.00$
Delivery = \$25.00
Administration fee (including taxes) = \$56.99
Total pay-later price: = \$1107.98

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

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

Resources

Essentials of Mathematics 11,
In-Store Promotions,
pages 50 - 56

Teacher Resource Book 11,
pages 38 and 39

Unit 1 - Income and Debt

Outcomes

1.7 Calculate the interest on a personal loan.

Notes for Teaching and Learning

In this **Exploration**, students will look at personal loans and how much they cost.

The instructor should ensure that students understand how to read the chart *Personal Loan Payment Calculator* on page 59 before moving on.

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.19 and 1.20 will meet the objectives of Outcome 1.7.

Resources

Essentials of Mathematics 11,
Personal Loans, pages 57 - 63

Teacher Resource Book 11,
pages 40 and 41

Unit 1 - Income and Debt

Outcomes

1.8 Convert between Canadian and foreign currencies.

Notes for Teaching and Learning

In this **Exploration**, students will learn how to convert between Canadian and foreign currencies.

The instructor should discuss the table on page 65 with the students.

Students may have difficulty knowing when to multiply or when to divide the bank selling price. The instructor should explain how to set up a ratio.

For example, \$.8766 Canadian = \$1 Australian.

Therefore, $\frac{\$1 \text{ Australian}}{\$.8766 \text{ Canadian}} = 1$.

So, to change \$400 Canadian to Australian currency:

$$\begin{aligned} \$400 \text{ Canadian} \times \frac{\$1 \text{ Australian}}{\$.8766 \text{ Canadian}} \\ = \$456.31 \text{ Australian.} \end{aligned}$$

Unit 1 - Income and Debt

Suggestions for Assessment

Study Guide questions 1.21 and 1.22 will meet the objectives of Outcome 1.8.

Practice Exercise 4, *Income and Debt*, is a good review of the full chapter.

In the Study Guide, students have been assigned questions from **Chapter Review** and **Case Study**. The instructor could choose to use some of these questions for an assessment.

Resources

Essentials of Mathematics 11,
Exchange Rates,
pages 64 - 70

Chapter Review,
pages 71 - 73

Case Study, pages 75 - 78

Teacher Resource Book 11,
pages 42 - 46 and 48 - 50

Appendix, Practice
Exercise 4, *Income and Debt*

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.1 Calculate the GST and PST when purchasing a vehicle.

2.2 Calculate monthly debt repayment.

Notes for Teaching and Learning

When the textbook, Study Guide and Curriculum Guide were printed, the GST rate was 7%. The instructor should give students the current GST rate. If the current GST rate is used, some answers will differ from the given answer keys.

The instructor could ask students to check the government websites for more information on fees, taxes, license, etc.

If the instructor chooses to use Newfoundland and Labrador taxes, then the answers to questions 5 - 10 for **Notebook Assignment**, pages 139 and 140, will be different.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide questions 2.1 and 2.2 will meet the objectives of Outcomes 2.1 and 2.2.

Resources

Essentials of Mathematics 11,
Choosing a Vehicle, pages
133, 136 - 140

Teacher Resource Book 11,
pages 77 - 82

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.3 Calculate the fuel costs for operating a vehicle.

Notes for Teaching and Learning

The instructor should ensure that students understand the difference between *fuel economy* and *litres of fuel used* when doing the **Notebook Assignment** on pages 146 - 148.

Students may need some help to rearrange the formula below and solve for *litres of fuel used*.

$$\text{fuel economy} = \frac{\text{litres of fuel used} \times 100}{\text{km driven}}$$

$$\text{litres of fuel used} = \frac{\text{fuel economy} \times \text{km driven}}{100}$$

Example:

Car dealers will provide the following information when purchasing a car:

<u>City</u>	<u>Highway</u>
12.9 litres/100 km	8.8 litres/100 km
22 miles/gallon	32 miles/gallon

For fuel economy, (litres/km), **less** is better.

For mileage (miles/gallon), **more** is better.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide questions 2.3 and 2.4 will meet the objectives of Outcome 2.3.

Resources

Essentials of Mathematics 11,
Operating a Vehicle: Fuel Economy, pages 141- 148

Teacher Resource Book 11,
pages 83 - 86

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.4 Calculate the cost of maintaining a vehicle.

