Adult Basic Education

Mathematics

Mathematics 2105B

Consumer Decisions
Sampling

Curriculum Guide

Prerequisite: Mathematics 2105A

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

I. Introduction to Mathematics 2105B

The goal of the first unit is to help students make informed consumer decisions. Students will use mathematical skills such as calculating and comparing unit costs, calculating sales tax and finding rates and ratios to make wise purchases.

The intent of the second unit is to have students learn about sampling techniques in an experimental environment. In everyday life, students are faced with information that is survey based and graphically presented. This unit gives students opportunities to select appropriate methods of data collection and to read, interpret and analyze the validity of data presentations.

II. Prerequisites

Students should be familiar with finding the greatest common factor (GCF), reducing fractions, and changing percents to decimals. The instructor should provide worksheets on these topics to ensure that students can do these calculations correctly and quickly.

III. Textbook

Essentials of Mathematics 10 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 10*.

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 10*.

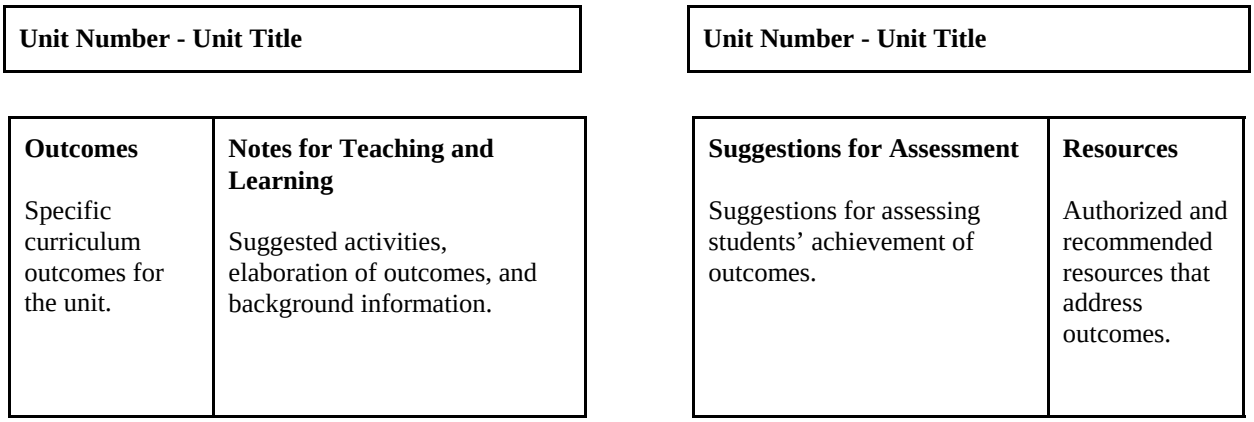
IV. Technology

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.

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



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.

VII. Resources

Essential Resources

Essentials of Mathematics 10, ISBN: 0-7726-4675-9

Essentials of Mathematics 10, Teacher Resource Book 10, ISBN: 0-7726-4808-5

Resources

Math Link: http://mathforum.org
http://edHelper.com
http://www.purplemath.com/index.htm
http://www.educationindex.com/math/
http://www.learner.org/exhibits/dailymath/resources.html

VIII. Recommended Evaluation

Written Notes	10%
Assignments	10%
Test(s)	30%
Final Exam *(entire course)*	50%
	100%

Consumer Decisions
Sampling

Unit 1 - Consumer Decisions

Outcomes

1.1 Describe the information on food packaging and labels.

Notes for Teaching and Learning

The **Chapter Project** and all **Project Activity** associated with it have been omitted. However, if there are several students working on this chapter, it would be worthwhile to assign this **Chapter Project** or something similar as an assessment.

Before students begin this chapter, the instructor should have copies of :

- Canada's Food Guide
- the self-test, "What Kind of Shopper are You?"
- information from Revenue Canada about GST and PST for Newfoundland and Labrador.

