



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.

DiskProps.xls - Compatibility Mode - Saved

File Home Insert Page Layout Formulas Data Review View Help

C24

	A	B	F	G
1	Disk Properties			
2	W. Dornfeld			
3	6-Sep-21			
4				
5	OD			
6	ID			
7	Thickness			
8	Density			
9				
10	Volume			
11	Weight			
12	lxx			
13	lzz			
14				
15				
16				
17				
18				
19				
20				

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

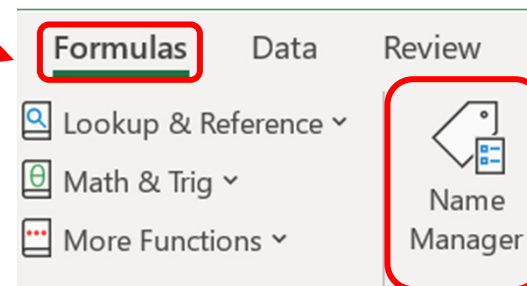
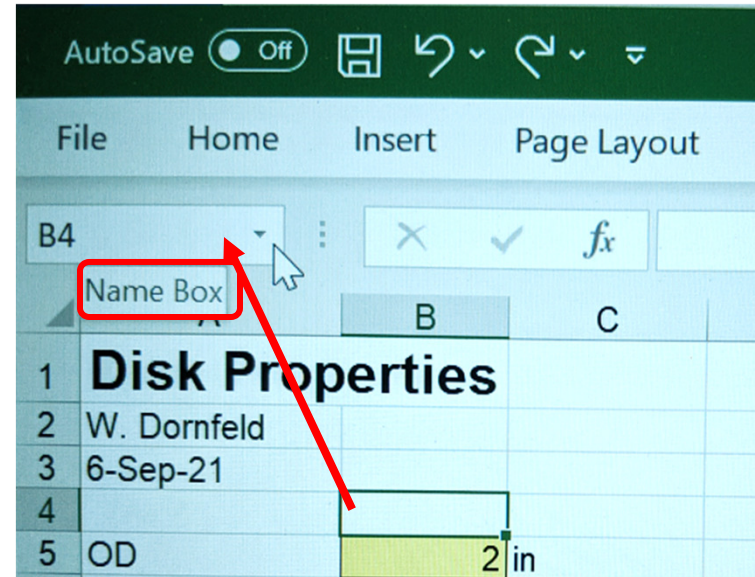
The screenshot shows the Microsoft Excel interface with the 'Formulas' ribbon selected. The 'Create from Selection' button is highlighted with a red box. Below the ribbon, a table of data is visible, with the first column highlighted by a red box. The table contains the following data:

2	W. Dornfeld	
3	6-Sep-21	
4		
5	OD	
6	ID	
7	Thickness	
8	Density	
9		
10	Volume	
11	Weight	
12	Ixx	
13	Izz	
14		
15		
16		
17		
18		
19		
20		

The 'Create from Selection (Ctrl+Shift+F3)' dialog box is open, showing the 'Create Names from S...' title and the 'Create names from values in the:' section. The 'Left column' checkbox is checked, and the 'OK' button is highlighted with a red box.

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)

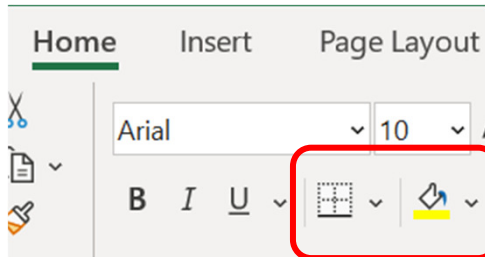


A screenshot of the Name Manager dialog box. It has buttons for 'New...', 'Edit...', and 'Delete'. Below these buttons is a table listing named cells. The table has three columns: 'Name', 'Value', and 'Refers To'. The names listed are Density, ID, lxx, lzz, OD, Thickness, Volume, and Weight. Each name is associated with a specific value and a cell reference.