Notes for Teaching and Learning

Learning to make sound decisions about acquiring a motor vehicle helps students to make connections between needs and personal budgets.

The instructor should ask students to contact a garage to find out what taxes (GST, PST or both) are applied to parts and labour. Different provinces have different regulations.

Students have been assigned **Notebook Assignment**, question 6, on page 153. The question should be completed using Newfoundland and Labrador instead of British Columbia.

If the instructor desires, students could be asked to complete **Notebook Assignment**, questions 2 - 5 on page 153, using Newfoundland and Labrador taxes.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide questions 2.5 and 2.6 will meet the objectives of Outcome 2.4.

Resources

Essentials of Mathematics 11,
Maintaining a Vehicle, pages
149 - 153

Teacher Resource Book 11,
pages 87 - 89

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.5 Explain the choices that are available in vehicle insurance.

Notes for Teaching and Learning

Students are not required to complete insurance forms.

Problems from **Notebook Assignment** have not been assigned in the Study Guide.

Students should read this **Exploration** and become very familiar with **New Terms** on pages 155 and 156.

The instructor should ask students to contact insurance companies and find out what factors have an impact on car insurance. Some factors are: age, gender, driving record, years of experience, type of vehicle, geographics and number of claims.

Students should contact Motor Vehicle Registration for registration and licence plate costs.

Teacher Blackline Masters 4 - 10 are required if the instructor wishes to assign problems from **Notebook Assignment**. Students will need a great deal of guidance if they are to complete insurance forms.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide question 2.7 will meet the objectives of Outcome 2.5.

Resources

Essentials of Mathematics 11, Insuring and Registering Your Vehicle, pages 154 - 159

Teacher Resource Book 11, pages 90 and 91

Blackline Masters 4 - 10

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.6 Calculate the total costs for purchasing a new vehicle.

Notes for Teaching and Learning

The instructor should ask students to bring in newspaper ads or brochures that show the price of a new vehicle. Students could also visit websites for different dealers and find information on different vehicle costs (base price + options).

For comparison purposes, students should also complete the assigned questions in **Notebook Assignment**, pages 163 and 164, using Newfoundland and Labrador tax rates.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide question 2.8 will meet the objectives of Outcome 2.6.

Resources

Essentials of Mathematics 11,
Buying a New Vehicle, pages
160 - 165

Teacher Resource Book 11,
pages 94 - 96

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.7 Calculate the resale value of a vehicle after depreciation.

Notes for Teaching and Learning

Cars, trucks, SUV's, etc, depreciate at different rates. If a vehicle is in demand, even when it is older it will not depreciate as fast as a less desirable vehicle. When the depreciation rate is unknown, the 20% rule is suggested. Each year, a vehicle depreciates by 20% of its value.

The instructor may need to guide students when they are using the formula for resale value in **Notebook Assignment**, question 4, page 169.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide question 2.9 to 2.12 will meet the objectives of Outcome 2.7.

Resources

Essentials of Mathematics 11,
Vehicle Depreciation, pages
166 - 169

Teacher Resource Book 11,
pages 97 - 99

Appendix, Practice
Exercise 5, *Vehicle Expenses*

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.8 Calculate the total costs of buying a used vehicle from a dealer and privately.

Notes for Teaching and Learning

The instructor should ask students to check with a car dealer or Motor Vehicle Registration and learn what taxes must be paid on a used vehicle.

The history of all used vehicles can be researched using the VIN (Vehicle Identification Number) at the following website: <http://www.carfax.com>.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide questions 2.13 to 2.15 will meet the objectives of Outcome 2.8.

Resources

Essentials of Mathematics 11,
Buying a Used Vehicle, pages
172 - 177

Teacher Resource Book 11,
pages 101 - 103

<http://www.carfax.com>

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.9 Calculate the costs of vehicle loans.

2.9.1 Calculate the monthly payment for a vehicle loan.

2.9.2 Calculate the total paid on a vehicle loan.

2.9.3 Calculate the finance charge on a vehicle loan.

Notes for Teaching and Learning

The Personal Loan Payment Calculator chart needed for this **Exploration** is on page 59, *Essentialss of Mathematics 11*.

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide questions 2.16 and 2.18 will meet the objectives of Outcome 2.9.

