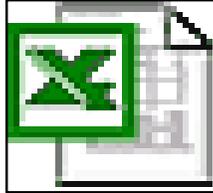# Mathematics LBS 4

Spreadsheet Mathematics: Statistics and Graphing

Lab 1 B: Adding, Averaging and Working with Percent

Microsoft Excel Logo and all screens captured by permission of Microsoft

Goal   To add, average and find percent change for data in an Excel Spreadsheet

Learning Outcomes   After completing this section, the student should be able to

- open a Microsoft Excel worksheet
- enter data in a worksheet
- add, average and find percent change for data in a spreadsheet
- complete several practice assignments

Prior Learning   Before attempting this unit, it is expected that the student has:
- completed Lab 1 of " Spreadsheet Math" and /or knows how to enter and format data in an Excel Spreadsheet

Contents

- open the **Microsoft Excel Spreadsheet Program**
- enter data in a worksheet
- use function keys to add and average data
- set up formulas to add, average, and calculate percent change of data
- save a worksheet
- print up a worksheet
- complete two practice assignments
- discuss questions or concerns about the assignments with your teacher

Spreadsheet Math

Lab 1 B: Adding, Averaging and Working with Percent

New Words: Formula

Exercise 1: Entering a Formula in a Spreadsheet

A.   Entering and Fomatting Data

1.   Open ***Excel***. (See Lab 1 if you have forgotten how to open ***Excel***)
2.   Enter the following data in your worksheet. <u>Do not enter spaces or commas in the numbers</u>. We will use the format key for that.

Motor Vehicle Registration In Canada

Vehicle Type	1997	1998
Passenger automobiles	13 486 957	13 887 270
Trucks and truck tractors	3 526 933	3 625 818
Buses	64 261	68 259
Motorcycles	299 170	313 680
Mopeds	20 013	19822
Other Road Motor Vehicles	80 408	73 292

Source: Statistics Canada, CANSIM, Matrix 356 and Catalogue no 53-219-XIB. Last modified: April 4, 2001

3.   Format the column headings (Vehicles, 1997, 1998) by bolding and centering.
        Format the vehicle types in column A by bolding them.
        Format the numbers by highlighting the range, choosing format, choosing number, then choosing custom and typing ### ### ##0 in the space where it says type. See below.

1. Choose format.

2. Choose Number

3. Choose Custom

4. Type ### ### ##0

Compare your worksheet with the example below. **Save your work** (using a different file name from other spreadsheets.

B. Entering Math formulas.

4. We will now "add up" or total each column to get the ***Total Motor Vehicle Registrations*** for both **1997** and **1998.** Add the word "**TOTAL**" to the bottom of column A. To get the total for column B and C we must enter a formula in **B8** (total for 1997) and **C8** (total for 1998).

5. To Sum (add up) all the vehicles registered in 1997, make **B8** the ***active cell*** (double click on a cell top to make it active)
   The formula for sum (total) in this case is: **=SUM(B2:B7)**
   A formula always starts with **=**
   After you key in: **=SUM(B2:B7)** in the active cell, hit **<Enter>**
   Now you should see the **total** for ***Motor Vehicle Registrations*** in **1997.**

6. Now, do the **total** for **1998**, by entering the correct formula.

   Your spreadsheet should look like the example below. **Save it!**

7. A shortcut way to get the total or SUM of a column is to use the *Autosum* **S** feature from the toolbar. We will practice using *Autosum.*

8. Delete the totals for **1997** and **1998.** To do this *Click on* (once) the total for **1997**. Then *Hit* on *Delete*. This deletes the total and the formula you put in that cell. Do the same for the 1**998** total.

9. To use *Autosum* to add up the **1997** column:

    Highlight the range **B2:B7** Next, *point* and *Click on* the *Autosum* symbol **S** on the toolbar. The sum will appear automatically in the cell right below the range. Did you get the same total you did when you entered the formula?

10. Now, use *Autosum* to add up the **1998** column. Is this total the same as when you used the formula?

Exercise 2: Enter a "Percent Change Formula" in Worksheet and Copy it Down a Column

The next thing we will do on this spreadsheet is calculate the "*percent change*" in Motor Vehicle Registrations from 1997 to 1998.
To see how we get the formula for "*percent change*", let's calculate by hand the "*percent change*" for registrations of **Passenger Cars:**

Percent Change= (13 887 270 – 13 486 957) X 100% = 4.85%
13 486 957

After looking at the calculation above, we see that the formula for "*percent change*" is: **=(C2 - B2)/ B2.** We do not need to enter the ´ **100%.** We can do all that using the format key.

1. To find the "***percent change***":
   First, key in the heading **Percent Change** in cell **D1.** Widen the column as you did in the formatting exercise.

2. Next, make **D2** cell the active. Key in the formula: **=(C2 - B2)/ B2**
3. Hit ***<Enter>*** . You will see the change as a decimal number. <u>We will format later.</u>

4. The good news is that we don't have to keep typing out the formula for each row. We will now **copy** the formula down **column D**. ***Click on*** (once)cell D2. Put the mouse **+** on lower right corner (little dotted square) of cell **D2**. Hold and drag the **+** pointer down the column to the lower right corner of **D8**. You will see the changes all the way down the column as decimals. See the example below.