Name	Value	Refers To
Density	0.285	=Sheet1!\$B\$8
ID	1	=Sheet1!\$B\$6
lxx	0.000326	=Sheet1!\$B\$12
lzz	0.000290	=Sheet1!\$B\$13
OD	2	=Sheet1!\$B\$5
Thickness	0.5	=Sheet1!\$B\$7
Volume	1.178	=Sheet1!\$B\$10
Weight	0.336	=Sheet1!\$B\$11

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.

	A	B	C
1	Disk Properties		
2	W. Dornfeld		
3	6-Sep-21		
4			
5	OD		in
6	ID		in
7	Thickness		in
8	Density		lb/in ³
9			
10	Volume		
11	Weight		
12	Ixx		
13	Izz		
14			
15			

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.

The screenshot shows the Microsoft Excel interface with the following content:

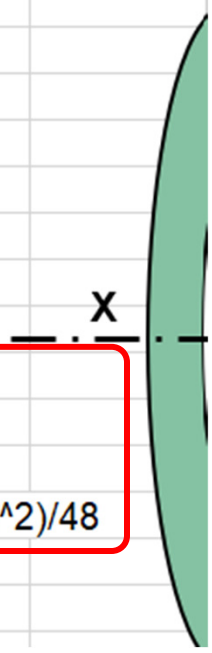
- Formula Bar:** $=PI()*(OD^2-ID^2)/4*Thickness$
- Spreadsheet:**

	A	B	C	D	E	F
1	Disk Properties					
2	W. Dornfeld					
3	6-Sep-21					
4						
5	OD					in
6	ID					in
7	Thickness					in
8	Density					lb/in ³
9						
10	Volume	$=PI()*(OD^2-ID^2)/4*Thickness$				
11	Weight					
12	lxx					
13	lzz					
14						

Red arrows indicate the flow of information: one arrow points from the text "click in the Data cell to add the variable to the equation" to the formula bar, and another points from "Don't click on the Name cell" to the data cells (B5-B8) in the spreadsheet.

6. Enter The Rest of Your Equations

	A	B	C	D	E	F	G
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

The screenshot shows an Excel spreadsheet with the following data:

	A	B	C	D	E	F	G
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					
11	Weight	0.336 lb					
12	Ixx	0.000326 lb.in.sec ²					
13	Izz	0.000290 lb.in.sec ²					
14							

The formula bar shows the formula for cell B11: =Density*Volume .

The Goal Seek dialog box is open, showing the following settings:

