# MEEG3311 Machine Design

## Excel Tutorial (365 Edition)

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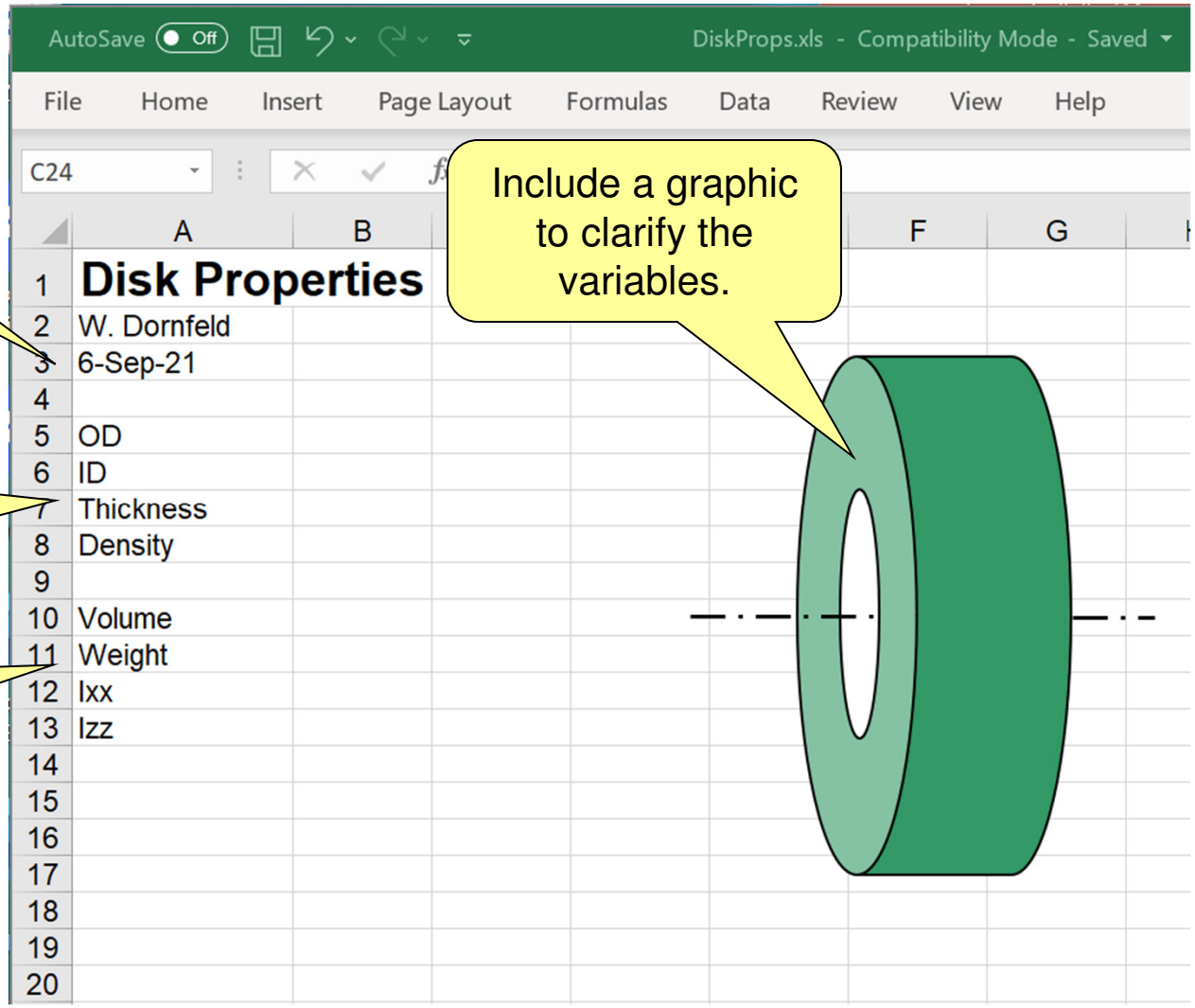
# 1. Get Organized

Enter some descriptive info about the sheet.

Put your inputs up top with names that will become variable names.

Put your calculated results down here.

Include a graphic to clarify the variables.

