Self-Grading Lessons

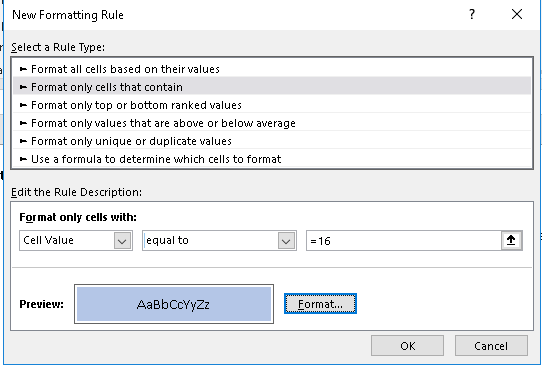
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**Introduction**: As a teacher, we do a lot of grading. But by the time students get their work back (if they ever do, in the case of my class, oops) they don’t really care much about their score. Creating self-graded assignments is a great way for students to get immediate feedback as to whether they did it right, as well as save YOU the hassle of grading it yourself. With the use of several features in Excel, you can easily create your own self-grading assignments. Much of what we go over can also be done in Google Docs, except the Macro section. Creating Self-Grading assignments can, up front, be a bit of work. But once they are done they save you a great deal of time both on the instruction and on the grading end. They can help you and your students both know if they know the answer, what to do if they don’t know it, and what to do if the do know it.



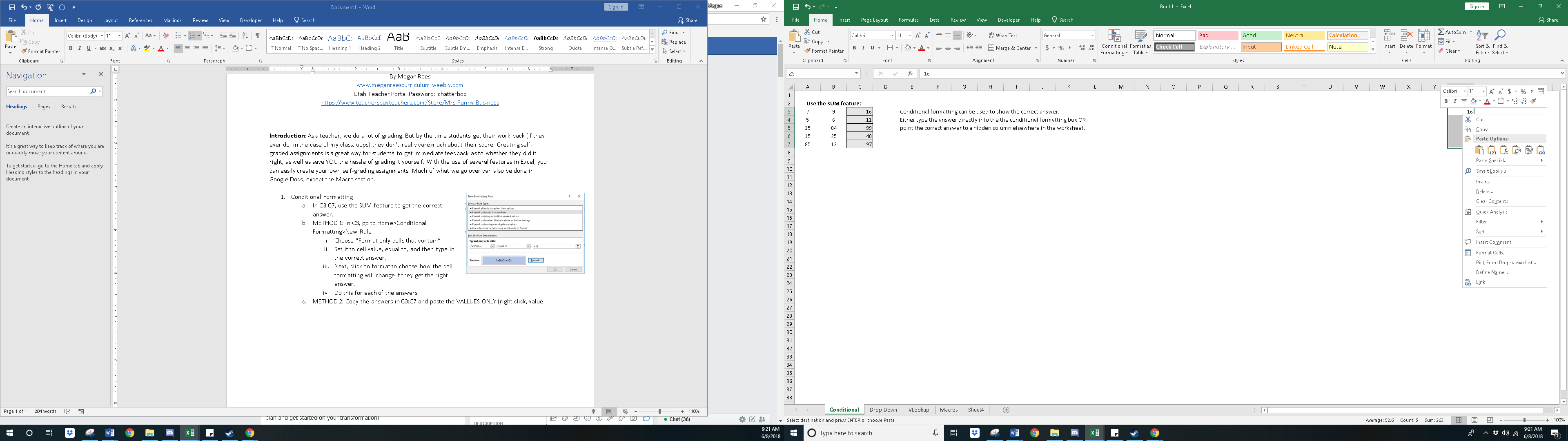
**PART 1 – CONDITIONAL FORMATTING**

1. Conditional Formatting - Basic
   1. In C3:C7, use the SUM feature to get the correct answer.
   2. In C3, go to Home>Conditional Formatting>New Rule
      1. Choose “Format only cells that contain”
      2. Set it to cell value, equal to, and then type in the correct answer.
      3. Next, click on format to choose how the cell formatting will change if they get the right answer.
      4. Do this for each of the answers.
   3. Practice some more on the other sections on this sheet.
      1. To save time you can add the numbers together and then only put conditional formatting on the total rather than each individual problem.
      2. Remember-if the answer is text rather than a number, choose “specific text” and type the answer in quotes. =”trump”

**PART 2 – IF FUNCTION**

This method can be better when you have answers that may have several hidden numbers after a decimal point—entering each number can be time consuming and inaccurate. It’s also great if later you want to change the answers.