Resources

Essentials of Mathematics 11,
Taking Out a Loan to Purchase a Vehicle, pages 178 - 183

Teacher Resource Book 11,
pages 104 - 106

Appendix, **Practice Exercise 6, Buying Cars**

Unit 2 - Owning and Operating a Vehicle

Outcomes

2.10 Calculate the total cost of leasing a vehicle.

2.10.1 Compare the cost of buying to the cost of leasing.

2.10.2 List the advantages and disadvantages of leasing.

Notes for Teaching and Learning

The instructor should discuss with students the advantages and disadvantages of leasing a vehicle.

A questionnaire and information on the costs to lease a vehicle are found on the following websites:

<http://www.learner.org/exhibits/dailymath/car/>

and

<http://leaseguide.com/>

Unit 2 - Owning and Operating a Vehicle

Suggestions for Assessment

Study Guide questions 2.19 and 2.20 will meet the objectives of Outcome 2.10.

In the Study Guide, students have been assigned questions from **Chapter Review** and **Case Study**. Some of these questions could be used for homework or an assessment.

Resources

Essentials of Mathematics 11, Leasing a Vehicle,
pages 184 - 188

Chapter Review, pages 189 and 190 (Omit question 5.)

Case Study, page 192
(Omit questions 5 and 7.)

Teacher Resource Book 11,
pages 107 - 111 and 113

Appendix, Practice
Exercise 7, *Owning and
Operating a Vehicle*

www.leaseguide.com

[www.learner.org/
exhibits/dailymath/car/](http://www.learner.org/exhibits/dailymath/car/)

Appendix

Practice Exercise 1: Earning Commission

Student Name: _____

Sandra sells furniture. She earns 10% commission on her sales up to her quota of \$2,500. She earns a 14% commission on all sales beyond \$2,500. Last week her sales were \$4,966. How much did Sandra earn?

<u>Quota</u>	<u>Rate</u>	<u>Sales</u>	<u>Bonus Rate</u>
\$2,500	10%	\$4,966	14%

Step 1: Regular commission: $\$2,500 \times .10 = \250
Step 2: Amount for bonus commission: $\$4,966 - \$2,500 = \$2,466$
Step 3: Bonus commission: $\$2,466 \times .14 = \345.24
Step 4: Regular commission + bonus commission = total commission
 $\$250.00 + \$345.24 = \$595.24$
So, Sandra earned \$595.24.

	Find the Total Commission for each example below.						
	Quota	Rate	Sales	Regular Commission	Bonus Rate	Bonus Commission	Total Commission
1)	\$5,300	11%	\$5,783		21%		
2)	\$8,700	6%	\$14,536		17%		
3)	\$1,600	11%	\$1,889		13%		
4)	\$5,600	8%	\$9,490		15%		
5)	\$9,400	10%	\$11,447		14%		
6)	\$4,500	5%	\$7,730		13%		
7)	\$8,800	4%	\$10,317		7%		
8)	\$4,600	2%	\$7,377		4%		
9)	\$2,500	8%	\$1,795		10%		
10)	\$1,900	8%	\$2,021		10%		
11)	\$4,600	9%	\$8,365		15%		
12)	\$8,800	3%	\$3,848		10%		
13)	\$4,400	5%	\$8,161		11%		
14)	\$7,000	9%	\$9,471		13%		
15)	\$7,800	8%	\$7,754		11%		

Answer key to Practice Exercise 1: Earning Commission

	Quota	Rate	Sales	Regular Commission	Bonus Rate	Bonus Commission	Total Commission
1)	\$5,300	11%	\$5,783	\$583.00	21%	\$101.43	\$684.43
2)	\$8,700	6%	\$14,536	\$522.00	17%	\$992.12	\$1,514.12
3)	\$1,600	11%	\$1,889	\$176.00	13%	\$37.57	\$213.57
4)	\$5,600	8%	\$9,490	\$448.00	15%	\$583.50	\$1,031.50
5)	\$9,400	10%	\$11,447	\$940.00	14%	\$286.58	\$1,226.58
6)	\$4,500	5%	\$7,730	\$225.00	13%	\$419.90	\$644.90
7)	\$8,800	4%	\$10,317	\$352.00	7%	\$106.19	\$458.19
8)	\$4,600	2%	\$7,377	\$92.00	4%	\$111.08	\$295.08
9)	\$2,500	8%	\$1,795	\$143.60	10%	\$0.00	\$143.60
10)	\$1,900	8%	\$2,021	\$152.00	10%	\$12.10	\$164.10
11)	\$4,600	9%	\$8,365	\$414.00	15%	\$564.75	\$978.75
12)	\$8,800	3%	\$3,848	\$115.44	10%	\$0.00	\$115.44
13)	\$4,400	5%	\$8,161	\$220.00	11%	\$413.71	\$633.71
14)	\$7,000	9%	\$9,471	\$630.00	13%	\$321.23	\$951.23
15)	\$7,800	8%	\$7,754	\$620.32	11%	\$0.00	\$620.32