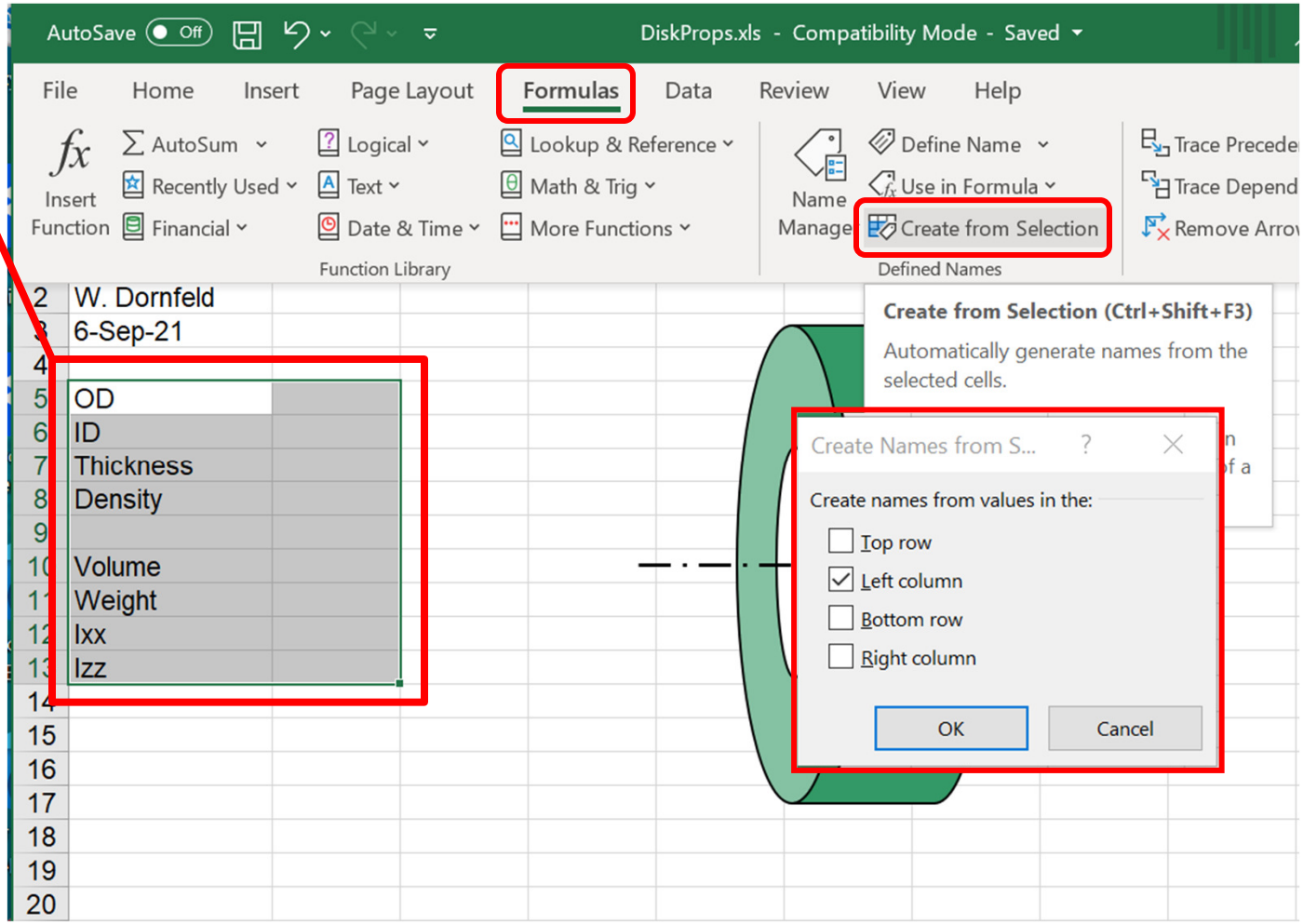


# 2. Name Your Variables

A. Select the cells with your variable names in them, and the cells to their right.

B. Click: Formulas > Create from Selection

C. In the pop-up, pick Left column and OK



# 3. Some Notes on Names

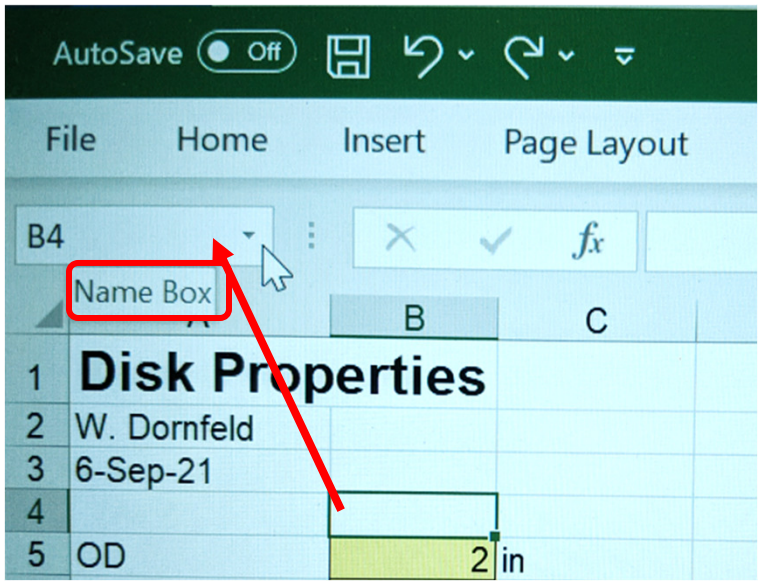