The ability to make financial decisions based on calculations of unit rate, percent taxes and discounts, as well as the ability to calculate rates such as fuel consumption are important real life skills.

A short review on percent might be useful at this time. Students may also need some extra practice in changing mixed fractions to improper fractions.

In **Exploration 1**, students will complete a survey which will tell them what kind of shopper they are. The instructor could lead a group discussion on the results of the survey and the possible implications.

The **Mental Math** exercises have been assigned in the Study Guide. However, the instructor should ensure that students realize that these problems and all calculations should be done with pencil and paper. The answers to the **Mental Math** exercises are found in the *Teacher Resource Book 10* .

In **Notebook Assignment**, question 4, students may need some help in changing grams to kilograms. It is not necessary to go through all of the metric conversions/prefixes since students will study this in more detail in Mathematics 3107 or 3109.

Unit 1 - Consumer Decisions

Suggestions for Assessment

Study Guide questions 1.1 to 1.4 will meet the objectives of Outcome 1.1.

Resources

Essentials of Mathematics 10, Smart Shopping, pages 195 - 206

Teacher Resource Book 10, pages 125 - 133

Health Canada
Canada's Food Guide,
www.hc-sc.gc.ca/fn-an/index_e.html

Canada Revenue Agency
GST/HST Memoranda
www.cra-arc.gc.ca/menu/GTMS_4-e.html

Appendix, *What Kind of Shopper are You?*

Unit 1 - Consumer Decisions

Outcomes

1.2 Calculate the unit price of a product.

1.2.1 Use the concept of unit rate to determine the best buy on a consumer item and justify the decision.

Notes for Teaching and Learning

A worksheet on changing percent to a decimal may be necessary before students start **Exploration 2**.

The instructor should verify that students correctly convert from kg to g and vice versa when completing the **Notebook Assignment**.

Students should be reminded that when comparing the unit price of two items, both *prices* have to be in the same unit and both *quantities* must be in the same unit.

The instructor should inform students that unit prices for many items are often given in the supermarket. The unit price or price per 100g is usually listed on a label on the shelf under the product. Comparing unit prices will guarantee that the best buy is found.

Suggestions for Assessment

Study Guide questions 1.5 and 1.6 will meet the objectives of Outcome 1.2.

The worksheet, *Unit Pricing*, has been assigned in the Study Guide, but it could be used for homework or review.

The following could be used for practice if students are having difficulty with unit pricing.

Have students compare some products to decide which is the better buy.

1. 500 g costs $4.98 or 1 kg costs $9.49

2. 2 boxes cost $6.00 or 1 box costs $3.25

3. 341 mL can costs $1.69 or 2–341 mL cans cost $3.49

4. Which is the better buy, given that the tins are the same size: 3 tins for $1.00 or 2 tins for $0.68?

Solution:
$1.00 ÷ 3 = 33 ¢ and $0.68 ÷ 2 = 34 ¢
It is cheaper to buy three for $1.00.

5. Find the unit price for each product listed:
- apples: 0.5 kilogram costs $0.99
- perfume: 50 mL costs $60.00
- cola: 2 litres cost $1.69

Solution:
apples: $0.99 ÷ 0.5 = $1.98 per kg
perfume: $60.00 ÷ 50 = $1.20 per mL
cola: $1.69 ÷ 2 = $0.845 per litre

Resources

Essentials of Mathematics 10, pages 210 - 216

Teacher Resource Book 10, pages 136 - 138

Appendix, Practice Exercise 1, *Unit Pricing*

Unit 1 - Consumer Decisions

Outcomes

1.3 Calculate GST, PST and the final price of a product.

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 should provide recent information on the GST and PST rates and which goods and services are taxable and which are exempt.

The map on page 218 of *Essentials of Mathematics 10* will be required to complete many of the assigned questions.

Students may need a practice worksheet on changing percents to decimals and vice versa.

