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 $x_0$ to $x_1$, use ‘plot’.

*Syntax:*

```maple
> plot(f(x), x=x_0..x_1);
```

*Example:*

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

![Cosine Plot](image)

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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.

```maple
> with(DEtools):
```

Plotting direction fields
To plot the direction field of the differential equation \( y' = f(y, x) \) from \( x_0 \) to \( x_1 \) and \( y_0 \) to \( y_1 \), use ‘dfieldplot’.

**Syntax**

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

**Example**

```maple
> 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 \( y(0) = y_i \) on top of the direction field, use ‘DEplot’.

**Syntax**

\[
> \text{DEplot}(\text{diff}(y(x), x), y(x), x=x0..x1, [[y(0)=yi]], y=y0..y1);
\]

**Example**

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

Solving differential equations
To obtain an equation for the solution to the differential equation with initial condition \( y(0) = y_i \), use ‘dsolve’.

**Syntax**

\[
> \text{dsolve}([[\text{diff}(y(x), x)=f(y(x), x), y(0)=yi]]);
\]

**Example**

\[
> \text{dsolve}([[\text{diff}(y(x), x) = y(x)*(1-y(x)), y(0)=0.5]]);
\]

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