Useful Maple Commands

The following Maple commands will be useful for plotting functions and checking your work. Note that in Maple, each command must be followed by a colon or semi-colon. The colon suppresses output, whereas the semi-colon displays output. To see the help page for any command, type ? followed by the command. The examples at the bottom of each help page are particularly useful.
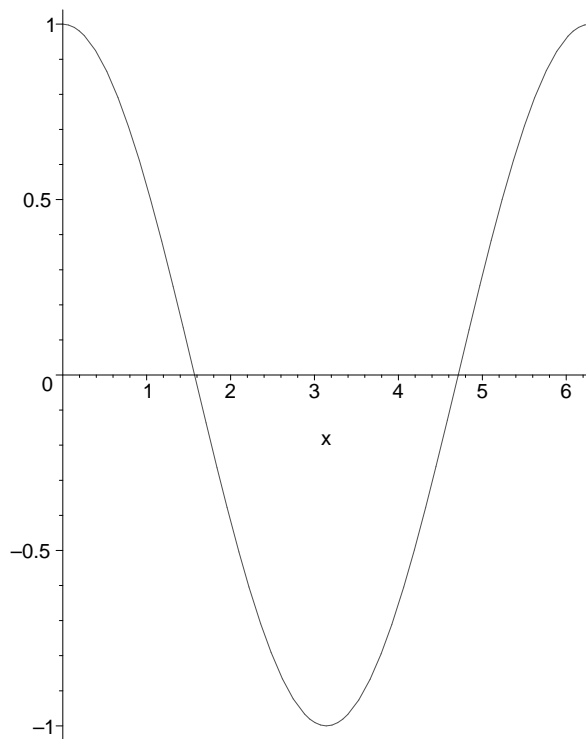
Plotting

To plot the function $y = f(x)$ on the interval from $x0$ to $x1$, use 'plot'.

Syntax:

```
>   plot(f(x),x=x0..x1);
```

Example:

```
>   plot(cos(x),x = 0..2*Pi);
```

Differential equations

At the beginning of a worksheet with differential equation commands, you will need to load the differential equations toolbox using the 'with' command.

```
>   with(DEtools):
```
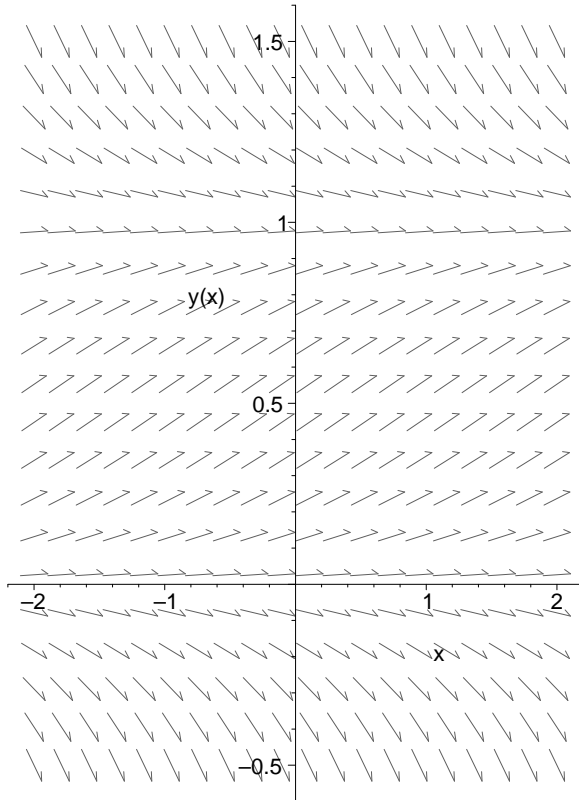
Plotting direction fields

To plot the direction field of the differential equation $y' = f(y, x)$ from $x0$ to $x1$ and $y0$ to $y1$, use 'dfieldplot'.

Syntax

```
>   dfieldplot(diff(y(x),x)=f(y(x),x), y(x), x=x0..x1, y=y0..y1);
```

Example

```
>   dfieldplot(diff(y(x),x)=y(x)*(1-y(x)), y(x), x=-2..2, y=-0.5..1.5);
```
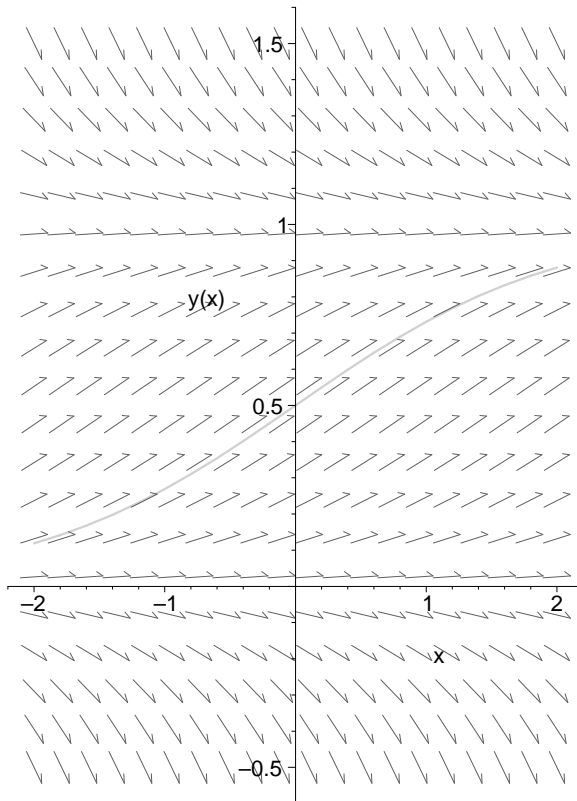
Plotting solutions on direction fields

To plot the solution with initial condition $y(0) = yi$ on top of the direction field, use 'DEplot'.

Syntax

```
>  DEplot(diff(y(x),x), y(x), x=x0..x1, [[y(0)=yi]], y=y0..y1);
```

Example

```
>  DEplot(diff(y(x),x)=y(x)*(1-y(x)), y(x), x=-2..2, [[y(0)=0.5]],
   y=-0.5..1.5);
```


Solving differential equations

To obtain an equation for the solution to the differential equation with initial condition $y(0) = yi$, use 'dsolve'.

Syntax

```
>  dsolve({diff(y(x),x)=f(y(x),x), y(0)=yi});
```

Example

```
>  dsolve({diff(y(x),x)=y(x)*(1-y(x)), y(0)=0.5});
```

$$y(x) = \frac{1}{1 + e^{(-x)}}$$