Also, if students have calculators with a [%] key, they may need to be reminded that they should be able to do the problems with and without a calculator.

Unit 1 - Consumer Decisions

Suggestions for Assessment

Study Guide questions 1.7 and 1.8 will meet the objectives of Outcome 1.3.

Resources

Essentials of Mathematics 10, Sales Tax: GST and PST, pages 217 - 222

Teacher Resource Book 10, pages 139 - 142

Unit 1 - Consumer Decisions

Outcomes

1.4 Calculate the percent discount when given the regular price and amount of discount.

1.5 Describe a variety of sales promotion techniques and their financial implications for the consumer.

Notes for Teaching and Learning

When calculating discount, students should calculate the actual discount and then subtract. The second method in **Example 2**, page 225, may be confusing for students.

In questions 1 and 2, **Notebook Assignment**, students are given the original cost and the amount of the discount, and asked to find the percent saved. The instructor should provide a few practice examples since this type of problem is not demonstrated in the textbook.

When completing question 3 in **Notebook Assignment**, students should assume that Video Village is in Manitoba.

Suggestions for Assessment

Study Guide questions 1.9 to 1.11 will meet the objectives of Outcomes 1.4 and 1.5.

The instructor could ask the student or a group of students to list some ways advertisers promote a product.

- Vague claims are sometimes made about products.
- A question maybe asked but no answer is expected. Example: Why not change the things you can?
- Advertisers play on our feelings of fear or guilt. They tell us that with their product we won't fail or be rejected.
- Slogans and songs are used in advertising. Soon we are able to hum the song as soon as we see the words. Example: "When you eat your Smarties, do you eat the red ones last?"
- Advertisers repeat the name of the product or the company throughout an advertisement. This repetition helps us to remember the name.
- The product is portrayed as special, important, or reserved for a special class. The implication is that if we buy this product we will be special too.
- Statistics and graphs are used to make an advertisement appear to be supported by scientific proof.
- Sometimes advertisers try to flatter you through the language used in the ad. Example: "Nobody tries to sell you a label."

The instructor could also discuss different methods of presentation.

- *Interview:* People who use the product are interviewed. Those who give favorable responses make it to print.
- *Testimonial:* Stars and sports heroes are used to endorse a product. The idea is "if it's good enough for my hero, it's good enough for me."
- *Demonstration:* Ads may demonstrate how quick and easy their product is to use.
- *Implied Promise:* Ads are often set in beautiful places or among people having fun. It is implied that by using the product you too can experience these things.
- *Premiums:* Ads may offer free gifts or coupons to encourage you to buy the product.
- *Association:* Advertisers try to create a scene which we will associate with happy memories. It is hoped that our warm, happy feeling will come back when we see the product in the store.

Resources

Essentials of Mathematics 10, Sales Promotions, pages 223 - 228

Teacher Resource Book 10, pages 143 - 145

Outcomes

1.6 Solve problems involving rate.

Notes for Teaching and Learning

Instructors should ensure that students understand that rates are expressed in two units.

Extension, page 233, has not been assigned although it could be a suitable homework assignment or group project.

Suggestions for Assessment

Study Guide questions 1.12 to 1.14 will meet the objectives of Outcome 1.6.

Resources

Essentials of Mathematics 10, Rate, pages 229 - 233

Teacher Resource Book 10, pages 146 - 149

Outcomes

1.7 Solve problems involving ratio.

Notes for Teaching and Learning

Students should realize that ratios are used when two quantities which have the same unit are compared.

Students should be reminded to use one unit of measure when finding a ratio. (e.g. don't mix minutes and hours.) The instructor may need to provide some remedial help in this area.

The instructor could ask students to list the ways a ratio is similar to a rate and the ways it is different. See the *Teacher Resource Book 10*, page 150, for possible answers.

Since one application of ratio occurs in cooking, the instructor could provide recipes or have students bring in recipes and calculate the quantities required for different numbers of servings.

