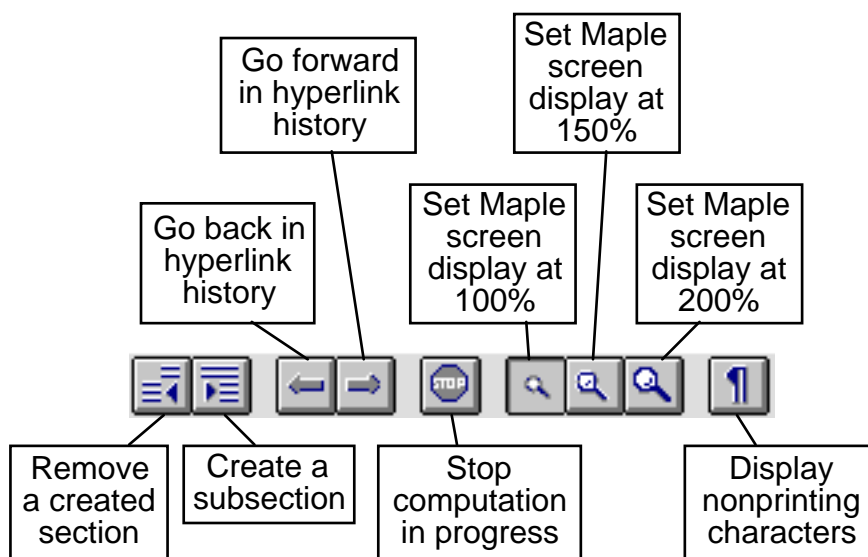
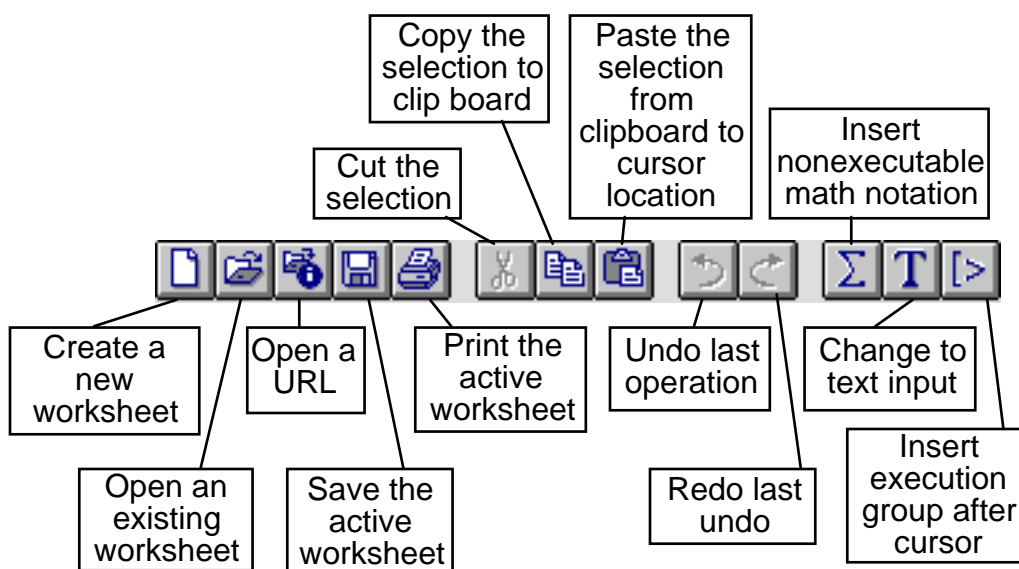


BASIC MAPLE COMMANDS AND MENUS

This sheet is provided as a quick reference for some of the *Maple* commands and menus. For more detailed instructions, see the appropriate section in this workbook or “Using Help” under **Help** on the *Maple* menu bar.