Practice Exercise 2: Weekly Wages for Piecework Student Name: _____

Compute the weekly wages for each example below:

	Daily Production						
	Monday	Tuesday	Wednesday	Thursday	Friday	Piece Rate	Wages
1)	37	38	34	38	35	\$1.00	
2)	10	11	11	9	12	\$3.12	
3)	16	14	15	14	14	\$3.01	
4)	31	32	33	34	34	\$1.05	
5)	9	10	10	8	8	\$2.91	
6)	8	6	7	6	9	\$4.25	
7)	19	18	18	18	15	\$2.50	
8)	13	14	11	13	11	\$2.72	
9)	14	13	13	12	14	\$3.68	
10)	17	20	21	19	20	\$1.88	
11)	12	16	17	16	15	\$2.76	
12)	6	7	6	7	7	\$3.66	
13)	22	20	19	21	17	\$2.44	
14)	15	16	14	17	17	\$1.76	
15)	28	29	26	28	25	\$1.77	
16)	16	14	16	16	13	\$2.62	
17)	54	49	45	46	48	\$0.75	
18)	101	97	106	100	110	\$0.60	
19)	83	80	85	86	88	\$0.80	
20)	95	98	90	91	89	\$0.95	

Answer key to Practice Exercise 2: Weekly Wages for Piecework

	Daily Production						
	Monday	Tuesday	Wednesday	Thursday	Friday	Piece Rate	Wages
1)	37	38	34	38	35	\$1.00	\$182.00
2)	10	11	11	9	12	\$3.12	\$165.36
3)	16	14	15	14	14	\$3.01	\$219.73
4)	31	32	33	34	34	\$1.05	\$172.20
5)	9	10	10	8	8	\$2.91	\$130.95
6)	8	6	7	6	9	\$4.25	\$153.00
7)	19	18	18	18	15	\$2.50	\$220.00
8)	13	14	11	13	11	\$2.72	\$168.64
9)	14	13	13	12	14	\$3.68	\$242.88
10)	17	20	21	19	20	\$1.88	\$180.48
11)	12	16	17	16	15	\$2.76	\$209.76
12)	6	7	6	7	7	\$3.66	\$120.78
13)	22	20	19	21	17	\$2.44	\$241.56
14)	15	16	14	17	17	\$1.76	\$139.04
15)	28	29	26	28	25	\$1.77	\$240.72
16)	16	14	16	16	13	\$2.62	\$196.50
17)	54	49	45	46	48	\$0.75	\$181.50
18)	101	97	106	100	110	\$0.60	\$308.40
19)	83	80	85	86	88	\$0.80	\$337.60
20)	95	98	90	91	89	\$0.95	\$439.85

Practice Exercise 3: Calculating Simple Interest Student Name: _____

1. Calculate the interest paid on each of the following:			
Principal	Rate per year	Time	Interest Paid
\$400	8½ %	3 years	
\$1,200	400%	7 months	
\$650	5¾ %	115 days	
\$7,000	9%	90 days	
\$425	7.5 %	5 years	
\$3,400	1.04 %	9 months	
\$6,500	3¼ %	230 days	

2. Find the unknown quantities for each of the following:			
Principal	Rate per year	Time	Interest Paid
\$900	5½ %	60 days	
\$700	8%	_____ days	\$40.04
\$4,000	9%	_____ months	\$658.00
\$300		2 years	\$30.00
\$1,500		4 months	\$55.00
	8 %	200 days	\$16.00
	11¼ %	5 years	\$250.00
\$640	10%	_____ days	\$19.93
\$2,400		120 days	\$98.63