Students may need help to reduce ratios to lowest terms. Finding the largest number which divides into both quantities requires the student to know about GCF, greatest common factor.

The instructor could provide worksheets on reducing fractions or finding GFC and changing mixed fractions to improper fractions. Most math textbooks have many examples in these areas.

Suggestions for Assessment

Study Guide questions 1.15 to 1.17 will meet the objectives of Outcome 1.7.

Practice Exercise 2, *Rates and Unit Rates*, has been assigned in the Study Guide, but it could be used as an assessment.

In the Study Guide, questions from **Chapter Review**, pages 240 - 242, have been assigned. The instructor may prefer to use these questions for an assessment.

The **Case Study**, pages 244 to 246, has also been assigned, but, again, it may be beneficial to assign this as a group or individual project.

The Appendix has a Chapter 4 Test.

Resources

Essentials of Mathematics 10, Ratio, pages 234 - 239

Chapter Review, pages 240 - 242

Case Study, pages 244 - 246

Teacher Resource Book 10, pages 150 - 160

Appendix, Practice Exercise 2, *Rates and Unit Rates*

Appendix, Chapter 4 Test

Unit 2 - Sampling

Outcomes

2.1 Identify sampling methods and how they can be used to estimate total population size.

Notes for Teaching and Learning

Students will need to know how to solve equations involving proportions. For example: $\frac{40}{w} = \frac{13}{108}$.

The instructor should provide a review worksheet if necessary.

The instructor will supply 400 white beads and 100 red beads to students when they are completing **Counting Shark Activity** on pages 340 and 341. This activity could be completed by a group of two or three students.

Suggestions for Assessment

Study Guide questions 2.1 to 2.4 will meet the objectives of Outcome 2.1.

For extra practice, the instructor could ask students questions similar to the following:

Suppose that naturalists catch, tag and release 40 deer in a forest. Several weeks later they catch a sample of 100 deer, eight of which have tags. What is the estimate for the number of deer in the forest? (Answer: 500)

Resources

Essentials of Mathematics 10, Determining Total Populations, pages 335 - 344

Teacher Resource Book 10, pages 215 - 222

400 white beads and 100 red beads

www.edhelper.com

Unit 2 - Sampling

Outcomes

2.2 Select, defend, and use appropriate methods of collecting data.

Notes for Teaching and Learning

The instructor should guide students as they explore four types of samples and make recommendations on which type is best suited to different situations.

Students should discuss the implications of faulty sampling method selection.

The instructor should ask students to create a list of types of surveys that reflect each sampling method.

Suggestions for Assessment

Study Guide questions 2.5 and 2.6 will meet the objectives of Outcome 2.2.

Resources

Essentials of Mathematics 10, What Type of Sample?, pages 345 - 349

Teacher Resource Book 10, pages 223 and 224

Outcomes

2.3 Describe how random numbers are used to select a sample.

Notes for Teaching and Learning

The **Group Activity** on pages 352 to 355 has been omitted. However, the instructor can choose to complete this activity if there is time to guide the students through it.

Microsoft Excel has a function to produce random numbers.

If you want random numbers from 1 to 250, enter the following formula into a cell, and then copy the formula throughout a selection of cells.
= INT (250* RAND ())+1

The INT ensures that the numbers are integers (no decimals), the 250* creates the range to be covered, and the +1 sets the lowest number in the range.

The instructor should provide a table of random numbers or guide students in producing their own table using Microsoft Excel.

Suggestions for Assessment

Study Guide questions 2.7 to 2.9 will meet the objectives of Outcome 2.3.

Resources

Essentials of Mathematics 10, Random Numbers, pages 350, 351 and 357.

Teacher Resource Book 10, pages 225 and 226

Outcomes

2.4 Describe the characteristics of and the method of choosing a representative sample.

Notes for Teaching and Learning

This **Exploration** introduces students to the importance of finding a representative sample.