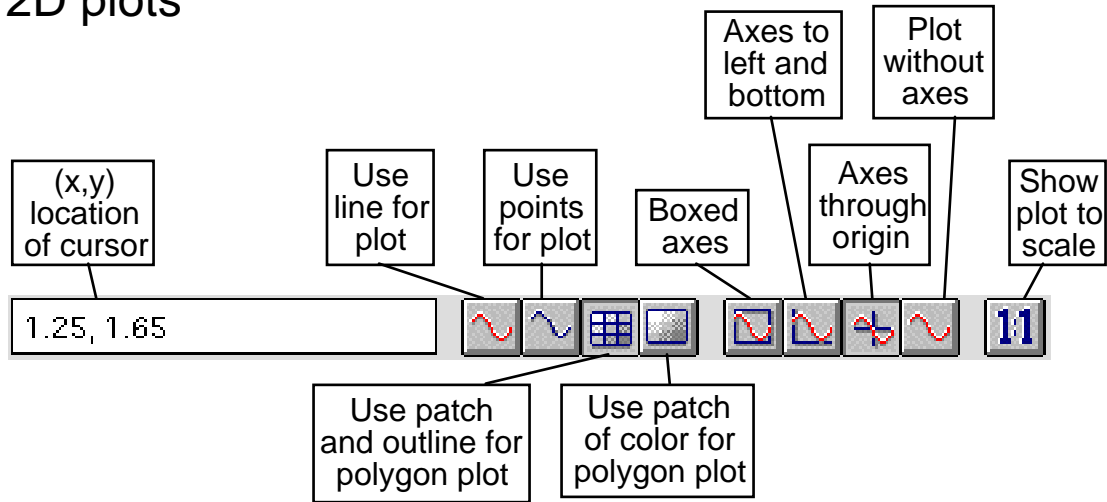
MAIN MENU BAR



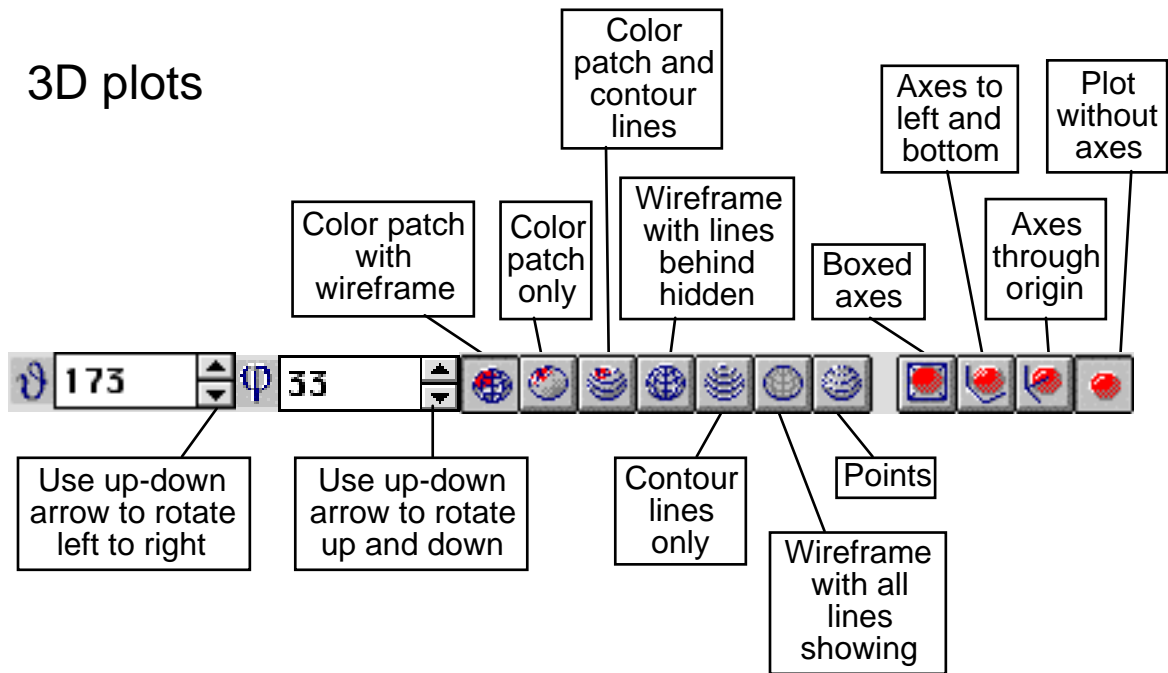
These commands can also be accessed under the menu headings **File**, **Edit**, **View**, and **Insert**. There are additional style commands under **Format** including justification for the worksheet.