A. You can add new names by selecting any cell and typing the name in the Name Box.

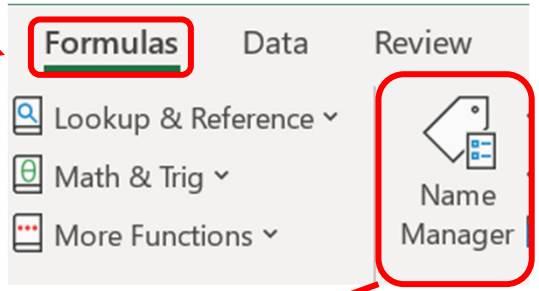
B. You can see or edit a list of named cells by clicking Formulas > Name Manager.

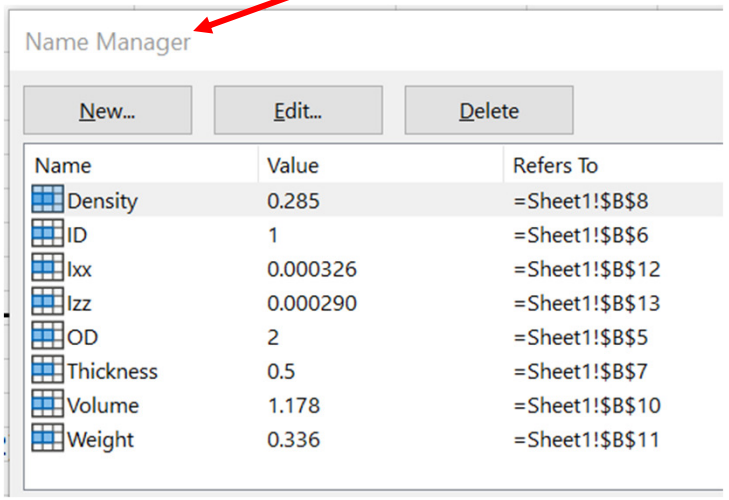
C. Some names will get redefined, such as “D1”, because it is already a cell name. Spaces become underscores.