See the *Teacher Resource Book 10* for a list of materials that students may need while working through this **Exploration**. The instructor may have to discuss with students how dice, a random number table, a telephone book, and a list of students could be used to find a representative sample of students for a survey.

Suggestions for Assessment

Study Guide questions 2.10 to 2.13 will meet the objectives of Outcome 2.4.

Resources

Essentials of Mathematics 10, Representative Samples, pages 358 - 361

Teacher Resource Book 10, pages 227 and 228

Outcomes

2.5 Describe issues to be considered when collecting data (e.g. appropriate language, ethics, cost, privacy, cultural sensitivity).

Notes for Teaching and Learning

The instructor should have examples of different types of market, internet and magazine surveys in the classroom.

The **Project Activity** has been omitted for this course. However, the instructor could use a modified version of the project as an assessment and have students conduct a survey.

Suggestions for Assessment

Study Guide questions 2.14 and 2.15 will meet the objectives of Outcome 2.5.

Resources

Essentials of Mathematics 10, Collecting Data: Surveys and Experiments, pages 362 - 365

Teacher Resource Book 10, pages 229 and 230

Outcomes

2.6 Determine whether a survey is fair and accurate.

Notes for Teaching and Learning

In this **Exploration** students will consider the fairness and accuracy of surveys and the data they gather.

The instructor should discuss with students (or students could discuss as a group) the factors that make a survey unfair or biased.

The instructor should have some samples of misleading survey ads or statistics for students to consider.

Suggestions for Assessment

Study Guide questions 2.16 and 2.17 will meet the objectives of Outcome 2.6.

Resources

Essentials of Mathematics 10, Survey Results, pages 368 - 371

Teacher Resource Book 10, pages 233 and 235

Outcomes

2.7 Display data using suitable graph types including:
- broken line graphs
- bar graphs
- histograms
- circle graphs

2.7.1 Use a given set of data to calculate the mean, median and mode.

Notes for Teaching and Learning

Students will decide on the best way to present statistical information in the form of graphs.

The instructor should discuss with students the advantages and disadvantages of the following types of graphs: circle, bar, histogram and broken line.

Students will need some guidance in finding the percentages, and the equivalent in degrees, that go into a circle graph. Students may need help in using a protractor to draw circle graphs.

The instructor should take time to discuss central tendency. Students need to understand the difference between mean, median and mode and when it is appropriate to use each.

The instructor should use other resources to find statistical information. Students could calculate mean, median and mode and use this same data and present it in the form of a graph.

Suggestions for Assessment

Study Guide questions 2.18 to 2.21 will meet the objectives of Outcome 2.7.

Chapter Review, pages 385 and 386, questions 2 - 7 and 9 - 12 could be used as an assessment.

Case Study, pages 389 and 390, could be used as a chapter assessment.

Chapter 6 Test is in the Appendix. It may need to be modified for a particular group or student.

The following questions could be used for further assessment.

1. A marble is rolled down a ramp 5.0 cm in length and out onto the floor. Students measured how far along the floor the marble rolled. The data below was collected by repeating this over and over again. Given these measurements (made using a centimeter ruler), ask students to use the data to answer this question: "How far will a marble roll along a horizontal surface after it leaves that ramp."

15.4, 12.8, 16.1, 15.3, 14.7, 13.2, 15.1, 16.4, 13.2
17.1, 15.6, 12.8, 13.3, 14.7, 12.8, 14.6, 15.5

2. In an experiment to determine if there is a relationship between the diameter of a circular balloon and the number of puffs to fill the balloon, the following data was collected:

Puffs to fill balloon	7	9	3	10	5	8
diameter (cm)	18.2	20.1	9.1	2.1	12.3	19.2

a) organize the data
b) sketch a broken-line graph

Note: Instructors may choose to actually perform this experiment in class to have students collect their own data.

