

# PTC Mathcad® Prime™ Tips and Tricks

When PTC upgraded from PTC Mathcad 15, the industry-standard software for solving, documenting, sharing, and reusing vital engineering calculations, to PTC Mathcad Prime, it created a brand new user interface designed to be particularly easy-to-learn and use.

With PTC Mathcad Prime 3.0, we added even more capabilities, including powerful 3D graphing and symbolic capabilities within a document centric environment. Easy-to-use live mathematical notation, powerful communication capabilities, and open architecture allow engineers and organizations to optimize their critical design and engineering processes. With over 600 built-in mathematical functions, Mathcad Prime 3.0 delivers advanced engineering exploration.

Customers come to PTC Mathcad Prime with varying degrees of experience with earlier versions. Some long-time users think they know the products inside and out, while others are completely new to the software. Regardless of your level of experience, PTC Mathcad solutions offer numerous ways to perform any given task — some of which are obvious, some of which are not.

The following are tips and tricks most users simply don't know. By having an arsenal of several ways of performing common tasks, you can select the method that works best for you.

## Tip 1 – Working with the grid

PTC Mathcad 15 provided users with a plain white background on which to place their text and equations. PTC Mathcad Prime introduced a new user interface, which features a grid. This grid looks like engineering paper and is designed to make it easy to place text and equations on the page in a highly precise manner.

Our first tip (a mini-tip for users of the older version of PTC Mathcad) is on how to toggle this grid on and off. You can control whether or not to show the grid by going to the Document Tab and using the “Show Grid” button to enable or disable the grid display. When the “Show Grid” button is selected, the grid is displayed. When the “Show Grid” button is deselected, the grid is not displayed.

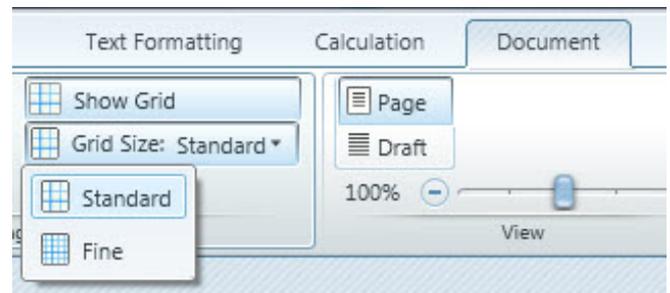


Figure 1: Go to the Document Tab and use the “Show Grid” button to toggle the grid on and off. The Grid Size tab allows you to change the size of the grid.

Our second tip regarding the grid relates to the option of changing the grid size. The default grid that appears is relatively large. You may, however, want a smaller grid to gain greater control over the formatting and spacing of text and equations (e.g., fitting large numbers of equations in a small amount of space or creating a table/matrix with text labels that must be placed close together), or you may prefer working with a smaller grid.

PTC Mathcad Prime makes it easy to change the grid size. Go to the Document Tab and go to Grid Size, shown in Figure 1. You have a choice of “Standard” or “Fine.” You can make the grid smaller by selecting “Fine.”

When making the choice to use a smaller grid, you can run into formatting challenges. If you already have equations and text labels or other regions on your screen, shrinking the grid can cause the regions to overlap, as shown in Figure 2.

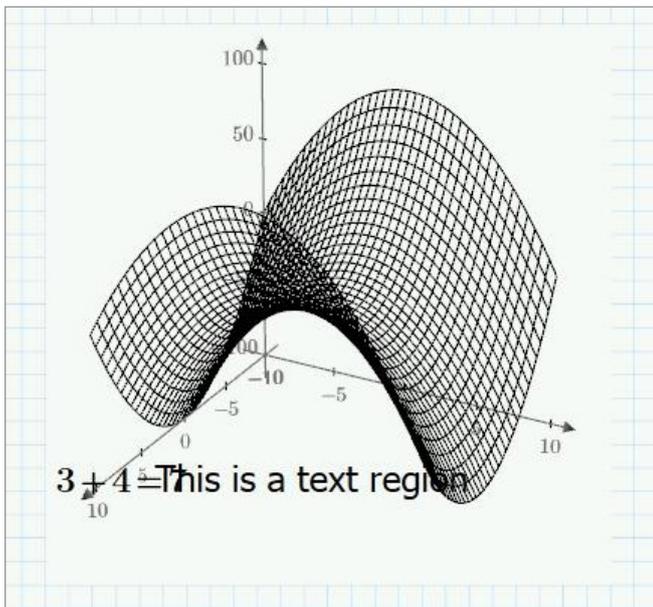


Figure 2: Shrinking the grid size can cause equations or text regions to overlap.