D. The names “c” and “r” become c_ and r_.

E. Capitalization is preserved but ignored! (d is same as D)

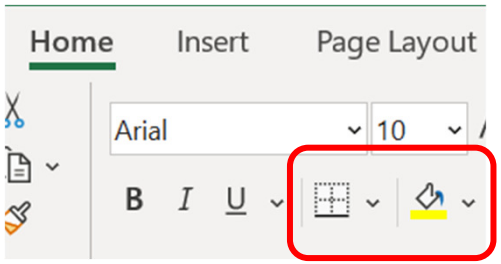


# 4. Highlight the Inputs

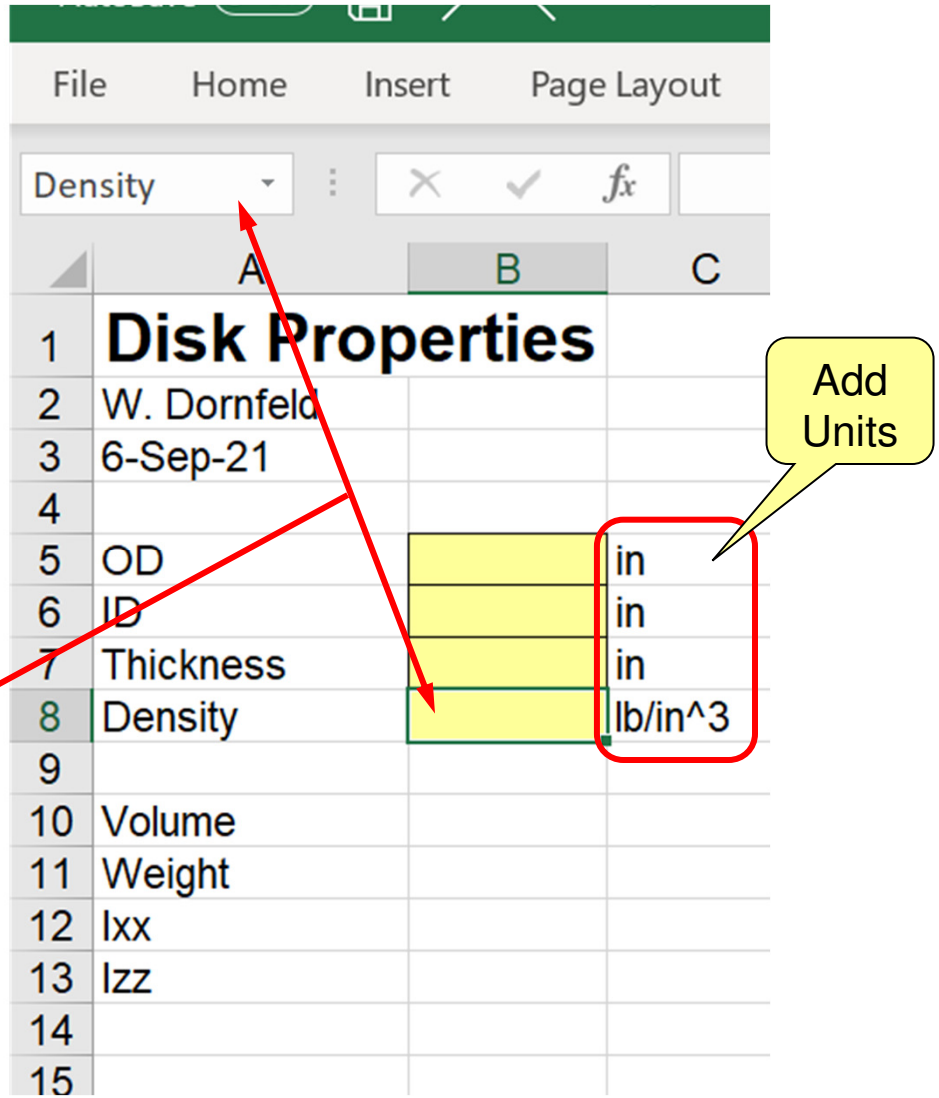
A. Select the cells where input values will go. Use these tool buttons




to highlight the cells.