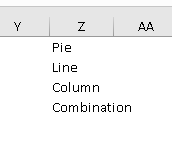
1. Conditional Formatting with IF function:



* 1. Calculate the average A12:E12.
  2. Copy and A12:E12 to Z12:AD12.
     1. Make sure when you paste it, you paste the VALUES ONLY.
  3. Highlight A12. Go to Home>Conditional Formatting>New Rule
  4. Choose “Use Formula to determine which cells to format”
     1. Enter =if(A12=Z12,1)
     2. Click on format to change the how the cell will change.
     3. Do this for each answer.
        1. Hint: if you remove the absolute values from the equation the come up automatically, and you can autofill it across.
     4. Finally, when you are finished, highlight columns Z:AD and right click to hide them. The students will never even think about unhiding them! You can also change the font color to white so that even if they do, they won’t see the answers.

1. IF Functions with Symbols
   1. For the next section, enter the correct answers in G18:G21.
   2. Copy and paste the values of these answers to one of your hidden columns.
   3. In H17, type if(G18=Z14,”R”,”S”) But change the cell references to the correct ones you used.
      1. You should be able to autofill down on this one.
   4. Now, change the font in H17:H21 to Wingdings 2.
2. IF Functions with Formulatext – What if you want to make sure they didn’t just type the right answer in, but actually used the correct formula or function?
   1. In M3, use the countif function to calculate how many people are on the yellow team.
      1. =countif(J3:J22,”yellow”)
   2. Do the same for the green and blue.
   3. In Z3, type =Formulatext(M3)
   4. In AA3, type it again =Formulatext(M3)
      1. In Z3, copy and then paste the values in the same cell.
   5. In N3, enter =if(Z3=AA3,1,0)
      1. You now get 1 point not just for getting the right answer, but for typing in the formula EXACTLY correct. Try typing just the number 7 into M3, and you don’t get the point!

**PART 3 – DROP DOWN MENUS**

You can use drop down menus and IF functions to create a mini-test. I use this to give students test questions at the end of each section.

1. Create a drop down menu of the possible answers
   1. In Z1:Z4 type five possible answers to the first question.
   2. Click on G6. Go to Data>Data Validation and choose “list” from the Allow drop down menu.
   3. In source, click on the box and then highlight the answers in Z1:Z4. Press ok.
   4. Next, add conditional formatting to show if the answer is correct—either change the color if they typed the right answer, or add a check mark or points in H6.
2. Practice with some of the other questions provided.

**PART 4 – VLOOKUP**

Vlookup tables aren’t all that necessary for a self-grading assignment, but they can be quite useful when you want to create a level of randomness in an assignment—like if you want to populate different numbers for each assignment (so they can’t copy their neighbor), or you want to create a button that will populate a random answer. First, a review on Vlookup tables.

1. Basic VLookup
   1. In B4, enter the following VLookup formula:
      1. =VLOOKUP(A4,P5:S54,2,FALSE)
         1. This will lookup the number in A4 on the list in P5:S54, and find the corresponding movie.
         2. Change the number in A4 and watch the movie change.
2. VLookup and Drop Down
   1. In D4, create a drop down menu for all the sku’s listed in K6:K16.
   2. In E4, create a vlookup table to look up the SKU you chose from the list and matching it to the price in column L.
      1. =VLOOKUP(D4,K6:L16,2,FALSE)
   3. Try changing the sku and watch the rest of the information adjust.

**PART 5 – RANDBETWEEN**

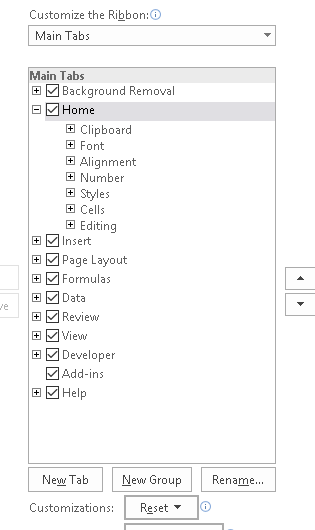
I like to use Randbetween to allow a random item be chosen for the assignment. BUT—the problem with randbetween is that it doesn’t stay put!