If only a small amount of text overlaps regions, you can simply select one of the regions and then pull them apart. However, some documents have so many overlapping regions that it becomes impossible to pull them apart. In this case, select both of the overlapping regions, go to the Document tab, then the Separate Regions drop down list and select “Vertically” or “Horizontally.” This feature will pull apart the regions so you can see them better, as shown in Figure 3.

## Tip 2 – Define custom units of measure and label mathematical elements

One convenient feature offered in PTC Mathcad is the ability to add measurements represented in two different units (as long as the additions are dimensionally correct). For example, you can add two inches and three meters and PTC Mathcad will automatically come up with an answer of 3.051 meters, without you having to perform manual conversions. However, PTC Mathcad won’t allow you to add pounds and meters.

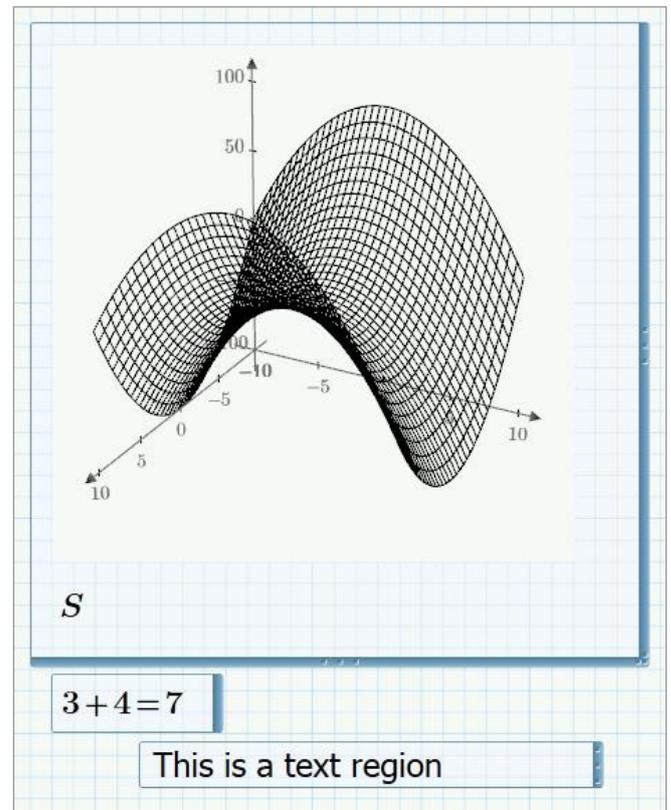


Figure 3: Go to the Document Tab, choose the Separate Regions drop-down list, and selecting either “Vertically” or “Horizontally” to eliminate overlapping regions caused by reducing the size of a grid.

Not only does this feature save you time, it also lets you easily create new units of measure. Although PTC Mathcad comes with dozens of different units of measure, it doesn’t include everything and you may wish to create your own unit of measure. For example, you may wish to represent 85.5 cubic feet per minute as 1.425 cubic feet per second.

PTC Mathcad makes it easy to define a new unit of measure—It is done in the same way as defining a variable. The trick is that you need to define the unit using existing units within PTC Mathcad. In addition to defining the unit, you also need to use a label to associate the new unit name with the specific math type.

