

**Adult Basic Education**  
**Mathematics**

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# Mathematics 3109C

**Personal Finance**  
**Statistics**

# Study Guide

**Prerequisites:** Mathematics 2105A, 2105B, 2105C  
Mathematics 3109A, 3109B

**Credit Value:** 1

**Text:** *Essentials of Mathematics 12*, Baron, Celia; Pacific Educational Press, 2003.

**Mathematics Courses [General College Profile]**

Mathematics 2105A  
Mathematics 2105B  
Mathematics 2105C  
Mathematics 3107A  
Mathematics 3107B  
Mathematics 3107C  
Mathematics 3109A  
Mathematics 3109B  
**Mathematics 3109C**



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## To the Student

### I. Introduction to Mathematics to 3109C

While studying the first unit, you will become familiar with different types of life and property insurance. You will learn how to decide how much life insurance is needed and then use Life Insurance tables in the textbook to calculate the monthly cost or premium. You will also learn about mortgages and how to calculate the interest that you will pay on a given mortgage. Make sure that you have access to and know how to use an on-line mortgage calculator. Using an on-line mortgage calculator, you will immediately see how the amount you pay in interest changes greatly depending on the payment option you choose. You will also see how the length of time required to pay off a mortgage varies greatly with each payment option.

In the second unit, you will be analyzing data. You will learn about percentile rank which tells you where a score falls when compared to the rest of the scores. You will also calculate the standard deviation and learn what it means, as well as draw and label normal curves. After you have finished this unit, you will always look at a set of data with a different perspective.

### II. Resources

You will require the following:

- *Essentials of Mathematics 12*
- scientific calculator

#### Notes concerning the textbook:

**Glossary:** Knowledge of mathematical terms is essential to understand concepts and correctly interpret questions. Written explanations will be part of the work you submit for evaluation, and appropriate use of vocabulary will be required.

Your text for this course includes a Glossary where definitions for mathematical terms are found. Be sure you understand such definitions and can explain them in your own words. Where appropriate, you should include examples or sketches to support your definitions.

**Examples:** You should study the **Examples** in each section carefully and see your instructor if you have any questions. These **Examples** have full solutions to problems that will be a great help when answering assigned questions from **Notebook Assignment**.

**Chapter Project:** Unless your instructor directs you differently, you should omit all **Chapter Projects** and **Project Activity**.

## To the Student

### Notes concerning technology:

You should have a scientific calculator (the word “scientific” should be written on it) and the instruction booklet that belongs with it. Scientific calculators are fairly inexpensive. Even though your calculator will be a useful tool, you should be able to solve most exercises by using paper and pencil.

### **III. Study Guide**


**This Study Guide is required at all times.** It will lead you through the course and you should take care to complete each unit of study in the order given in this Guide.

To be successful, you should read the **References and Notes** first and then, when indicated by the ☐☐ symbols, complete the **Work to Submit** problems. Many times you will be directed to see your instructor, and this is vital, especially in a Mathematics course. If you have only a hazy idea about what you just completed, nothing will be gained by continuing on to the next set of problems.

## To the Student

The Study Guide has the following format:

**Reading for this Unit:** In this box, you will find the name of the text, and the chapters, sections and pages used to cover the material for this unit. As a preliminary step, skim the referenced section, looking at the name of the section, and noting each category. Once you have completed this overview, you are ready to begin.