3. The **Find Your Reaction Time** experiment found in the Appendix is a fun activity for students.

Resources

Essentials of Mathematics 10, Presenting Data, pages 373 - 381

Chapter Review, pages 385 and 386

Case Study, pages 389 and 390

Teacher Resource Book 10, pages 236 and 240

Appendix, Chapter 6 Test

Appendix, Activity: *Find your Reaction Time*

Appendix

What Kind of Shopper are You?

Directions: Circle the word that describes you best. Student Name_____

1. I look to ads to get information about products or services.

   4 Always 3 Often 2 Rarely 1 Never

2. I find information about products and services from places other than ads.

   4 Always 3 Often 2 Rarely 1 Never

3. I check for the price and quality of different brands at different companies before I buy.

   4 Always 3 Often 2 Rarely 1 Never

4. I read the labels and the guarantees given on products and follow any directions given.

   4 Always 3 Often 2 Rarely 1 Never

5. I try out a product before buying it, if possible, and ask about items I cannot try out.

   4 Always 3 Often 2 Rarely 1 Never

6. I make a list and follow it while shopping.

   4 Always 3 Often 2 Rarely 1 Never

7. I let manufacturers and retailers know what I like and dislike about their products and services.

   4 Always 3 Often 2 Rarely 1 Never

8. I decide what products and services to get before I go out shopping.

   4 Always 3 Often 2 Rarely 1 Never

9. I consider what I need and want as well as the price before I decide what to buy.

   4 Always 3 Often 2 Rarely 1 Never

   Add up your scores and rate yourself according to the following scale:

   28-36 super shopper 19-27 careful shopper
   10-18 poorly prepared shopper 0-9 need-to-improve shopper

Practice Exercise 1: Unit Pricing Student Name_____

To find the better buy (the product that gives you more for less money), you need to compare prices for the same item. Many stores sell items by stating a rate (the price for a given quantity of an item). When the second part of a rate is one unit, the rate is called a *unit rate*. The best way to compare prices is to find the unit price (the cost of one unit of the item). To find the unit price, you must write a fraction with the cost in the numerator and the number of units in the denominator. Then divide the numerator and denominator by the same number so that the denominator equals 1.

1. Complete the chart below by first writing the items and prices as a fraction. Then find the unit price. Round answers to the nearest cent.

Items and prices	Fraction	Unit Price
3 kg of applies for $4.17		
400 g of detergent for $4.99		
5 cans of soup for $4.30		
3 boxes of pasta for $2.49		
300 g bag of chips for $1.29		

2. Marie is buying potato chips for a party. Which is the better buy, 200 g bags that cost $2.22 each or 350 g bags that cost $2.90? Why? _____
_____

3. Co-op sells bologna at $1.59 per half kilogram and Sobey's sells it at $.89 for .25 kg. Which store sells bologna for less? How much less?_____
_____

4. Wal-Mart sells markers for $.45 each and Zellers sells six markers for $2.00. Which store has the better buy? Why?_____
_____

5. Peas cost 3 cans for $1.00 at one store, 5 cans for $1.50, and 8 cans for $2.25 in a third store. In which store is the unit price the least? Show all workings. _____
_____
_____

Answer Key for Practice Exercise 1: Unit Pricing

1.

Items and prices	Fraction	Unit Price
3 kg of applies for $4.17	$\frac{\$4.17}{3}$	$1.39 per kg
400 g of detergent for $4.99	$\frac{\$4.99}{400}$ or $\frac{\$4.99}{4}$ for 100 g	$0.0125 per g or $1.25 per 100 g
5 cans of soup for $4.30	$\frac{\$4.30}{5}$	$0.86 per can
3 boxes of pasta for $2.49	$\frac{\$2.49}{3}$	$0.83 per box
300 g bag of chips for $1.29	$\frac{\$1.29}{300}$ or $\frac{\$1.29}{3}$ for 100 g	$0.0043 per g or $0.43 per 100 g

2. $\frac{\$2.22}{200}$ = $0.011 and $\frac{\$2.90}{350}$ = $0.008, therefore the 350 g bag for $3.90 is the better buy because .008 is smaller than 0.011.

