

# Quick Study

◆ HELPFUL HINTS FOR THE RENSSELAER COMPUTING COMMUNITY ◆

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Quick Study #33

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## Maple

### Introduction

Maple is a symbolic mathematical calculation language that can simplify algebraic expressions, solve equations, differentiate and integrate functions, evaluate series and limits, plot graphs, and perform other mathematical operations. Maple is available on Rensselaer laptops, public PCs, and UNIX workstations. Maple for the PC (and upgrades) are for sale at the Campus Computer Store in the VCC.

### Running Maple

**Starting Maple on a PC:** Double-click the Maple icon on the desktop. If there isn't an icon, pull down the **Start** menu, and select the Maple program.

**Starting Maple on a UNIX workstation:** Left-click (once) on the **Maple: Symbolic Math Package** option on the RCS Applications menu, or enter the command **maple &** at a UNIX prompt.

After a brief interval, the Maple window will appear, with a smaller, separate Untitled window inside it. (If the Introduction window opens, you may either iconify or close it, if you do not need any additional Maple help.) Make sure the mouse pointer is inside the Maple window before you start to enter commands.

**Quitting Maple:** Save your work. To quit Maple, pull down the **File** menu and select the **Exit** option.

### Getting Started

Maple has an on-line **Introduction** and a **New User's Tour** which can be accessed from the **Help** menu at the top right of the main Maple window.

We have also created an on-line tutorial at <http://www.rpi.edu/computing/software/maple/RPItutorial8.mws>. To run it, download the file to the PC you are using and double-click the local copy to start Maple. It is an excellent introduction to Maple and we suggest you work through this tutorial first.

### Additional Help

The ARC Maple page at <http://www.rpi.edu/computing/software/maple/> includes:

- a link to the Maple tutorial described above
- a link to an FAQ
- links to several Waterloo Maple on-line resources
- information about using Maple remotely

Maple also has extensive on-line help. Click on the **Help** menu at the top right of the main Maple window. You may also enter **?** at the **> Maple** prompt. If you know the topic or command on which you would like help, you can enter **?topic**; or **help(topic)** to see a help window on a particular topic. For example, for help with the diff command, you would enter **?diff**.

The consultants at the ARC Help Desks can also help with using Maple as well as the installation of Maple (and upgrades) on laptops.

## Entering Commands

Enter all Maple commands at the > prompt, and be sure to end each Maple statement with a semicolon (or a colon, if you do not wish to have Maple display the result). If you forget to include the (semi)colon at the end of a command, a warning message will appear, and no further commands will work until you enter the required (semi)colon.

If the command you just entered generates an error message, instead of retyping the command, you can click in the command, make the appropriate changes, and press Enter. The error message will disappear.

## Using the Palettes

There are three palettes which you can use to simplify building mathematical expressions: *Symbol Palette* - to enter symbols and Greek letters in expressions, *Expression Palette* - to enter integrals, derivatives, sums, and products, and *Matrix Palette* - to build matrices. To open a palette, pull down the **View** menu, select **Palettes**, and then the appropriate palette. For more information on using these palettes, please refer to Maple's built-in on-line help.

## Saving and Resuming Your Maple Session

If you would like to be able to continue your Maple session at a later time, using the same environment and variables as in your current session, pull down the **File** menu and select **Save** or click on the icon of a diskette.

In the **Save Session** window that appears, enter the desired filename, being sure the proper directory is chosen. The filetype should be Maple Worksheet and the filename should have an .msw extension. You can also choose to save the file as Maple Text, plain text, HTML Source, or LATEX Source. Click **OK** to finish saving the file.

When you are ready to resume your Maple session, start up Maple as usual, then pull down the **File** menu and select the **Open...** option or click the icon of an open file folder. If the name of the desired file exists (e.g., filename.msw) in the Files field of the window that appears, click on that filename to select it; otherwise, type the desired filename in the Selection field. Click **OK** to open the specified Maple session.

## Printing Your Maple Session or Saving It to a File

The **Print** command is used both to print your Maple session or save it to a PostScript file. Pull down the **File** menu in the upper left-hand corner of the main Maple window and select **Print...** or click on the icon of a printer.

**Note:** Never print the file *filename.msw*, which gets created when you save a Maple file. Printing this file will only produce many pages of garbage.

**On a PC:** A Print window opens. If the desired printer name doesn't appear in the **Name:** field, select another printer from the pull-down list. There are also other options you can select, e.g., number of copies. Click **OK**.

To save your session to a PostScript file, click the box to the left of **Print to file**. Enter the desired filename in the dialog box which appears, and click **OK**.

**On a UNIX workstation:** In the Printer Setup window, make sure that the button to the left of the **Print Command:** field is selected, then click the **Print** button. Your Maple session will print on the default printer. Or, you can specify a particular printer by appending **-Pprintername** to the lpr command in the **Print Command** field, replacing *printername* with the name of the desired printer. There are other options you can select.

To save your session to a file, select the button to the left of the **Output to File:** field. You can then either accept the default filename shown (untitled.ps), or enter a new name. Click on **Print** at the bottom of the window. This creates a PostScript file which you can print at any time, using the lpr command from a UNIX prompt.

## Maple Hints

- To enter a comment, click on the T icon on the Tool Bar. Type text as usual. To return to entering Maple commands, click on the [>] icon.
- To assign a value to a variable, use the assignment operator (:=), e.g.,  $x:=y+2$ .
- To unassign a variable, use a command of the form  $x:=x$ ;
- If you would like to refer to previous results, use the percent sign ( % refers to the most recent result, %% refers to the next to last result, and %%% refers to the one before that). Of course, if you assign a name to a result, it is very simple to refer to it again.
- To refer to an item in a list, use the notation [k], where k picks out the k<sup>th</sup> item in a list. For example, % [2]; refers to the second item in the most recent result.
- Use the notation Pi (note the capital P) to refer to the constant  $\pi$ .