Online Maple® Manual

Donald Hartig
California Polytechnic State University

Douglas B. Meade
University of South Carolina

to accompany

Thomas' Calculus

Eleventh Edition

And

Thomas' Calculus, Early Transcendentals

Eleventh Edition

Based on the Original Work by

George B. Thomas, Jr.
Massachusetts Institute of Technology

as Revised by

Maurice D. Weir
Naval Postgraduate School

Joel Hass
University of California, Davis

Frank R. Giordano
Naval Postgraduate School

Boston San Francisco New York
London Toronto Sydney Tokyo Singapore Madrid
Mexico City Munich Paris Cape Town Hong Kong Montreal

Reproduced by Pearson Addison-Wesley from electronic files supplied by the authors.

Publishing as Pearson Addison-Wesley, 75 Arlington Street, Boston, MA 02116.

ISBN 0-321-22648-8

1 2 3 4 5 6 SC 08 07 06 05 04

An Introduction to Maple

Computer Algebra System (CAS) Exercises

Prior to attempting to solve any CAS Exercises, spend a few minutes reading through this introduction to become more familiar with some of the basic features, commands and structure of Maple. You are also encouraged to complete the Maple modules that accompany the Eleventh Editions of *Thomas' Calculus* and *Thomas' Calculus: Early Transcendentals*. These modules will give you more experience using Maple in the context of mathematical modeling and include several interesting applications of calculus. Information about the modules can be found at the following web site: www.aw-bc.com/thomas.

Maple Arithmetic

At the simplest level, you can think of Maple as a powerful calculator that can do symbolic (exact) manipulations as well as floating point (approximate) arithmetic.

Addition, Subtraction, Multiplication, and Division

The symbols +, -, *, and / are used for addition, subtraction, multiplication, and division, respectively. Don't try any of these on your graphing calculator!

```
> 575754575849849885 + 748949854985944749598984;
                                748950430740520599448869

> 87575750 - 4897475988744894574949;
                                -489747598874480699919 9

> 6868868686 * 18234987271740;
                                125253733060463458733640

> 9968686861273254659868650000000000000 / 5000;
                            19937373722546509319737300000000 0
```

Remember that each command has to end with a semi-colon (or colon, if you don't wish to see the result).

Powers

Either ^ or ** can be used to raise a number to a power.

```
> 55757^22;
26217227822130734686061732698724649910044114252485611900573633503107377146737745 57\
      2003534597863691126104 9

> 109**5;
                                        15386239549
```

Exponentials are handled with the **exp** command.

```
> exp(2);
```

$$e^2$$

Euler's constant, *e*, is obtained as

```
> exp(1);
```

$$e$$

The Maple name for ∞ is **infinity** .

```
> infinity;
```

$$\infty$$

Palettes

Maple has four palettes containing shortcuts to entering commands via the keyboard. The **Expression** palette can be used to compute powers, roots, elementary transcendental functions, limits, derivatives, and other basic calculus-based quantities. To view this palette, pull down the **View** menu, choose **Palettes** and then select **Expression** . Then click on the tiny right arrow symbol at the bottom left corner of the worksheet window. The pallette will pop out of the left margin. It can be resized by dragging its right side.

To use the palette to enter a quantity like $\sqrt{390625}$, position the cursor in an input region and click on the symbol $\sqrt{a}$ in the palette. This produces **sqrt(%a)** with the argument selected. Type 390625 and then execute the group. Your final input and output should appear as

```
> sqrt(390625);
```

$$625$$

When a palette generates a template that involves more than one argument, the **Tab** key can be used to move from one argument to the next. For example, to compute $\frac{757555}{5}$, use the a/b button on the palette, enter 757555, press **Tab**, enter 5, then press **Return** to obtain

```
> ((757555)/5);
```

$$151511$$

The Expression pallette can be moved to one of the other three sides of the worksheet. Right click on the **Expression** button, choose **Dock** then the desired position. To make the pallette disappear, click on the left arrow at the bottom of the worksheet.

Exact vs. Approximate Calculations

Maple is designed to provide exact answers to mathematical computations.

```
> sqrt( 27 );
```

$$3\sqrt{3}$$