ClassPad 101

for ClassPad Version 3.00+

LESSON 13

Continuation of Spreadsheet

Welcome

In this lesson, we will learn some of the more advanced features of a spreadsheet. Spreadsheet can be a very powerful tool for analyzing data and even algebraic expressions.

Lesson Goals

- To understand cell referencing (relative and absolute)
- To become comfortable using formulas inside a spreadsheet
- To understand the meaning of a regression

In Lesson 13, you will learn how to:

- Use cell referencing in a spreadsheet
- Create a percentage table
- Use Fill Sequence and Fill Range
- Fit a regression curve to data

Upon completion of this lesson, you will be able to answer the following questions:

1. If cell **C2** contains **=3xB2** and we copy **C2** to **B5**, what will **B5** contain?
2. If cell **C2** contains **=3xB2** and we copy **C2** to **B5**, what will **B5** contain?
3. What does Fill Sequence do?
4. How do you insert a row?
5. How do you insert a column?
6. What does the button do?

Time required

About 60 minutes.

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Getting Started

Recall from lesson 8 that a spreadsheet is made up of rows and columns, and each small part of the grid is called a *cell.* Each *cell* is named or addressed by its column letter and row number. We can use a cells address to reference it from within another cell. We will begin PART I by exploring what is meant by *cell referencing*.

PART I

In this part, we will review entering formulas and then you will learn about two special types of cell referencing.

1. Inputting a Formula [formulas must begin with an = sign]

a. Click m and then

b. Select **Edit/Clear All**

c. Input **5** into cell **A1**

d. Click on **B1** to make it active

e. Input **=2*A1** into **B1**

f. Press **EXE**

g. Change **A1** to **-3** and press **EXE** again

h. Keep changing **A1**. Does the result in **B1** make sense?

2. Relative Cell References

A relative cell reference changes according to its location in the spreadsheet. Let's experiment.

a. Select cell **B1** and let go

b. Press on **B1** (its border should turn white) and drag to **B2**

c. Notice cell **B2** contains **=2xA2** (**A2** is one cell to the left of **B2**)

d. Input **100** into cell **B5**

e. Select cell **B1** and let go

f. Press on **B1** (notice white border) and drag to **C5**

g. Cell **C5** contains **=2xB5** (**B5** is one cell to the left of **C5**)

3. Another Example of Relative Cell Referencing

Hint: You can press and drag on the line dividing columns to resize them.

a. Please clear Spreadsheet
b. Input **10** into cell **B5**
c. Input **=2xB5** into cell **D2** and press **EXE** (EXE takes you out of the *selection* mode)
d. Select **D2** and let go
e. Press on **D2** (its border should turn white) and drag to **E7**
f. Notice cell **E7** contains **=2xC10** (Why…)
g. Input **15** into cell **C10** and press **EXE**

Important…Please Read

Position is the key to understanding relative cell referencing. You can think of "relative" as meaning where you currently are.

For example, if we have **A1 = 2xB1**, then **A1** is referencing a cell that is ***one column to the right***. The ***one column to the right*** is what is maintained when we copy cell **A1** to another location. If you copy **A1** to cell **C3**, **C3** will contain **=2xD3** (a reference to the cell that is one column to the right).

Another example: If **D5 = 6xB2,** then **D5** is referencing a cell that is ***two columns to the left*** *and* ***three rows up***. Now, if you copy **D5** to **C4, C4** will contain **= 6xA1.** Does this help you understand example 3 above?

4. Errors in Referencing

a. Please clear your Spreadsheet window again
b. Input **5** into cell **B1**
c. Input **=B1** into cell **B2**
   *Note that this reference is setup to refer to "*one cell above*"
d. Select **B2** and let go
e. Press on **B2** (its border should turn white) and drag to **A1**
f. If it were possible, **A1** would contain **=A0**, but we do not have a row 0!

5. Data Type Errors

a. Please clear your Spreadsheet window again

b. Input **10** into cell **A1** and **20** into **A2**

c. Click on **B1** and type in **=A1+A2;** press EXE

   Or, click on **B1,** input an **=** sign, click on **A1**, input a **+** sign, click on **A2**

d. Change cell **A2** to abc and press **EXE**

   *Notice cell **B1** now shows **#ERR** because Spreadsheet does not know how to add a text value (abc) to a number

e. Click on cell **B1** and notice its error shows in the status bar

f. Click on cell **A2** and then click the button to change cell A2 to a math cell

g. Notice the error disappears! Spreadsheet now thinks of abc as a variable

Step (c)

Step (e)

Step (f)

6. Getting Ready to Work with Percents

If we divide one number by another number and then multiply by 100, we have what percent the first number is of the second number. If we do not multiply by 100 then we have just the decimal equivalent of the percent.

