START UP

When getting familiar with Maple, it is best to start off with Worksheet Mode:

COMMON TOOLBAR COMMANDS

GENERAL INFORMATION

Maple is much like Microsoft Word in terms of equation input. Use the following characters to denote each operation: multiplication (*), division and fractions (/), exponents (^), and subscripts (_).

Maple is also case sensitive; make sure to watch out for capitalization (ex. the variables mapleVariable and Maplevariable will be different and the commands limit() and Limit() will show different things.)

Most Maple input requires you to end in a semicolon (;). So it is best to get into the habit.

Comments can be added to code via the pound sign (#).

Maple Worksheets can be saved and run later.

BASIC MATH

> restart;
#Clears variables from memory

> 1234 + 4567;
5801
#You can use Maple as you would a regular calculator

> \frac{5 \cdot 6 \cdot 9}{3};
90
## BASIC MATH

$\% \; ; \quad 90 \quad #\text{Recalls the answer from the previous line}$

$\% \quad 10 \quad #\text{Do not forget the multiplication sign or erroneous answers will appear}$

$(1+2) (1+2) \quad 3 \quad #\text{The correct way to write the above equation}$

$\frac{2}{3} \quad \frac{2}{3} \quad #\text{Fractions will appear as fractions}$

$\text{evalf}\left(\frac{2}{3}\right) \quad 0.6666666667 \quad #\text{Evaluates the fraction as a floating point number}$

$pi \quad \pi \quad #\text{Evaluates Pi as a floating point number}$

$\text{evalf}\left(pi\right) \quad 3.141592654 \quad #\% \text{ recalls the answer from the previous line}$

$\text{evalf}\left(\%\right) \quad 3.141592654 \quad #\% \text{ recalls the answer from the previous line}$

$\exp\left(1\right) \quad e \quad #\text{Euler's number}$

$\text{evalf}\left(\%\right) \quad 2.718281828 \quad #\% \text{ recalls the answer from the previous line}$

$\sqrt{144} \quad 12 \quad #\text{Computes the square root of 144}$

## SIMPLE EXPRESSIONS AND VARIABLES

$Area: = \pi \cdot r^2; \quad Area: = \pi \cdot r^2 \quad #\text{Defines the Area of a circle}$

$r: = 10 \quad r: = 10 \quad #\text{Assigns 10 to the variable ‘r’}$

$Area; \quad 100 \pi \quad #\text{Computes the Area of a circle}$

$\text{evalf}\left(Area\right); \quad 314.1592654 \quad #\text{Evaluates the Area as a floating point number}$

$r: = 5 \quad r: = 5 \quad #\text{Assigns 5 to the variable ‘r’}$
### SIMPLE EXPRESSIONS AND VARIABLES

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&gt; Area;</code></td>
<td>25 π</td>
<td>Computes the Area of a circle with the new 'r' value</td>
</tr>
<tr>
<td><code>&gt; evalf (Area);</code></td>
<td>78.53981635</td>
<td>Evaluates the Area as a floating point number</td>
</tr>
<tr>
<td><code>&gt; Area: = ' Area ';</code></td>
<td>Area: = Area</td>
<td>Clears data from the 'Area' variable</td>
</tr>
<tr>
<td><code>&gt; Area;</code></td>
<td>Area</td>
<td>Displays the Area variable</td>
</tr>
</tbody>
</table>

### ADVANCED EXPRESSIONS

**Defining**

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&gt; y: = 2 \cdot x^3 + 5 \cdot x^2;</code></td>
<td>y: = 2 \cdot x^3 + 5 \cdot x^2;</td>
<td>Defines the expression y: = 2 \cdot x^3 + 5 \cdot x^2;</td>
</tr>
</tbody>
</table>

**Solving**

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&gt; subs (x = 4, y );</code></td>
<td>208</td>
<td>Substitutes x = 4 and solves for y</td>
</tr>
<tr>
<td><code>&gt; solve (x = 208 );</code></td>
<td>[4, -\frac{2}{3} - \frac{1}{4} \cdot i \cdot \sqrt{247}, \frac{13}{4} + \frac{1}{4} \cdot i \cdot \sqrt{247}]</td>
<td>Solves for x when y = 208</td>
</tr>
<tr>
<td><code>&gt; fsolve (x = 208 );</code></td>
<td>4</td>
<td>Solves for x when y = 208</td>
</tr>
<tr>
<td><code>&gt; solve (x = 208 );</code></td>
<td>[4, -\frac{2}{3} - \frac{1}{4} \cdot i \cdot \sqrt{247}, \frac{13}{4} + \frac{1}{4} \cdot i \cdot \sqrt{247}]</td>
<td>Uses floating point arithmetic</td>
</tr>
</tbody>
</table>

### DIFFERENTIATING AND INTEGRATING

<table>
<thead>
<tr>
<th>Expression</th>
<th>Result</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td><code>&gt; diff (y , x );</code></td>
<td>6 \cdot x^2 + 10 \cdot x</td>
<td>Differentiates y with respect to x</td>
</tr>
<tr>
<td><code>&gt; diff (y , x , x );</code></td>
<td>12 \cdot x + 10</td>
<td>Second derivative of y with respect to x</td>
</tr>
<tr>
<td><code>&gt; subs (x = 4, diff (y , x ));</code></td>
<td>136</td>
<td>Value of the first derivative of y with respect to x when x = 4</td>
</tr>
<tr>
<td><code>&gt; int (y , x );</code></td>
<td>[\frac{1}{2} \cdot x^4 + \frac{5}{3} \cdot x^3]</td>
<td>Integrates y with respect to x</td>
</tr>
<tr>
<td><code>&gt; integrate (y , x = 0..6 );</code></td>
<td>1008</td>
<td>Integrates y with respect to x from x = 0 to x = 6</td>
</tr>
</tbody>
</table>
PLOTTING

\[
> \text{plot}(y, x = -6..9); \]
#Plots y vs. x (for a range from -6 to 9)

\[
> g := \sin(t); \]
\[
g := \sin(t) \]
#Defines the expression \( g = \sin(t) \)

\[
> h := \cos(t); \]
\[
h := \cos(t) \]
#Defines the expression \( h = \cos(t) \)

\[
> \text{plot}([g, h], t = -3\pi..3\pi); \]
#Plots the expressions, \( g \) and \( h \), vs. \( t \) (for a range of \( t = -3\pi \) to \( 3\pi \))

LIMITS

\[
> \text{limit}(i(t), t = 0); \]
0
#The limit of \( i(t) \) as \( t \) approaches 0