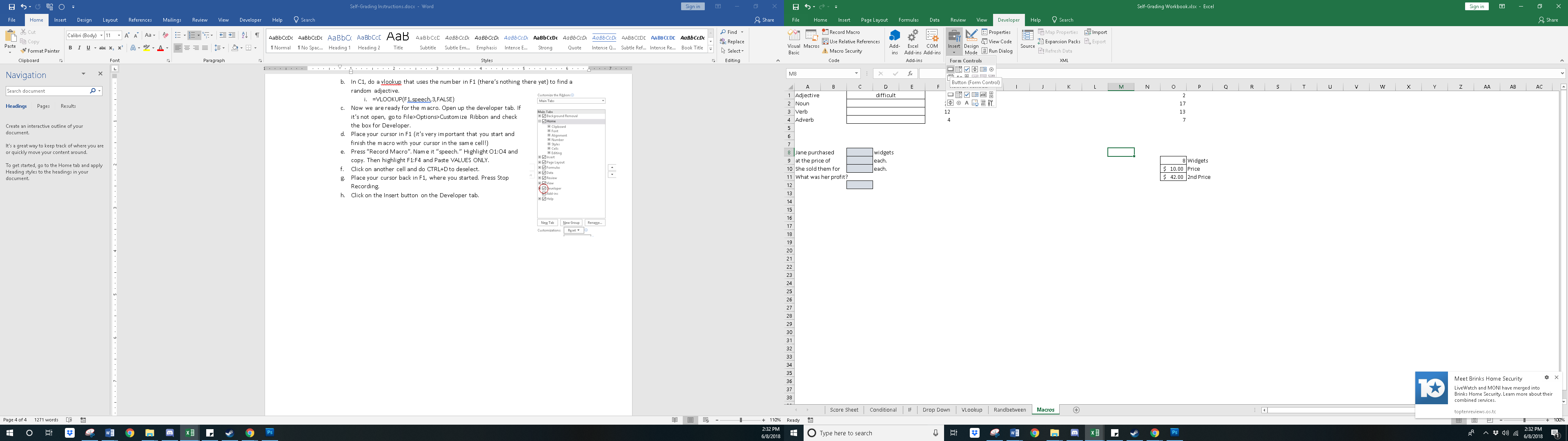
1. Use the randbetween function to find a random number in the ranges provided.
   1. Randbetween(1,50)
   2. Note how, whenever you enter information elsewhere, the random number is regenerated?
2. Use vlookup to assign a part of speech
   1. Highlight Z9:AD29. Type “Speech” in the name box.
   2. In C6, use randbetween to choose a random number between 1 and 21. Autofill down to C15.
   3. In B6, use vlookup to find the corresponding part of speech for that number.
      1. =VLOOKUP(C6,speech,3,FALSE)
   4. Do the same for all B7:B15, making sure to choose the correct column for that part of speech.
      1. NOTE: The story is funny, but is always changing. How can we make it STAY PUT?

PART 6 – MACROS

Macros record a simple action that can be played at the click of a button. They have many uses, but in this case I use it to do a simple copy and paste.

1. Let’s make a simple word generator.
   1. In O1, do a randbetween 1 and 21, drag down to O4.
   2. In C1, do a vlookup that uses the number in F1 (there’s nothing there yet) to find a random adjective.



* + 1. =VLOOKUP(F1,speech,3,FALSE)
    2. Do the same for the others, changing the column number as needed.
  1. Now we are ready for the macro. Open up the developer tab. If it’s not open, go to File>Options>Customize Ribbon and check the box for Developer.
  2. Place your cursor in F1 (it’s very important that you start and finish the macro with your cursor in the same cell!)
  3. Press “Record Macro”. Name it “speech.” Highlight O1:O4 and copy. Then highlight F1:F4 and Paste VALUES ONLY.
  4. Click on another cell and do CTRL+D to deselect.
  5. Place your cursor back in F1, where you started. Press Stop Recording.
  6. Click on the Insert button on the Developer tab and choose the button option, the first one.
  7. Draw the button. Attach the macro you created to it.
     1. Change the name of the button to Generate.
     2. Press the button and watch the magic happen!
  8. Highlight F1:F4 and change the text to white OR hide the column.

1. Now let’s create a problem where it is customized to each student—this prevents students from just copying their neighbor!
   1. In O8, randbetween 1 and 100.
   2. In O9, randbetween 5 and 10
   3. In O10, randbetween 10 and 50.
   4. Now create a macro that just copies the numbers in O to a new column Q.
   5. Then in C8:C11, just do =Q8 and so forth.
   6. Next, add conditional formatting so that the if the number in C12 matches the number in Q12, it changes color.
2. Go back to the VLookup tab. Knowing what you know now, can you create a button that will generate a different story every time you push it?