- Set cell: B11
- To value: 1
- By changing cell: \$B\$7

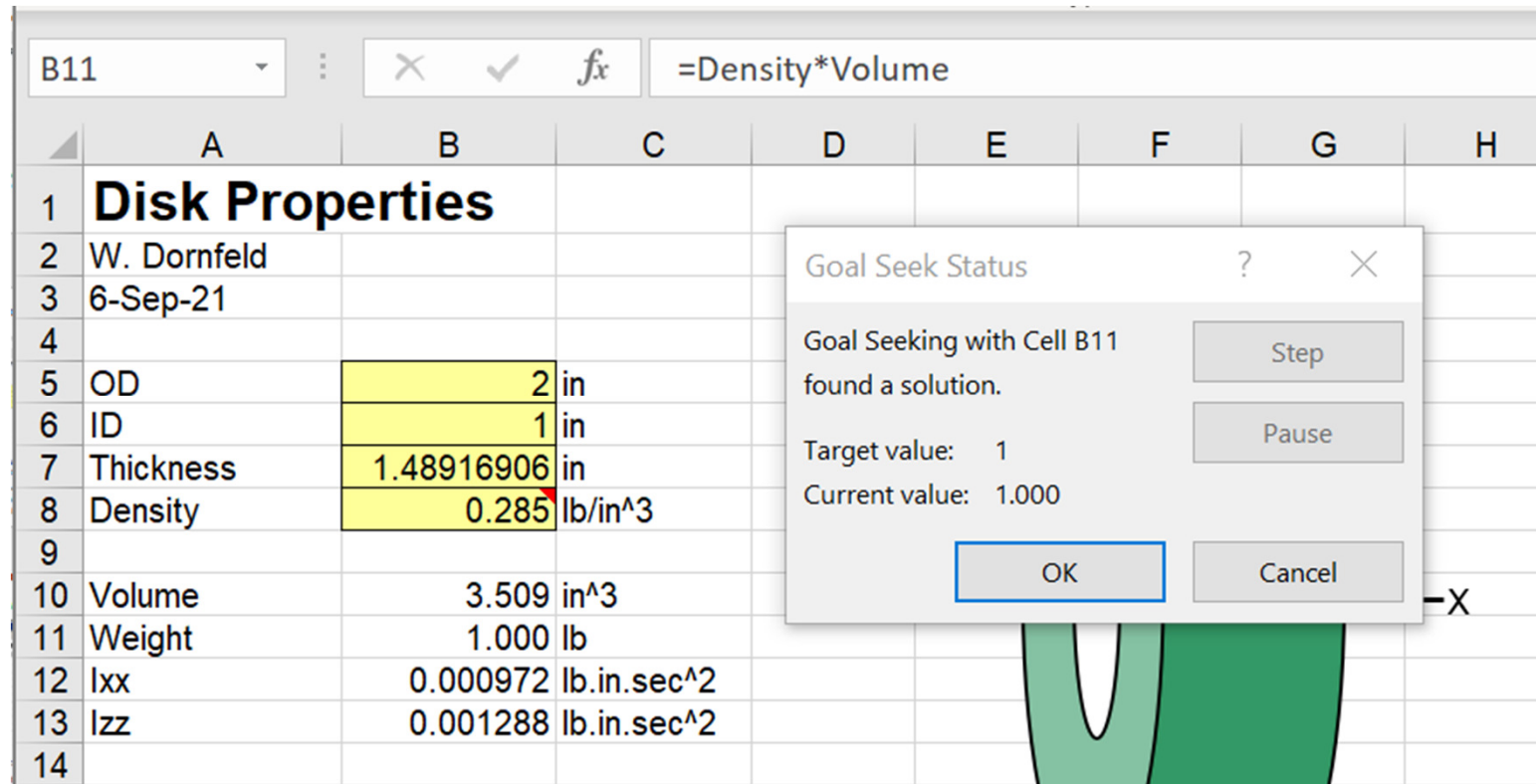
Red arrows point from the dialog box to cells B11 and B7 in the spreadsheet.

The screenshot shows the Excel ribbon with the 'Data' tab selected. The 'What-If Analysis' dropdown menu is open, and 'Goal Seek...' is highlighted.

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



The screenshot shows an Excel spreadsheet with a 'Goal Seek Status' dialog box open. The spreadsheet data is as follows:

	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	1.48916906	in					
8	Density	0.285	lb/in^3					
9								
10	Volume	3.509	in^3					
11	Weight	1.000	lb					
12	Ixx	0.000972	lb.in.sec^2					
13	Izz	0.001288	lb.in.sec^2					
14								

The 'Goal Seek Status' dialog box displays the following information:


- Goal Seeking with Cell B11 found a solution.
- Target value: 1
- Current value: 1.000
- Buttons: Step, Pause, OK, Cancel

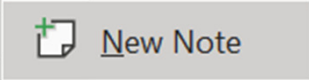
You can accept what Goal Seeker found or Cancel.

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

10. Add a Comment

	A	B	C	D	E	F
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	Steel = 0.285 lb/in ³ Alum = 0.10 lb/in ²		
9						
10	Volume	1.178	in ³			
11	Weight	0.336	lb			
12	Ixx	0.000326	lb.in.sec ²			
13	Izz	0.000290	lb.in.sec ²			
14						



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.