PLOT MENUS

2D plots



3D plots



These commands can also be accessed under the menu headings **Axes**, **Color**, **Style**, and **Projection**. There are additional style commands under these menu headings for various views and coloring schemes.

COMMANDS FOR 2D PLOTS

| Common Name | Maple Command and Options |
|-----------------|--|
| Cartesian Plot | <code>plot([f,g],x=a..b,c..d,discont=true);</code> <code>[f,g]</code> — function(s) to be plotted (omit [] to plot one function) <code>x=a..b</code> — horizontal domain <code>c..d</code> — (optional) vertical range <code>discont=true</code> — (optional) remove lines connecting plus and minus infinity |
| Contour Plot | execute <code>with(plots);</code> <code>contourplot(f,x=a..b,y=c..d);</code> <code>f</code> — function to be plotted <code>x=a..b</code> — horizontal domain <code>y=c..d</code> — vertical range |
| Density Plot | execute <code>with(plots);</code> <code>densityplot({f},x=a..b,y=c..d);</code> <code>f</code> — function to be plotted <code>x=a..b</code> — horizontal domain <code>y=c..d</code> — vertical range |
| Direction Field | execute <code>with(plots);</code> <code>fieldplot([dx,dy],x=a..b,y=c..d);</code> <code>dx</code> — change in the x value <code>dy</code> — change in the y value <code>x=a..b</code> — horizontal domain <code>y=c..d</code> — vertical range |
| Histogram | execute <code>with(stats);</code> and <code>with(statplots);</code> <code>histogram(L,area=a,numbars=b);</code> <code>L</code> — list of data to be plotted <code>area=a</code> — total area of all bars <code>numbars=b</code> — number of bars to be plotted |
| Implicit Plot | execute <code>with(plots);</code> <code>implicitplot({f,g},x=a..b,y=c..d);</code> <code>{f,g}</code> — equation(s) to be plotted (omit { } to plot one function) <code>x=a..b</code> — horizontal domain <code>y=c..d</code> — vertical range |
| Parametric Plot | <code>plot([x,y,t=a..b]);</code> <code>x</code> — x -coordinate as a function of t <code>y</code> — y -coordinate as a function of t <code>t=a..b</code> — domain for t |
| Polar Plot | execute <code>with(plots);</code> <code>polarplot({f,g},q=a..b);</code> <code>{f,g}</code> — function(s) to be plotted (omit { } to plot one function) <code>q=a..b</code> — angle domain to be plotted |

COMMANDS FOR 3D PLOTS

| Common Name | Maple Command and Options |
|---------------------|---|
| Cartesian Plot | <code>plot3d({f}, x=a..b, y=c..d, orientation=[p,t]);</code> {f} — function of (x,y) to be plotted x=a..b — horizontal domain y=c..d — vertical domain orientation=[p,t] — (optional) angles of view for graph |
| Cylindrical Plot | execute <code>with(plots);</code> <code>cylinderplot([r,t,f,g], t=a..b, r=c..d);</code> r,t — letters used for radius and angle f,g — functions used for radius, r , and angle, t t=a..b — domain for angle r=c..d — domain for radius |
| Direction Field | execute <code>with(plots);</code> <code>fieldplot3d(F, x=a..b, y=c..d, z=e..f);</code> F — function of (x, y, z) to be plotted x=a..b — domain to plot in x direction y=c..d — domain to plot in y direction z=e..f — range to plot in z direction |
| Solid of Revolution | execute <code>with(plots);</code> <code>tubeplot([x,0,0], x=a..b, radius=f);</code> [x,0,0] — axis to revolve about x=a..b — domain for t radius=f — function to be revolved |
| Spherical Plot | execute <code>with(plots);</code> <code>sphereplot(f, t=a..b, p=c..d);</code> f — function of the theta, t , and phi, p , to be plotted t=a..b — domain for theta p=c..d — domain for phi |
| Vectors | execute <code>with(plots);</code> <code>spacecurve([v], t=a..b, axes=boxed, numpoints=n);</code> [v] — vector in (x, y, z) coordinates as functions of t t=a..b — domain for t axes=boxed — (optional) label axes on outside edges numpoints=n — number of points to compute for graph |