Part 7 – Score Sheets

Creating a single score sheet that tots up all the points can be a great way to make grading simple. Students can print just the score sheet, and you know they did all the work without having to look at it. This can be simple or more complex depending on what type of assignment it is.

1. On the Score sheet in J10, sum the answers on the sum section of the conditional formatting tab.
   1. In J11, enter the correct answer that SHOULD come up. (263)
   2. In D11, use the IF function to determine if J10 and J11 are equal, then 1, or 0.
2. In J12:J16, enter the correct answers for the president last names.
   1. In K12, enter an If function to ensure their answer matches the correct answer.
      1. =IF(J12=Conditional!F3,1,0)
      2. Autofill down, then sum the total.
   2. In D12, enter an If function to determine if they got all 5 points.
      1. =IF(K17=5,1,0)
   3. In K19, sum the totals in the Conditional tab, D12:D14.
      1. In D13, enter an if function as follows:
         1. =IF(K19=977.53,1,0)
   4. In K21, use the countif function to count how many R’s there are on the IF tab, H18:H21.
      1. =COUNTIF(IF!H18:H21,"R")
      2. Then in D17, use an IF function to determine if there are 4 R’s.
         1. =IF(K21=4,1,0)
      3. Drop down menus cannot be graded automatically—there is no way to check if they actually created a drop down menu. But you can see that they got the right answer. These have been done for you.
   5. Part 4 uses more complex functions, so lets use formulatext to check if they are right.
      1. In K23, enter =Formulatext and then click on B4 in the VLookup sheet.
      2. In K24, copy and paste the values only from K23.
      3. In D27, use an IF function to see if they match.
         1. =IF(K23=K24,1,0)
   6. In part 5, sometimes its easier to just give points for the LAST one, assuming they did all the others before it. These have been done for you, but note that points are only given for the last in the series.

**PART 8 – LOCKING, HIDING, PROTECTING, PRINT AREA, SAVING**

Before your assignment can be given to students, make sure you have done a few housekeeping things that will make the assignment more smoothly. This includes hiding columns or even sheets that students do not need, locking cells that should not be messed with, protecting the sheet so that students cannot find the answers, and setting the print area so students will not print the wrong page.

1. Hiding
   1. Make sure that all columns that have been used to keep answers have been hidden. You can highlight the columns, then right click and choose hide. You an also choose to put all answers on another sheet entirely, then hide the sheet. I don’t always do this, however, if I am using macros because hidden sheets make macros tricky to use.
2. Locking
   1. If your students were to click on the wrong cell, the might see the answer right there in your If function. Most students won’t notice this—but some will. Or, they could delete it by accident, and then none of your self-grading will work. There are two ways to prevent this.
      1. If you have not typed the actual answer into the If statement, but instead just pointed to a hidden cell where the answer is, few students will look beyond that. However, this will not solve the problem of their deleting cells on accident. I often will color all cells they are allowed to work in the same color, and warn them not to type ANYWHERE that is not that color.
      2. Lock cells and protect the sheet. This is the best way—but can often be a problem if you need the students to use Autosum or some other function that also gets locked when you protect a sheet. I don’t usually have this problem unless I’m teaching Excel and higher functions.
         1. To lock cells, first highlight the whole sheet, right click, and choose Format Cells. Then go to Protection and uncheck the Locked button.
         2. Next, use the CTRL key to highlight all the cells you DO NOT want students to click on—like the cells where the points are added or checkmarks are given. Then got into format cells and check the locked box.
         3. Next, go to Review>Protect Sheet. Make sure to UNCHECK the box that says “select locked cells.” You don’t want them to be able to click on them and see the functions you have used.
3. Print Area – One of the biggest problems I have with Self-Grading assignments is that students think they have to print every page—no matter how much I remind them. Print area will help with this problem.
   1. First, on the page you DO want them to print, highlight the area you want to print and choose Print Area from the Page Layout menu.
   2. Second, on the pages you DO NOT want them to print, highlight a random empty cell and set that as the print area. Then when they go to print they will only see a blank page. If they print anyway, it’s just going to print a blank page.
4. Finally, If you have used Macros in your assignment, you must save the workbook as Macro Enabled, or else it won’t work. When students pull up the workbook, they must click the “enable macros” button at the top of the screen.