3. The Co-op price is cheaper because $\frac{\$1.59}{.5}$ = $3.18 is less than the Sobey's price of $\frac{\$0.89}{.25}$ = $3.56. It's 38 cents per kg cheaper.

4. Zellers has the better buy because the markers sell for $\frac{\$2.00}{6}$ = $0.33 each, which is $0.12 cheaper than the Wal-Mart price.

5. 8 cans for $2.25 is the cheapest price, because, $\frac{\$2.25}{8}$ = $0.28, while $\frac{\$1.50}{5}$ = $0.30 and $\frac{\$1.00}{3}$ = $0.33.

Practice Exercise 2: Rates and Unit Rates Student Name_____

1. Express each situation as a Rate and a Unit Rate:

Situation	Rate	Unit Rate
You run 18 km in 2 hours	speed =	
You earn $120 in 15 hours	wage =	
Potatoes cost $6.25 for 20 kg	cost =	
7 cubic centimetres of water has a mass of 7 grams	$density = \frac{mass}{volume} =$	
You can exchange $22 Canadian for 15,034 Italian Lira	exchange =	

2. **Multiple choice** : Circle the letter for your answer.

a.) A *ratio* is a comparison of two numbers or quantities that uses what operation?
A. addition B. subtraction C. multiplication D. division

b) Which form is **not** used to represent the ratio of numbers *a* and *b*?

A. a + b B. a:b C. $\frac{a}{b}$ D. a to b

c) Which rate is **not** equivalent to the others?

A. $\frac{72\ mi}{4\ h}$ B. $\frac{18.5\ mi}{1\ h}$ C. $\frac{37\ mi}{2\ h}$ D. $\frac{46.25\ mi}{2.5\ h}$.

d) Which is **not** a unit rate?

A. $\frac{\$2.50}{1\ photo}$ B. $\frac{\$50}{1\ dozen}$ C. 9 to 1 D. $\frac{1\ pound}{14\ bricks}$

e) Which rate represents the best buy?
A. $\frac{\$2.34}{2.5\ g}$ B. $\frac{\$4.60}{5\ g}$ C. $\frac{\$6.65}{7\ g}$ D. $\frac{\$0.94}{1\ g}$

f) Tanya got 45 hits in 72 at-bats. Express the ratio of hits to at–bats (batting average) in decimal form.

A. 45:72 B. .375 C. .625 D. 3 to 8

Answer Key for Practice Exercise 2: Rates and Unit Rates

Situation	Rate	Unit Rate
You run 18 km in 2 hours.	speed $= \frac{distance}{time} = \frac{18\,km}{2\,hr}$	9 km per hour
You earn $120 in 15 hours.	wage $= \frac{earnings}{\#\,of\ hours} = \frac{\$120}{15\,hr}$	$8.00 per hour
Potatoes cost $6.25 for 20 kg.	cost $= \frac{cost}{kg} = \frac{\$6.25}{20\,kg}$	$0.31 per kg
7 cubic centimetres of water has a mass of 7 grams.	density $= \frac{mass}{volume} = \frac{7\,grams}{7\,cubic\ centimetres}$	1 g per cubic centimetre or 1 $\frac{g}{cc}$
You can exchange $22 Canadian for 15,034 Italian Lira.	exchange $= \frac{Italian\ Lira}{Canadian\ Dollar} = \frac{15034}{22}$	683 Lira per Dollar

2. a) D division

   b) A a + b

   c) A $\frac{72\,mi}{4\,h}$

   d) D $\frac{1\,pound}{14\,bricks}$

   e) B $\frac{\$4.60}{5\,g}$

   f) C .625

Chapter 4 Test Student Name:_____

1. Calculate the unit price for each of the following.

   a) $2.40 for 12 pencils

   b) $6.33 for 3 kg of apples

   c) $6.00 for 12 bagels

   d) $9.88 for 10 disks

   e) $3.79 for 225 g of cereal

2. A store sells salt in three different sizes: 250 g for $0.89, 500 g for $1.59, and 2.5 kg for $2.99. Which of these has the highest unit price?