MULTIPLE COMMANDS

Maple has more than one command for some operations. This summary gives guidelines for the multiple commands.

| Category | Commands | Guidelines |
|------------------|---|--|
| Declare equation | f:=x-> | The created equation is a function of x . Substitution is done by entering $f(a)$. This can be cumbersome when plotting or doing other operations with a function. |
| | y:= | Names an equation, plot, or anything. The equation may include an equal sign. Using the named expression in plots or other equations is done by just using the given letter. Substitution must be done using the command subs(x=a,y); . |
| Derivative | D(f)(x) | <i>Maple</i> uses this command if f is declared $f(x)$. This must be used to declare a new function as a derivative of a given function. |
| | diff(y,x); diff(f(x),x); | Takes the derivative of any expression. The expression may be a named equation or an $f(x)$. |
| | Diff(y,x); | Displays, but does not compute the derivative. |
| Integral | int(y,x); int(f(x),x); | Gives the most general antiderivative of any expression. The expression may be a named equation or an $f(x)$. |
| | int(y,x=a..b); | Computes the definite integral on the range $x=a$ to $x=b$. |
| | Int(y,x); Int(y,x=a..b); | Displays, but does not compute the integral. |
| Solve equation | solve(f=g,x); | <i>Maple</i> gives the exact roots for the equality. The answer may be in rational numbers, radical form, complex numbers, or as "ROOTS" of a given equation in Z . |
| | fsolve(f=g,x); | <i>Maple</i> gives a decimal approximation for the real roots of the equality. If no real roots exist, no answer is given. |
| | fsolve(f=g,x=a); | <i>Maple</i> gives a decimal approximation for the real root nearest $x=a$. |
| | fsolve(f=g,x=a..b); | <i>Maple</i> gives a decimal approximation for the real root between $x=a$ and $x=b$. |

QUICK REFERENCE OF COMMON COMMANDS

| To Do | Command | Comments |
|------------------------------|-------------------------------------|--|
| Arithmetic | + | Add |
| | - | Subtract |
| | * | Multiply |
| | / | Divide |
| | sqrt(a); | Take square root of a . |
| | ^ | Raise to a power |
| | abs(a); | Take absolute value of a . |
| Clear <i>Maple</i> 's memory | restart; | This does not delete the worksheet. Only <i>Maple</i> 's memory is cleared. |
| Decimal form of number | evalf(n); | Changes the given number, n , to a decimal. |
| Decimal places | Digits:=n; | Sets the <i>Maple</i> display to n decimal places. (See page 39.) |
| Derivative | diff(y,x); | Computes derivative of y with respect to x . |
| Graph | plot(y,x=a..b); | Graphs the equation, y , on the domain $x=a$ to $x=b$. |
| Integrate (indefinite) | int(y,x); | Integrates y with respect to x . |
| Integrate (definite) | int(y,x=a..b); | Computes integral of y from $x=a$ to $x=b$. |
| Substitute | f(a); subs(x=a,f); | Substitutes the value a for x . Use f(a) ; if the expression was declared using f:=x-> . Use subs(x=a,f) ; if the expression was declared using f:= . |
| Un-name | unassign('f'); | Removes the expression assigned to f from <i>Maple</i> 's memory. |