Answer key for Practice Exercise 3: Calculating Simple Interest

1. Calculate the interest paid on each of the following:			
Principal	Rate per year	Time	Interest Paid
\$400	8½ %	3 years	\$102.00
\$1,200	400%	7 months	\$280.00
\$650	5¾ %	115 days	\$11.78
\$7,000	9%	90 days	\$155.34
\$425	7.5 %	5 years	\$170.00
\$3,400	1.04 %	9 months	\$25.50
\$6,500	3¼ %	230 days	\$133.12

2. Find the unknown quantities for each of the following:			
Principal	Rate per year	Time	Interest Paid
\$900.00	5½ %	60 days	\$8.14
\$700.00	8%	261 days	\$40.04
\$4,000.00	9%	22 months	\$658.00
\$300.00	5%	2 years	\$30.00
\$1,500.00	11 %	4 months	\$55.00
\$365.00	8 %	200 days	\$16.00
\$444.44	11¼ %	5 years	\$250.00
\$640.00	10%	114 days	\$19.93
\$2,400.00	13%	120 days	\$98.63

Practice Exercise 4: Income and Debt

Student Name: _____

1. Weili is an insurance salesperson. He receives a 30% commission on the first year's premium of each life insurance policy he sells. Weili sells three life insurance policies this week. If the premiums for the first year are \$350, \$400, and \$440, what was Weili's gross pay this week?

2. Weili decides to work for another company that will give him a weekly salary of \$350 and a commission rate of 6% for any goods sold over \$3000. If he sold goods worth \$5688 this week, what is his gross pay?

3. Evan works for a machine company that pays him 1% on the first \$5000 sold, 2% on the next \$15,000 sold and 3% on anything over \$20,000. What would his gross pay be if he sold \$25,000?

4. Mary works for a packaging company, assembling condiment packages for a fast-food industry. She earns \$0.08 for each package. Calculate her earnings for the week.

Day	# of Packages	Daily Earnings
Monday	760	
Tuesday	690	
Wednesday	792	
Thursday	420	
Friday	608	
Saturday	201	
Weekly Earnings		

5. Jace Manufacturing Co. makes pallets. Their workers get \$1.20 per pallet. If a worker assembles 100 pallets in a day, what would be the gross pay in a five-day week?

6. May Hill owes \$200 on her credit card. She misses a payment. She must pay interest for 28 days. If the yearly interest rate is 18%, how much interest would she pay for 28 days?

7. What is the compound interest earned on a deposit of \$1000 after two years if it is compounded semi-annually at a rate of 6%?

8. A purchase of \$220 was made on June 14. Nothing was paid on the first due date of July 20. Calculate the daily interest charge for the purchase if the rate is 18.6% per year. The next due date is August 20.

9. Amy would like to buy a computer. She has found one that she likes for \$2400 plus taxes. She doesn't have the money right now so she decides to take out a personal loan at a 9.5% fixed rate.

a) How much will she pay per month if she takes the loan out for two years?

b) How much interest will she pay?

Practice Exercise 5: Vehicle Expenses

Use the information in the tables to answer the questions on the following page.

The data in this table is invented for the purpose of this exercise. Numbers are based on one year's driving.

Vehicle Maintenance, Operating, and Repair Information

Type of Vehicle	# of Cylinders	Type of Fuel Used	Fuel Efficiency	Oil Efficiency	Tune-up Costs	Lube & Oil Change	Repairs per year	Depreciation per year	Insurance per year
Moped		regular	57 km/L	1L/6500 km	\$22.50	\$18.50	\$65.00	12% of value	12% of value
Motor-bike		regular	47 km/L	1L/4800 km	\$24.50	\$19.50	\$75.00	15% of value	12.8% of value
Motor-cycle		regular	40 km/L	1L/3200 km	\$26.50	\$19.50	\$100.00	22% of value	14.2% of value
Subcompact car	4	regular	13 km/L	1L/1500 km	\$34.88	\$21.88	\$225.00	11.7% of value	12.9% of value
Compact car	6	supreme	11 km/L	1L/4000 km	\$39.88	\$23.88	\$325.00	16.2% of value	14.5% of value
Intermediate car	8	supreme	15 km/L	1L/8000 km	\$49.98	\$25.88	\$250.00	21.8% of value	18% of value

Typical Fuel and Oil Costs

Gasoline

Regular	76.5 ¢ per litre
Supreme	85.4 ¢ per litre
Oil	\$2.90 per litre

Practice Exercise 5 - Vehicle Expenses

Student Name: _____

1. John drives his subcompact car about 12,000 km per year. How much gas will he use in an average year? How much oil?

2. Cindy has purchased a compact car. What will it cost for her for gasoline and oil to drive this car 8,300 km this year?