B. Notice that the variable names now display in the Name Box. Cell B8 is selected, and "Density" is its name.

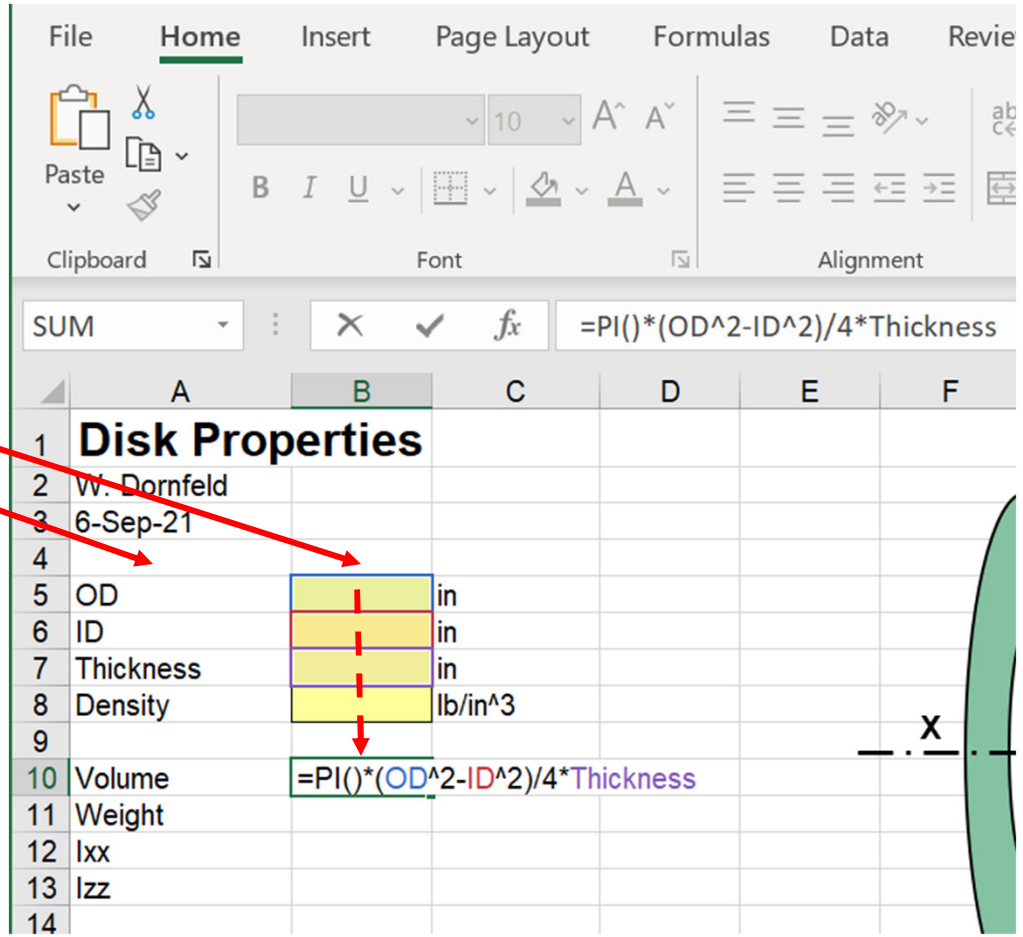
C. Add units to the right of each input cell.



# 5. Enter Your Equations

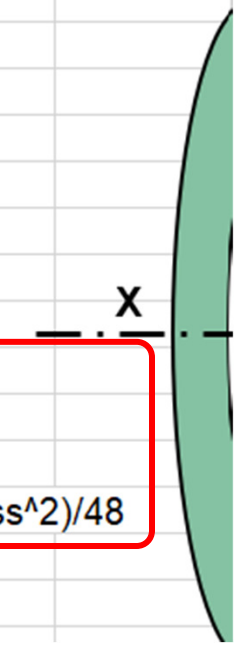
A. Lead with the “equals” sign. You can either type in the variable name or click in the Data cell to add the variable to the equation. Don’t click on the Name cell.

B. You can enter equations in the cells, or in the Formula box up above.



# 6. Enter The Rest of Your Equations

| | A | B | C |
|---|---|---|---|
| 1 | **Disk Properties** | | |
| 2 | W. Dornfeld | | |
| 3 | 6-Sep-21 | | |
| 4 | | | |
| 5 | OD | 2 | in |
| 6 | ID | 1 | in |
| 7 | Thickness | 0.5 | in |
| 8 | Density | 0.285 | lb/in^3 |
| 9 | | | |
| 10 | Volume | 1.178 | =PI()*(OD^2-ID^2)/4*Thickness |
| 11 | Weight | 0.336 | =Density*Volume |
| 12 | Ixx | 0.000326 | =Weight/386*(OD^2-ID^2)/8 |
| 13 | Izz | 0.000290 | =Weight/386*(3*OD^2+3*ID^2+4*Thickness^2)/48 |
| 14 | | | |
| 15 | | | |




Notice how readable the formulas are.