3. a) What does GST stand for?

   b) What is the percent rate of the GST?

   c) List 3 goods and/or services on which you pay GST.

   d) What does PST stand for?

   e) List 3 goods and/or services subject to this tax.

4. The regular price of a particular brand of jeans in a NL department store is $29.95. During a sale, the jeans are reduced by 25%.

   a) Calculate the amount of the discount.

   b) Calculate the sale price.

   c) Calculate the total cost of these jeans during the sale.

5. Calculate the unit rate for each of the following. Include correct units in all your answers.

   a) 30 metres in 5 seconds

   b) net pay of $24.00 for 6 hours of work

   c) 300 kilometres in 15 hours

6. Karl works 30 hours during a week and his net pay is $225.00. Dominique works 33 hours during that same week; and her net pay is $280.50.

   a) Find Karl’s net hourly rate of pay.

   b) Find Dominique's net hourly rate of pay.

   c) Both students are saving for an overseas trip that costs $1400.00. How many hours will each of them have to work to earn the $1400.00 for the trip?

Chapter 6 Test **Name:_____**

1. Wildlife biologists use procedures of "banding" and "capture-recapture" to get statistics on populations of various animals. Explain what each procedure is and give an example of what the procedures might be useful for. _____

2. A survey was taken of adult Esquimalt residents to see if Canadians are generally in favour of providing more money for the military. Would this sample be representative of Canada's adult population? Why or why not? If not outline a better way to do it. _____

3. A scientist examines the stomach contents of raccoons trapped in Prince Edward Island to study their diet. Is this sample likely to be representative of the raccoon population of New Brunswick? Why or why not? _____

4. A school nutrition committee wants to find out if students would like the cafeteria to serve only vegetarian food. They can survey only 30 out of 900 students and the rugby team had 30 members so they decide to survey the rugby team. Should they place much confidence in the results? Why or why not? If not, suggest a better method and explain why it is better.

5. Find the mean, median, and mode for the following sets of test scores:

a) 47, 67, 73, 78, 80, 80, 91, 94, 97 mean = _____ median = _____ mode = _____

b) 20, 30, 30, 40, 60, 80 mean = _____ median = _____ mode = _____

6. Explain which of the mean, median, or mode would be most appropriate in each of the following situations and why.

a) A store owner deciding what brand of pop to stock

_____
_____
_____
_____
_____

b) A medical researcher reporting blood pressures for Canadian males

_____
_____
_____
_____
_____

c) A sports reporter writing a story about the salaries of players on a particular team

_____
_____
_____
_____
_____

7. The number of passengers in different buses was recorded. The mean was 40 and the median was 42. If 20 extra passengers rode on each bus, what would the new mean and median be? If all passengers paid $1.20 to ride, what would be the mean and median amount of money collected?

_____
_____
_____
_____
_____
_____
_____
_____
_____

Why?_____

Find Your Reaction Time **Student Name: _____**

Purpose: To find your reaction time to an event.

Procedure

A. Hold a ruler vertically so that the “0" is at the bottom.
- Have another person hold out a hand so that the thumb and forefinger are on either side of the ruler at the mark “0" mark, ready to catch the ruler when it is dropped.
- Drop the ruler without warning the other person.
- Record the position in centimetres at which the other person grabs the ruler.

B. Repeat Step A at least 10 times and record all the results.

C. Switch roles with the other person and repeat Steps A and B.

D. Find a single number that best represents the data you collected.

E. The number in Step D should describe your typical or average performance. Discuss what typical or average might mean in this situation.

F. Discuss how measuring the distance on the ruler gives a measure of your reaction time.