a. Please clear Spreadsheet again
b. **Type in** the data that is showing in the first picture
c. Click on **column A** to select it and then [B]
d. Make cell **C1** bold also
e. Set cell **B6** equal to the sum of **B2** through **B5**

7. Working with Percents

What percentage of the total is red? What about green? We need to calculate (# of each color)/(Total #) x 100.

a. Set cell **C2=B2/B6*100**
b. Select **C2** and let go
c. Press on **C2** (its border should turn white) and drag to **C3**
d. **What happened?**
e. Notice that **C3** now contains **=B3x100/B7**, but the total value is in **B6** not **B7.** Since **B7** has no data, its value is zero and division by zero is undefined!
f. Select **C3** and press your keyboard delete key

Important…Please Read

We would like to have our formula change the cell reference for **B2** *but* keep the reference to **B6**. So, we will change **B6** to **B6**. This is called an ***absolute reference***. Wherever we move **B6**, it will always reference cell **B6**.

We can tell a spreadsheet to keep the same row and/or column in a reference address by placing a $ sign in front of what we want to keep absolutely the same. For example, the column of **A$6** will change when we copy it to a new location, but the row will always be **6**.

8. Absolute Cell References

To keep an exact reference to cell **B6** when we drag our formula, we just need to change **B6** to **B6**.

a. Click on cell **C2**
b. **C**hange it to **=B2x100/B6**
c. Press **EXE**
d. Select **C2** and let go
e. Press on **C2** (its border should turn white) and drag to **C3** (Better!)
f. An easy way to copy:
   - Select **C2**
   - Press **Ctrl** + **c**
   - Select cells **C4** and **C5**
   - Press **Ctrl** + **v**
g. Select cell **B6** and drag it to **C6**. Notice this reference is correct!

PART I
Practice Exercises

Before beginning the practice exercises, open a word document, type in the following information and then *save it as Lesson13 in your CASIO folder within My Documents*:

- Date: (enter today's date)
- To: (put your instructor's name here)
- From: (put your name here)
- Re: Lesson 13

1. Please open the eActivity application.
2. Open the eActivity named **L13_PartI_a** in the **Lesson13** folder.
3. Read the instructions inside the eActivity.
4. Once you accomplish dragging cell **C10** so that it creates a new reference to **A2**, get a **screen capture**. Paste it into your Lesson13 document (under a title of PART I).

5. **Save** your work as an eActivity named **L13_PartI_a**_your initials here.
6. Open the eActivity named **L13_PartI_b** in the **Lesson13** folder.
7. In **L13_PartI_b**, you will need to do the following:
   a. Type in the headings shown in the figure below and make them bold.
   b. Type in the hours worked (cells **B3** through **B7**).
   c. Enter a formula to find the total hours.
   d. Enter a formula to find the percentage each day's hours are of the total number of hours.
   e. Enter a formula to find the total of the percentage formula.

	A	B	C
1			
2		Hrs	Percent
3	Mon	12	25
4	Tues	8	16.67
5	Wed	8	16.67
6	Thur	10	20.83
7	Fri	10	20.83
8	Total	48	100
9			
10			
11			
12			
13			
14			

8. When you are finished, **select** your cell **C7** (its formula should show in the status bar).
9. Get a **screen capture** while the Spreadsheet is full screen. Add two blank spaces following the first screen capture and then paste this one.
10. **Save** your work as an eActivity named **L13_PartI_b**_your initials here.

PART II

In this part, we will explore some of the options in the Edit menu.

1. Using the Fill Sequence Command

a. Open Spreadsheet and clear the window
b. Click on cell **A1**
c. Open the **Edit menu** and select **Fill Sequence**
d. **Fill in** the dialog as shown and click **OK**
e. You should now have 10 perfect square numbers showing

2. Using the Fill Range Command to Sum Entries on Column A

a. Click on **B1** and input **=sum(A1:A1)**
b. Press **EXE**
c. Click on **B1** to select it
d. Open the **Edit menu** and select **Fill Range**
e. **Fill in** the dialog as shown and click **OK**
f. Well…not quite right!
g. Select **Edit/ Undo/Redo** to delete **B2** through **B10**
h. **Repeat steps c** and **d**
i. **Fill in** the dialog as shown (with the first **A1** as an absolute reference) and click **OK**
j. Better
k. Click the column **B** heading
l. Delete column **B**, but keep column **A** (we will use it in the next exercise)