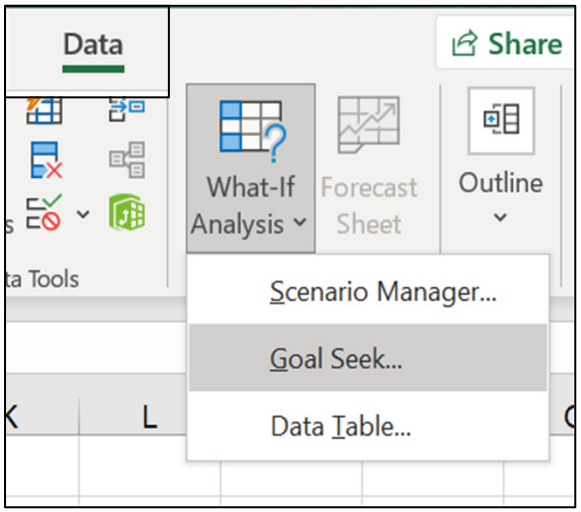
You can display the formulas by copying your equation cells one column to the right and then adding an apostrophe ahead of the equals sign – to turn it into text.

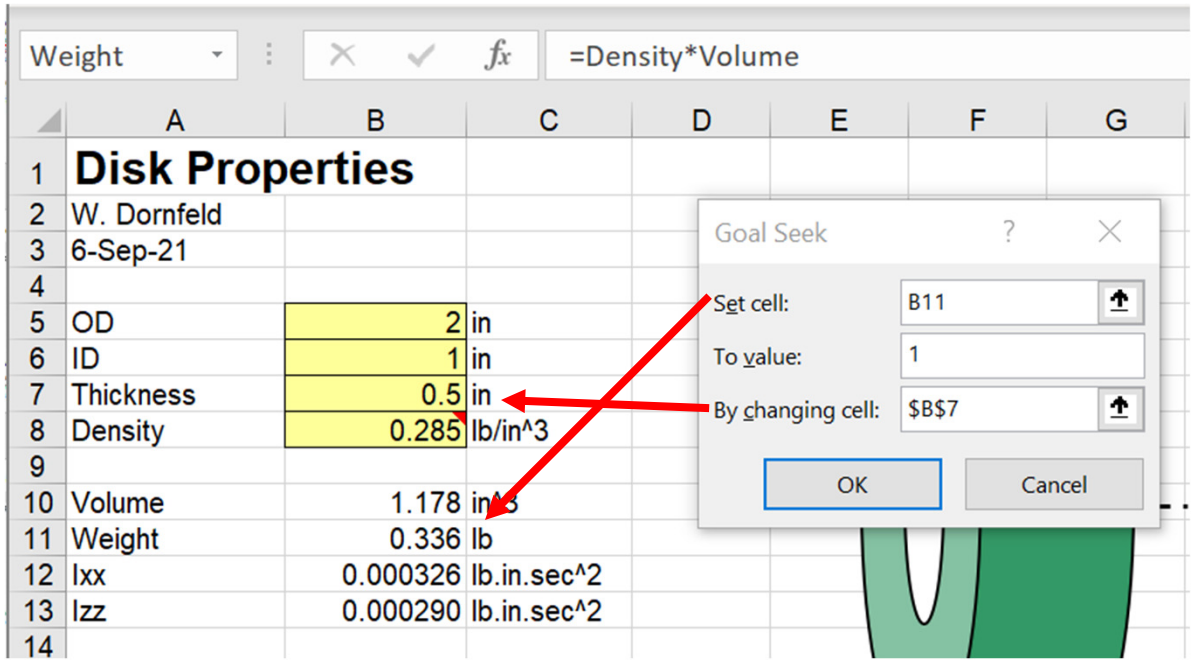
# 7. Don’t Forget the Units

| | A | B | C | D | E | F | G | H |
|---|---|---|---|---|---|---|---|---|
| 1 | **Disk Properties** | | | | | | | |
| 2 | W. Dornfeld | | | | | | | |
| 3 | 6-Sep-21 | | | | | | | |
| 4 | | | | | | | | |
| 5 | OD | 2 | in | | | | | |
| 6 | ID | 1 | in | | | | | |
| 7 | Thickness | 0.5 | in | | | | | |
| 8 | Density | 0.285 | lb/in^3 | | | | | |