References and Notes	Work to Submit
<p>This left hand column guides you through the material to read from the text.</p> <p>It will also refer to specific <b>Examples</b> found in each Exploration. You are directed to carefully study these <b>Examples</b> with solutions and see your instructor if you have any questions. The <b>Examples</b> are important in that they not only explain and demonstrate a concept, but also provide techniques or strategies that can be used in the assigned questions.</p> <p>You should read and understand the <b>Hints</b> and <b>New Terms</b> that are at the bottom of selected pages in the textbook.</p> <p>The symbols  direct you to the column on the right which contains the work to complete and submit to your instructor. You will be evaluated on this material.</p> <p>This column will also contain general <b>Notes</b> which are intended to give extra information and are not usually specific to any one question.</p>	<p>There are two basic categories included in this column that correspond to the same categories in the sections of the text. They are <b>Mental Math</b> and <b>Notebook Assignment</b>.</p> <p><b>Mental Math:</b> These problems should be completed using pencil and paper. If you have difficulty, you should see your instructor for extra practice problems. Usually the skills that are applied in <b>Mental Math</b> are those required to successfully complete <b>Notebook Assignment</b>. Your instructor will provide the answers to <b>Mental Math</b> exercises.</p> <p><b>Notebook Assignment:</b> This section provides a series of problems similar to those in the <b>Exploration</b>. You should attempt these problems only after the <b>Exploration</b> problems have been understood and all assigned <b>Mental Math</b> and practice worksheets have been completed. The textbook contains answers to <b>Notebook Assignment</b>. Your instructor will provide more detailed solutions with workings and some explanations.</p> <p>This column will also contain <b>Notes</b> which give information about specific questions.</p>

## IV. Recommended Evaluation

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



## Unit 1 - Personal Finance

To meet the objectives of this unit, students should complete the following:

**Reading for this unit:** *Essentials of Mathematics 12*

Chapter 1: Exploration 1:	pages 11, 13 - 23
Exploration 2:	pages 24 - 33
Exploration 3:	pages 34 - 41
Exploration 4:	pages 44 - 53
Exploration 5:	pages 54 - 60
Exploration 6:	pages 61 - 65
Chapter Review:	pages 66 - 68
Case Study:	page 70

### References and Notes

Omit **Chapter Project** and **Project Activity**, unless your instructor directs you otherwise.

Read page 11 and **Exploration 1**.

You should be able to correctly use the terms: *beneficiary*, *insurer*, *policy*, *premiums* and *cash surrender*.

Study **Examples 1 - 4**.

Make sure that you know how to read the tables on pages 14 - 17. See your instructor if you have any difficulties.

Answer the following questions.



### Work to Submit

- 1.1 List some differences between term insurance and whole-life insurance.



## Unit 1 - Personal Finance

### References and Notes

The website [www.termcanada.com](http://www.termcanada.com) provides annual premiums for life insurance.

#### Read **Exploration 2**.

You should be able to appropriately use the vocabulary in **New Terms** on pages 24 - 26 .

Read page 28 and study **Example 1**.

You do not have to complete an amortization schedule; however you should understand how to read one. The amortization schedule shows how, initially, most of the mortgage payment goes toward interest.

The websites: [www.calculatorz.com/united/amortschedule.cgi](http://www.calculatorz.com/united/amortschedule.cgi) and [www.canadamortgage.com](http://www.canadamortgage.com) will provide amortization schedules.

Study **Example 2**. Work through the given solutions.

Answer the following questions.  
▶▶

Use the **Amortization Table** on page 27 when necessary.

### Work to Submit

1.2 **Class Activity**, page 21

**Note:** Use the table on page 15 to answer this question.

1.3 **Notebook Assignment**, pages 22 and 23  
Answer questions 1 - 8.

1.4 **Mental Math**, page 31

## Unit 1 - Personal Finance

### References and Notes

#### Read **Exploration 3**.

Make sure that you are familiar with the different payment options which are described on pages 34 and 35. The figures in the table on page 35 can be obtained from an on-line mortgage calculator. Try the following site:

[www.canadamortgage.com](http://www.canadamortgage.com).

Study **Examples 1 - 4**. Work through the calculations.

Answer the following questions.



### Work to Submit

1.5 **Notebook Assignment**, pages 32 and 33  
Answer questions 1 - 4.  
(See note below on question 4.)

Answer questions 5 - 8.

**Question 4:** Go to one of the websites previously mentioned to create the amortization schedule.

1.6 **Notebook Assignment**, page 41  
Answer questions 1 - 4.

**Note:** Use the on-line mortgage calculator to answer these questions.

## Unit 1 - Personal Finance

### References and Notes

Read **Exploration 4**.