3. The intermediate car Warren has bought will probably be driven 24,000 km in the next year. How much will Warren have to spend on gasoline and oil for the car during this time?

4. The subcompact car M.J. drives runs about 15,000 km per year. What will be the cost of gasoline and oil for the car during the year?

5. Damian wants to know the annual fuel and oil costs for three kinds of cars - a subcompact, a compact and an intermediate - if each car is to be driven a total of 32,000 km per year.

Subcompact _____
Compact _____
Intermediate _____

6. Tanya knows that she normally drives 25,000 km per year. What would be the cost of gasoline and oil for each one of the three kinds of cars mentioned in Question 5?

Subcompact _____
Compact _____
Intermediate _____

7. Tony wants to estimate the costs of driving his subcompact car for the coming year. He wants to include the costs of gasoline, oil, tune-ups (one per year), and lube and oil changes (one per year). What costs should Tony plan on if he expects to drive 17,000 km?

8. If Tony were to buy an intermediate car, what would be the costs of operating this car for one year? Include the same costs as those mentioned in Question 7 for 17,000 km of driving.

9. Lori wants to know the total estimated cost of driving her intermediate car a total of 18,500 km in the coming year. At the beginning of the year, the estimated value of her car was \$6,500.

10. A compact car will be driven 37,500 km in the coming year. Its current estimated value is \$7,250. What are the total estimated costs for this car?

11. Gar's older subcompact car is expected to have about three more years of good driving left. Its current value is \$4,950. What expenses can he expect for this car for the coming 12 months? He expects to drive the car 42,000 km in that time (12 months).

12. What are the total estimated driving expenses for each of these cars that will have to travel 42,500 km in the coming year?

Subcompact (value is \$4500) _____

Compact (value is \$3600) _____

Intermediate (value is \$6550) _____

Answers to Practice Exercise 5: Vehicle Expenses

1. Gas = \$706.15
2. Gas + Oil = \$644.38 + \$6.02 = \$650.40
3. Gas + Oil = \$1366.40 + \$8.70 = \$1375.10
4. Gas + Oil = \$882.69 + \$29.00 = \$911.69
5. Subcompact: Gas + Oil = \$1883.08 + \$61.87 = \$1244.95
Compact: Gas + Oil = \$2484.36 + \$23.20 = \$2507.56
Intermediate: Gas + Oil = \$1821.87 + \$11.60 = \$1833.47
6. Subcompact: Gas + Oil = \$1471.15 + \$48.33 = \$1519.48
Compact: Gas + Oil = \$1940.91 + \$18.15 = \$1959.04
Intermediate: Gas + Oil = \$1423.33 + \$9.06 = \$1437.39
7. Gas + Oil + Tune-up + Lube & Oil Change =
\$1000.38 + \$32.87 + \$34.88 + \$21.88 = \$1090.01
8. Gas + Oil + Tune-up + Lube & Oil Change =
\$967.87 + \$6.16 + \$49.98 + \$25.88 = \$1049.89
9. Gas + Oil + Tune-up + Lube & Oil Change + Repairs + Depreciation + Insurance =
\$1053.27 + \$6.71 + \$49.98 + \$25.88 + \$250.00 + \$1417.00 + \$1170.00 = \$3972.84
10. Gas + Oil + Tune-up + Lube & Oil Change + Repairs + Depreciation + Insurance =
\$2911.36 + \$13.59 + \$39.98 + \$23.88 + \$325.00 + \$1174.50 + \$1051.25 = \$5539.56
11. Gas + Oil + Tune-up + Lube & Oil Change + Repairs + Depreciation + Insurance =
\$2471.54 + \$81.20 + \$34.88 + \$21.88 + \$325.00 + \$579.15 + \$638.55 = \$4152.20
12. Subcompact:
Gas + Oil + Tune-up + Lube & Oil Change + Repairs + Depreciation + Insurance =
\$2500.96 + \$82.17 + \$34.88 + \$21.88 + \$225.00 + \$526.50 + \$580.50 + \$3971.89