Say you want to add a custom unit — cubic feet per second. You create this unit as follows:

1. Type the unit name and label it as a unit by going to the Math Tab, selecting “Labels” and choosing “Unit.”
2. Define the new unit using PTC Mathcad’s built in units (e.g., you can define the new unit cfs by using the existing unit of ft/s)

$$cfs := \frac{ft^3}{s}$$

Now say you have the unit .0065 cfm. Normally, PTC Mathcad will evaluate this unit using the default unit system. But if you want to evaluate that using the newly added unit cfs, simply change the default to the newly defined cfs, and PTC Mathcad will use the new unit in your worksheet.

$$.0065 \cdot cfm = (1.083 \cdot 10^{-4}) cfs$$

A label can be used to associate mathematical elements in your worksheet with other specific math types as well. Select the mathematical element that you want to label. Go to the Math tab, select “Labels” and choose one of the following labels to apply to the element you selected:

- Variable
- Unit
- Constant
- Function
- System
- Keyword

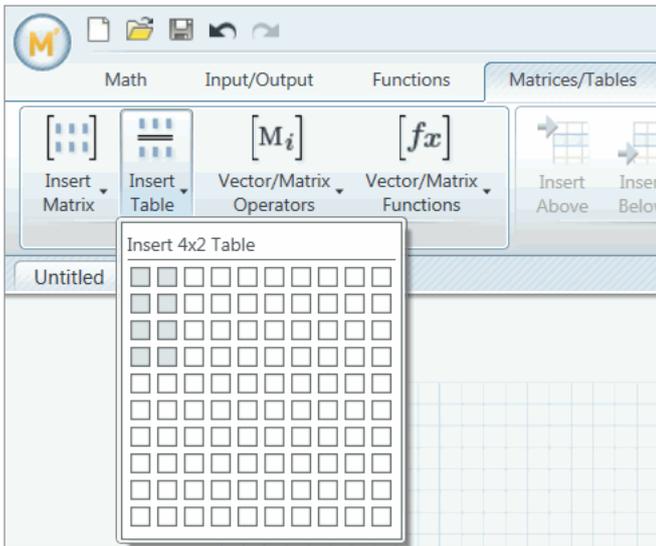
One caveat: These new definitions and labels only work within the worksheet in which they were created. If you need to use these definitions on an ongoing basis for other projects, develop a worksheet with these definitions and then create an informal template by doing a “Save As” to save the worksheet under a new project name. You can also create a template by selecting “Save As” and saving the worksheet as a PTC Mathcad template.

### Tip 3 – Using tables

Tables in PTC Mathcad provide a convenient method for you to define data sets or specifications. A table is a region containing variable names, data sets, and unit placeholders for defining the units for each data set. Each data set has a name and a set of units, or no units assigned.

$P$ units ( )	$p$ units (in)
3	1.0472
4	.7854
5	.6283
6	.5236

Defining a table is easy in PTC Mathcad Prime. Select the Matrices/Tables tab, and then click the “Insert Table” tab. Drag to select the size of the table you want.



A maximum number of 10 rows and 10 columns can be inserted. Once defined, each data set can be used as a column vector which you can then evaluate, plot, or use in a function. The column header is the variable name with the units assigned.

$$P = \begin{bmatrix} 3 \\ 4 \\ 5 \\ 6 \end{bmatrix} \qquad p = \begin{bmatrix} 0.027 \\ 0.02 \\ 0.016 \\ 0.013 \end{bmatrix} m$$

### Conclusion

Some of these tips are not easily found in the basic handbook, so they are not widely known. They are representative of the types of hidden tips and tricks that interacting with instructors during PTC University training sessions will bring to light.

PTC University’s training and tools help individuals and organizations use PTC software more effectively. Whether you’re looking for specific training courses, ways to improve the proficiency of experienced users, or a personalized corporate learning program that meets your training schedule and budget requirements, PTC University can help you optimize your business through traditional classroom training, online courses, as well as leadership training and consulting.

PTC University enables you to make the most of your software investment through:

- **First hand PTC product knowledge:** PTC University has direct access to the PTC product development and consulting organizations to ensure that your courses include the most up-to-date product information plus best practices derived from thousands of customer deployments.
- **Global expert network:** All PTC University training classes are delivered by experienced instructors or certified training partners. Our global network ensures that PTC University training is delivered with consistent quality no matter where you are located.
- **Flexible delivery options:** PTC University offers any instructor-led class in the delivery format of your choice—on-site, virtual, or in a traditional classroom

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