Formula entered in D2

Change expressed as decimals

	A	B	C	D	E	F	G	H
1	Vehicle	1997	1998	Percent Change				
2	Passenger Cars	13,486,957	13,887,270	0.029681				
3	Trucks and Truck Tractors	3,526,933	3,625,818	0.028037				
4	Buses	64,261	68,259	0.062215				
5	Motorcycles	299,170	313,680	0.048501				
6	Mopeds	20,013	19,822	-0.009544				
7	Other	80,408	73,292	-0.088499				
8	TOTAL	17,477,742	17,988,141	0.029203				

5. To format column D as "percent":
   Highlight cells **D2:D8**. ***Click on*** **Format** on toolbar. ***Click on*** **Cells**
   Then ***Click on*** **Percentage** and indicate **<u>2 decimal places.</u>** Then, ***Click on*** **O.K.**
   You will see the "***percent change***" all down column D.

Save your worksheet giving it an appropriate name.

Exercise 3: Practice Assignment to Hand In (Your chance to try out the formula.)

1. On your Excel Worksheet, Click on Sheet 2 Tab at the bottom of the worksheet. You will get a new clean Sheet.

2. Enter the following set of data on your worksheet. Use any formatting style you want.

Number of Secondary School Graduates in Canadian Provinces

	1996	1997
Newfoundland	6,999	7,073
Prince Edward Island	1,624	1,741
Nova Scotia	10,180	10,387
New Brunswick	8,960	8,754
Quebec	77,817	78,120
Ontario	105,493	101,934
Manitoba	11,994	11,970
Saskatchewan	11,783	11,584
Alberta	25,689	26,433
British Columbia	34,943	37,739
Yukon	179	245
Northwest Territories	276	381

Source: Statistics Canada, Catalogue no. 81-229-XIB

3. Using a formula, find the total number of secondary school graduates in Canada for 1996 and 1997.

4. Using a formula, find the percent change in secondary school graduates from 1996 to 1997. Use the copy technique to find the percent change for all the provinces and the total for Canada.

5. **Save your Worksheet. Print it out and show it your instructor.**

Exercise 4: Hand In Assignment (Homework Assignment)

This last exercise is going to demonstrate another formula that we can use. We will go one step further and find the statistical "average" of a set of numbers. We will design a spreadsheet that a math teacher might use to keep track of math marks a student receives in Foundations Math 2.

1.   Open sheet three of your spreadsheet and enter the data as you see it in the table below. There are 15 students who write 5 math tests. Each test is worth 20 marks and the total value of the tests is 100 marks.

Student Name	Ratio Test	Percent Test	Metric Test	Area Test	Geometry Test	Final
A	17	18	19	15	17	
B	18	17	20	17	19	
C	11	15	18	13	14	
D	9	10	20	8	9	
E	15	17	17	15	14	
F	14	13	17	12	13	
G	15	15	18	14	13	
H	13	19	19	15	16	
I	19	19	20	19	18	
J	20	20	20	19	20	
K	18	17	20	15	13	
L	17	16	16	11	14	
M	15	17	12	9	11	
N	15	12	17	11	13	
P	12	16	18	13	15	

2.   Format the headings and numbers as you wish.

3.   In the column below the title **Final**, use the **Autosum** button to get each student's final mark. **Save your spreadsheet so you don't lose your work!**

4.   The next step is to find out the "average" mark that students got for each test and also to find out the average mark for the course. Type in Average in column A after the last student. Your spreadsheet should look similar to this:

Microsoft Excel - Formula spreadsheet
File Edit View Insert Format Tools Data Window Help

	A	B	C	D	E	F	G	H	J
1	Student Name	Ratio Test	Percent Test	Metric Test	Area Test	Geometry Test	Final Mark		
2	A	17	18	19	15	17			
3	B	18	17	20	17	19			
4	C	11	15	18	13	14			
5	D	9	10	20	8	9			
6	E	15	17	17	15	14			
7	F	14	13	17	12	13			
8	G	15	15	18	14	13			
9	H	13	19	19	15	16			
10	I	19	19	20	19	18			
11	J	20	20	20	19	20			
12	K	18	17	20	15	13			
13	L	17	16	16	11	14			
14	M	15	17	12	9	11			
15	N	15	12	17	11	13			
16	P	12	16	18	13	15			
17	Average Mark								

Sheet1 Sheet2 Sheet3

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1. Enter the title **Final Mark** in this spot.

2. Use a formula to enter final scores down this column.

3. Enter the title **Average Mark** in this spot.

4. Enter the formula for the average test scores in this row.

5.   Do you remember how to find the average of a group of numbers. First you add the numbers, and then you divide the total by the number of scores you have.

For example: To find the average of these numbers: 2, 3, 5, 7, 6, 1, 9 and 7, add up the numbers. The sum of all the numbers is 40. Next, divide 40 by 8 because you have 8 different numbers. When you do, you find the average of those 8 numbers is 5.

The formula to find the average mark for the ratio test could be:

=sum(B2:B16)/15   where you are getting the sum of all the ratio test scores and then dividing by 15 because there are 15 individual tests scores.

or

if you used the Autosum key, and used row 17 to enter the total mark for each test, you would use the formula:

=B17/15   where b17 represents the cell that contains the total mark and 15 represents the number of students you have.

Don't forget to save your final spreadsheet. Print it out and hand in to your instructor.