Compact:
Gas + Oil + Tune-up + Lube & Oil Change + Repairs + Depreciation + Insurance =
\$3299.55 + \$30.81 + \$39.88 + \$23.88 + \$325.00 + \$583.20 + \$522.00 = \$4824.36

Intermediate:
Gas + Oil + Tune-up + Lube & Oil Change + Repairs + Depreciation + Insurance =
\$2419.67 + \$15.41 + \$49.98 + \$25.88 + \$250.00 + \$1427.90 + \$1179.00 = \$5367.74

Practice Exercise 6: Buying Cars

Student Name: _____

Note: Refer to *Textbook* , page 59

New Cars: The tax rate is _____ Used Cars: The tax rate is _____

Read through each of the following scenarios, and answer the questions on the following page.

1. You wish to buy a new car for \$45,000. You trade in your old car for \$5,000. The dealership offers a loan for 2% per year to be paid monthly over 4 years, compounded semi-annually.
2. You wish to buy a new car for \$60,000. You trade in your old car for \$10,000. The dealership offers a loan for 1.5% per year to be paid monthly over 5 years, compounded semi-annually.
3. You wish to buy a new car for \$70,500. You trade in your old car for \$12,000. The dealership offers a loan for 0.9 % per year to be paid monthly over 4 years, compounded semi-annually.
4. You wish to buy a new car for \$120,000. You trade in your old car for \$20,000. The dealership offers a loan for 1.8% per year to be paid monthly over 3 years, compounded semi-annually.
5. You wish to purchase a used car for \$10,000. You have a \$3,000 down-payment. You borrow from the bank at 6.8% to be paid monthly over 5 years, compounded semi-annually.
6. You wish to purchase a used car for \$8,000. You have a \$1,000 down-payment. You borrow from the bank at 8.8% to be paid monthly over 3 years, compounded semi-annually.
7. You wish to purchase a used car for \$15,000. You have a \$4,000 down-payment. You borrow from the bank at 7.5% to be paid monthly over 4 years, compounded semi-annually.
8. You wish to purchase a used car for \$6,000. You have no down-payment. You borrow from the bank at 5.5% to be paid monthly over 2 years, compounded semi-annually.

Answer these questions for each of the scenarios on the previous page.

1. What is the tax on the car you wish to buy? What is the cost of the car?
2. What is the amount borrowed?
3. What is the monthly payment?
4. What is the total payment?
5. What is the finance charge?

Practice Exercise 7: Owning and Operating a Vehicle Student Name: _____

1. Dez would like to buy a Camaro Z28 Sports Coupe. The base price is \$32,000. He adds option package #8 to it for an extra cost of \$1585, plus he wants an automatic transmission for an additional \$695. Freight on the car is \$655. The dealership will give him a trade-in allowance of \$5000 on his old car. What is his total price?

2. The following describes a 2006 sports utility vehicle. The cost of the vehicle is \$34,000 plus taxes (freight is included in this price). The monthly lease payment is \$349 plus taxes for a lease term of 36 months. For leasing, a down payment of \$3850 is required. As well, a refundable security deposit of \$500 and the first month's payment must be made when the lease is signed.

a) Calculate the total monthly payment.

b) Calculate the total lease payment (total for three years).

c) Calculate the residual value at the end of the lease if the residual value rate for this type of vehicle is 75% after three years.

d) At the end of the three-year lease, you have the option of returning the vehicle or purchasing it for its residual value. If you decide to purchase the vehicle, what is the total cost of purchasing the vehicle (this includes the cost of the lease)?

3. A car requires 52 litres of gasoline. If the cost of gasoline is \$0.89 per litre, calculate the cost to fill the tank.

4. Jane took her vehicle to a car dealer for servicing. The oil and the oil filter were changed, and new wiper blades were installed. She also asked them to check over the motor as she was planning to go on a long trip. The costs were as follows: four litres of oil at \$2.05 per litre, one oil filter at \$5.60 and two wiper blades at \$9.75 per pair. The time required for servicing was 0.6 hours. The shop rate for labour was \$59 per hour. How much is this servicing going to cost Jane?