This **Exploration** looks at the factors considered by banks and other lending institutions when determining whether or not they will lend the money for a mortgage.

Study **Examples 1 - 4** and work through the given solutions.

Obtain copies of **Affordability Chart** from your instructor

Answer the following questions.



Ask your instructor for a copy of **Practice Exercise 1, Calculating Gross Debt Service Ratio**.

Read **Exploration 5**.

Study **Examples 1 and 2**.

You should study the **New Terms** on pages 54 and 56 and be able to properly use this vocabulary.

Check out the insurance website: [www.kanetix.com](http://www.kanetix.com), where you can compare the rates for different levels of coverage.

### Work to Submit

1.7 **Practice Exercise 1, Calculating Gross Debt Service Ratio**

1.8 **Notebook Assignment**, page 53  
Answer questions 1 - 6.

## Unit 1 - Personal Finance

### References and Notes

Answer the following questions.



Read **Exploration 6**.

Obtain copies of the form **Additional Costs in Purchasing a Home** from your instructor.

Study and work through the calculations in **Example 1**.

Answer the following questions.



Ask your instructor for a copy of **Practice Exercise 2, Additional Costs in Purchasing a Home**

### Work to Submit

1.9 **Mental Math**, page 58

1.10 **Notebook Assignment**, pages 59 and 60  
Answer questions 1 - 7.  
(See note below on question 7.)

**Question 7:** Assume that Rosie lives within city limits. Refer to Table 2 in **Exploration 1** on page 15 to calculate the cost of the life insurance.

1.11 **Practice Exercise 2, Additional Costs in Purchasing a Home**  
Answer questions 1 and 2.

1.12 **Notebook Assignment**, pages 64 and 65  
Answer questions 1 - 3.

1.13 **Chapter Review**, pages 66 - 68  
Answer questions 1 - 7.

1.14 **Case Study**, page 70  
Answer the following: *Mortgage and Property Insurance*.

## Unit 2 - Statistics

To meet the objectives of this unit, students should complete the following:

**Reading for this unit:** *Essentials of Mathematics 12*

Chapter 8: Exploration 1:	pages 381, 383 - 392
Exploration 2:	pages 393 - 400
Exploration 3:	pages 401 - 413
Exploration 4:	pages 416 - 426
Chapter Review:	pages 427 - 431
Case Study:	pages 433 and 434

### References and Notes

Omit **Chapter Project** and **Project Activity**.

Read **Exploration 1**.

Omit **Pairs Activity:**  
**Wordsplash**

Study **How to Calculate a Percentile Rank** and make sure you understand and can use the formula.

$$\text{Percentile rank} = \frac{B+0.5E}{n} \times 100,$$

where:

$B$  = number of scores below a given score

$E$  = number of scores equal to, and including, the given score

$n$  = total number of scores.

### Work to Submit

## Unit 2 - Statistics

### References and Notes

Study **Examples 1 - 4**. Work through each solution.

Answer the following questions.



Ask your instructor for a copy of **Practice Exercise 3, Percentile Rank**.

Read **Exploration 2**.

You should recall that  $\Sigma$  is the Greek letter, sigma, and means “the sum of”. Make sure that you know what the variables mean in the formula for standard deviation:

$$s = \sqrt{\frac{\Sigma(x - \bar{x})^2}{n - 1}} .$$

Study **Examples 1 - 4**. Work through each of the calculations.

**Note: Step 6, in Example 2**, on page 395, calculates the “mean of the squares”. You should note that to find this mean you must divide by  $(n - 1)$ , (not  $n$ , as you would normally to find a mean or average).

We will not go into the theoretical justification for using  $(n - 1)$ .

### Work to Submit

2.1 **Mental Math**, page 388  
Answer questions 1 - 3.

2.2 **Practice Exercise 3, Percentile Rank**  
Answer questions 1 - 5.

2.3 **Notebook Assignment**, pages 390 - 392  
Answer questions 1 - 8.