3. Inserting Rows and Columns using the Edit Menu

a. **Select all** of column **A** (click the column **A** heading)

b. Open the **Edit menu** and select **Insert/Columns**

c. **Select all** of row **1** (click the row **1** heading)

d. Open the **Edit menu** and select **Insert/Rows**

4. Inserting/Removing Rows & Columns using Toolbar Buttons

a. **Advance** the toolbar by clicking u (far right)

b. **Select all** of row **1** (click the row **1** heading)

c. **Click** to insert a **row**

d. **Select all** of column **A** (click the column **A** heading)

e. **Click** to insert a **column**

f. Select column **A** again and then click to remove one column

5. Finding the Difference

a. **Click** on cell **A3**

b. Open the **Edit menu** and select **Fill Sequence**

c. **Fill in** the dialog as shown and click **OK**

d. **Click** on cell **C4**

e. Set cell **C4=B4-B3** and press **EXE**

f. Select **C4** again and then **Edit/Copy**

g. Select **C5** to **C12** and then **Edit/Paste**

h. Can you see *a pattern* in the differences?

PART II
Practice Exercises

1. Please start with a clean Spreadsheet window. Are you ready?
2. Beginning at cell **A1** input a sequence using **x** as the expression, a low value of 1, a high value of 10 and a step size of .5.
3. Get a **screen capture** and paste it into your Lesson13 document (under a title of PART II).
4. With the sequence from **step 2 still showing**, insert a column in front of column **A** (your column **A** will move to **B**).
5. Next, insert a row above row **1** (your data will shift down one row).
6. Get a **screen capture.** Add two blank spaces following the first screen capture and then paste this one.
7. Set **C2=B3/B2.**
8. Copy the formula in **C2** to cells **C3** through **C20**.
9. Make column **C** wider to better view the numbers.
10. Select column **C** and then open the **Graph menu** and select **Column/Clustered**. Your window should now look like:

11. Get a **screen capture.** Add two blank spaces following the second screen capture and then paste this one.

PART III

In this part, you will learn how to create a scatter plot and then fit a regression curve to it. Many times people will collect data to help them try to predict the future. Once they have enough data, they can plot the data and try to fit a curve to it. This curve is called a regression curve.

1. Creating a Scatter Plot

a. Open Spreadsheet and clear the window
b. Type the data shown into columns **A** and **B**
c. Select columns **A** and **B**
d. Open the **Graph menu** and select **Scatter**

2. Experimenting with Regression Curves

a. First we will fit a linear equation to our data
b. Open the **Calc menu** and select **Linear Reg**
c. If a dialog opens on top, click in it and tap ☒ to close
d. To see the equation, select the line in the lower window (it will show in the status bar)
e. After selecting the line, press near the left end of the graph and drag to a cell

*[Hint] If you press too near a scatter point, the line will deselect.

3. Experimenting with Regression Curves (continued)

a. Delete the linear regression by selecting it and pressing the back arrow or your keyboard's delete key

b. Open the **Calc menu,** if DispStat is checked, uncheck it

c. Open the **Calc menu** and select **Cubic Reg**

d. To see the equation, select the curve (it will show in the status bar)

e. Try graphing other regressions

f. Try dragging a single data point in the graph window

g. Or, change a data value in a cell (your regression updates automatically)

PART III
Practice Exercises

1. Please open the eActivity application.
2. Open the eActivity named **L13_PartIII_a** in the **Lesson13** folder.
3. Within the eActivity, expand the Spreadsheet strip and create a scatter plot using columns **A** and **B**.
4. Get a **screen capture** and paste it into your Lesson13 document (under a title of PART III).
5. We should zoom the data. Open the View menu and select Zoom Box. Click and drag a box about your scatter plot. Your box will become the new window size.
6. Get a **screen capture.** Add two blank spaces following the first screen capture and then paste this one.
7. Draw a regression curve that you think best fits the data. Select your regression curve so that its equation shows in the status bar.
8. Get a **screen capture.** Add two blank spaces following the second screen capture and then paste this one.
9. You *do not* have to save this eActivity!

PART IV

Reflection Exercises

You have just completed the thirteenth lesson in ClassPad 101. Excellent. Please take a few moments to copy and paste the following four questions at the end of your Lesson13 document and answer them.

1. Approximately how long did it take you to complete this lesson?
2. Which activity did you find particularly useful?
3. Did you find any part of this activity difficult to follow? If so, which part? Also, how did you overcome the difficulty?

Assessment 13: Continuation of Spreadsheet

- **Checkpoint**: Your word processed document, titled "Lesson13", should contain the following activities:
  1. Two screen captures from PART I.
  2. Three screen captures from PART II.
  3. Three screen captures from PART III.
  4. Three reflection questions with answers from PART IV.
- **Submit** your **Lesson13 document** to your instructor for grading.