| 9 | | | | | | | | |
| 10 | Volume | 1.178 | in^3 | =PI()*(OD^2-ID^2)/4*Thickness | | | | |
| 11 | Weight | 0.336 | lb | =Density*Volume | | | | |
| 12 | Ixx | 0.000326 | lb.in.sec^2 | =Weight/386*(OD^2-ID^2)/8 | | | | |
| 13 | Izz | 0.000290 | lb.in.sec^2 | =Weight/386*(3*OD^2+3*ID^2+4*Thickness^2)/48 | | | | |
| 14 | | | | | | | | |

Even better, copy the formulas over Two columns and use the middle column to show the units of the calculated cells.

# 8. Try The Goal Seeker

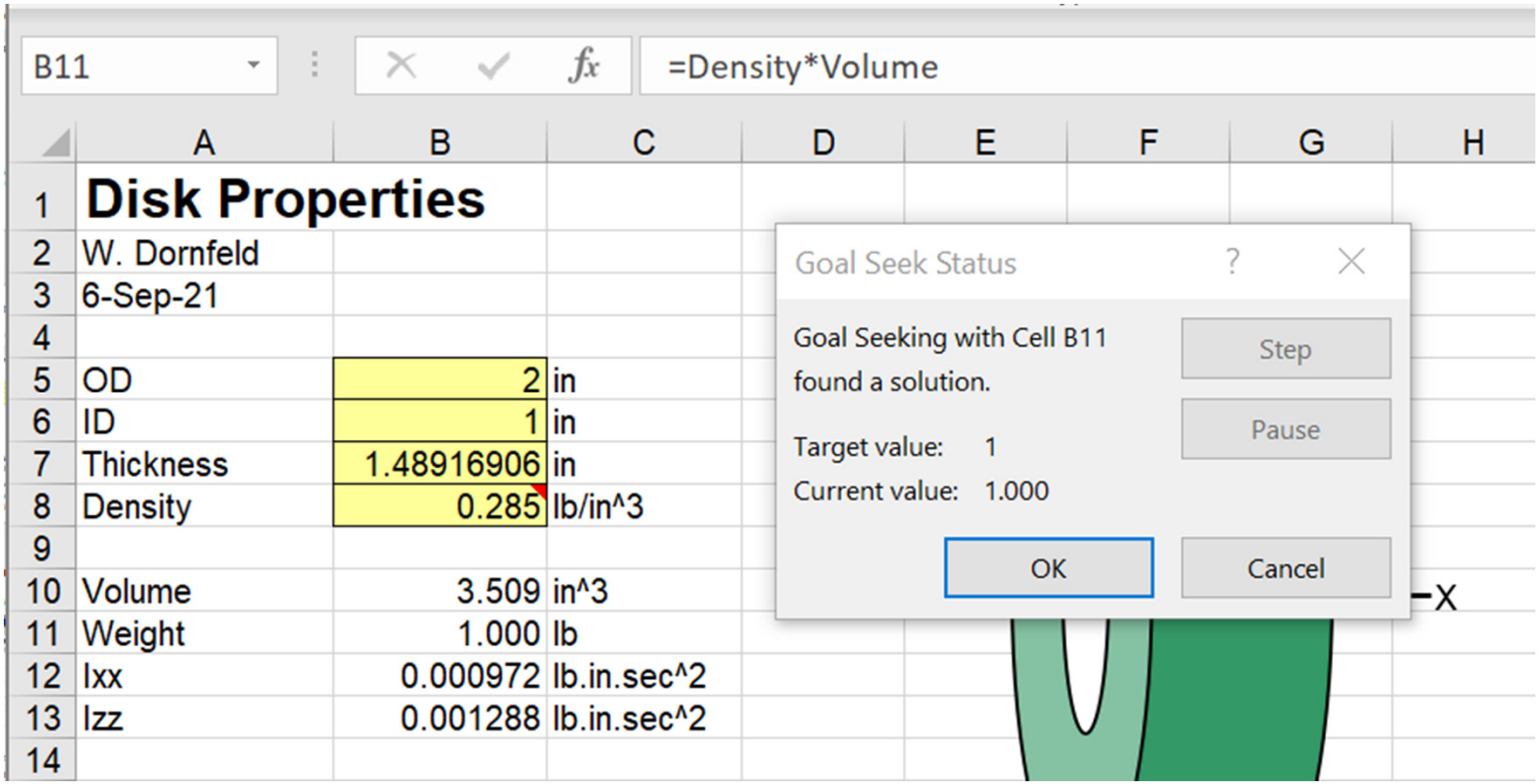



What if you wanted to know how thick the disk needed to be for it to weigh one pound?