## Unit 2 - Statistics

### References and Notes

You should be able to calculate standard deviation by using the formula. You can also determine standard deviation using a TI - 83 graphing calculator. Use the following steps:

2<sup>nd</sup> [LIST] MATH 7: stdDev (

Put in {, list the numbers with commas between them and close with }). Press ENTER.

You should practise using the calculator (after you have mastered the pencil and paper method) on **Examples 2** and **3** on pages 395 - 397.

Answer the following questions.



### Work to Submit

2.4 What information does the standard deviation reveal about a set of numbers?

2.5 **Notebook Assignment**, pages 399 and 400  
Answer questions 1 - 7.

**Note:** Answer questions 1 - 5 using the equation for standard deviation. Complete tables similar to the one in **Example 2** on page 395. Use your graphing calculator to check your final answers.

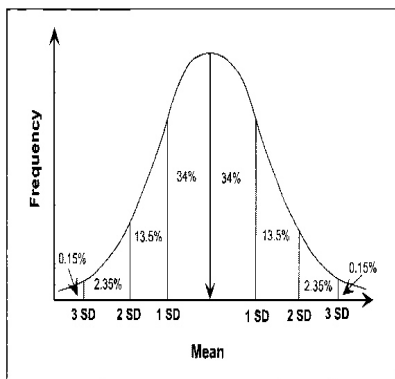
## Unit 2 - Statistics

### References and Notes

Study **Exploration 3**.

Read **Hints** on the bottom of page 401. Make sure that you know the four characteristics of the normal curve.

The percentages given in the normal distribution graphs in this **Exploration** have been rounded in order to simplify calculations. Below is the normal curve with percentages that are not rounded.



Study **Example 1**. See your instructor if you have difficulty with this example.

Answer the following questions.



### Work to Submit

2.6 **Pairs Activity**, page 404  
Answer questions 1 - 4.

**Note:** This question can be completed individually.

2.7 Draw and label a normal curve, showing percentages and standard deviations.



## Unit 2 - Statistics

### References and Notes

Ask your instructor for a copy of **Practice Exercise 4, Standard Deviation and the Normal Curve.**

### Study Exploration 4.

Read **Hints** and **New Terms** on page 416.  
Study **Examples 1** and **2**.

You should note that a scatterplot is not a dependent-independent relationship, but a co-relation.

The correlation coefficient,  $r$ , is useful to determine the strength of the linear relationship that may exist between two sets of data. It is important to note that not all correlation is linear, but in this course, only linear correlation will be considered.

### Work to Submit

2.8 **Practice Exercise 4, Standard Deviation and the Normal Curve**  
Answer questions 1 - 5.

2.9 **Notebook Assignment**, pages 408 - 413  
Answer questions 1 - 7.  
(See notes below on questions 6 and 7.)

**Question 6 and 7:** Draw and label a normal curve for each of these problems, **before** you answer the questions.

**Question 7:** The answers in the answer key in the textbook are incorrect for 7c), d) and e).

The following answers are correct:

- c) 68%, 34 000 bars
- d) 1 bar
- e) 1 bar

## Unit 2 - Statistics

### References and Notes

Answer the following questions.



Ask your instructor for a copy of **Practice Exercise 5, Correlation.**

### Work to Submit

2.10 Define the following terms and draw a sketch:  
i) correlation coefficient  
ii) negative correlation  
iii) positive correlation  
iv) zero correlation  
v)  $r$ -value

2.11 **Mental Math**, page 417

2.12 **Pairs Activity**, pages 418 and 419

2.13 **Practice Exercise 5, Correlation**  
Answer questions 1 - 3.

2.14 **Notebook Assignment**, pages 422 - 426  
Answer questions 1 - 7.  
(See note below on questions 6 and 7.)

**Questions 6 and 7: Omit 6c) and 7c).**

2.15 **Chapter Review**, pages 427 - 431  
Answer questions 1 - 10.

2.16 **Case Study**, pages 433 and 434  
Answer questions 1 - 4.