Click Data>What-If Analysis>Goal Seek, and tell it you want to set B11 (the Weight) to be 1 lb by changing B7 (the Thickness). Then click OK.

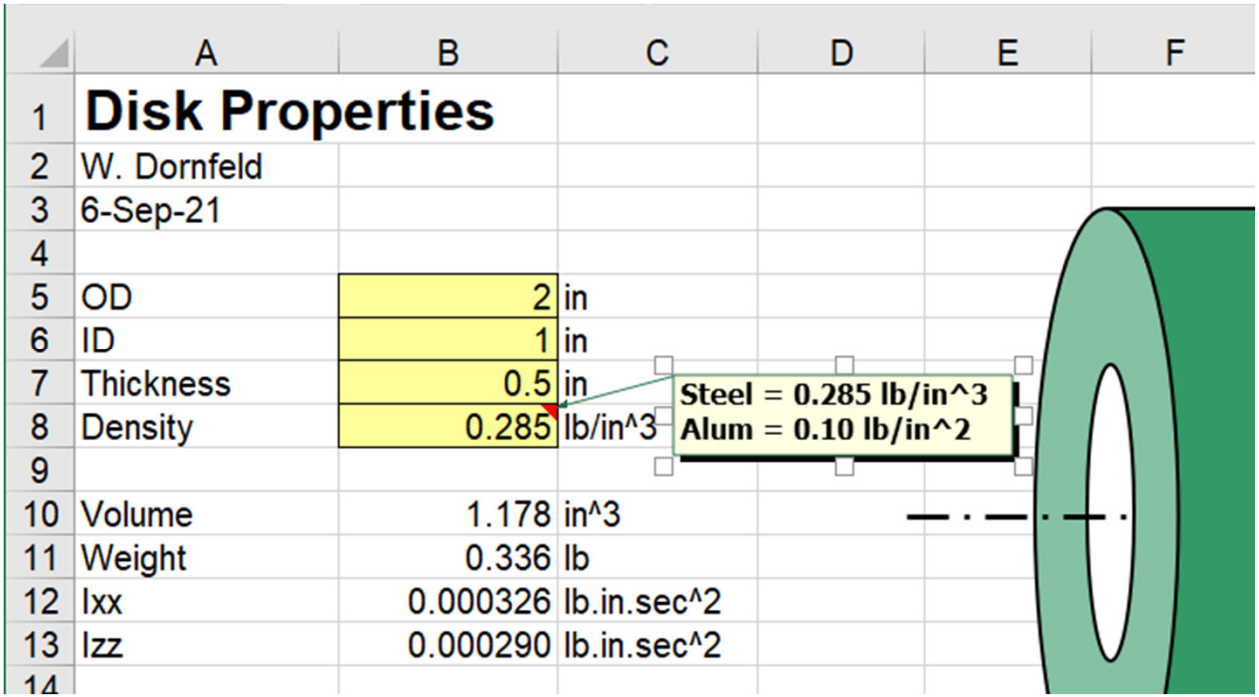
# 9. The Goal Seeker, continued

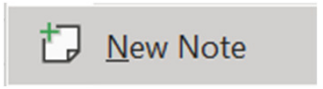



You can accept what Goal Seeker found or Cancel.

Try doing this manually by tweaking guesses to thickness and see how long it takes!

# 10. Add a Comment




You can add comments (now called Notes) to cells by selecting the cell and then right clicking and selecting 

from the drop-down list.

Once entered, the comment will appear when your cursor dwells over the cell. Or you can right click the cell and pick "Show/Hide Note" to have it always visible.