

MATHEMATICA TUTORIAL, SANDER

Instructions: Here is a tutorial on Mathematica. Make sure you complete this before class. Remember that Mathematica is good at messy calculations, so do not be worried when you see something messy looking.

- (1) Type the following basic calculator command:

```
2+3
```

Now push the shift and return keys. This will evaluate your answer, so you should see 5 on the screen.

- (2) Type the following variable assignment and calculation. Make sure to push shift return again to make sure you get the answer (namely 5).

```
a=3
```

```
a+2
```

- (3) Try this command. Note that Cos and Sin use radians, so the answer is -1.

```
Cos[Pi]
```

- (4) Try this set of useful commands. Make sure to hit shift-return in each case so you can see your answer:

```
y=1.5
```

```
Cos[y]
```

```
Sin[Pi y]
```

```
Exp[y+1]
```

```
Log[y]
```

```
Sqrt[y]
```

```
3^y
```

- (5) Now plot the function 3^x on the interval $-1 < x < 1$:

```
Plot[ 3^x,{x,-1,1}]
```

- (6) Now we define a function:

```
f=Sin[x]
```

```
Plot[f,{x,0,2 Pi}]
```

- (7) Notice that all the commands and constants have capital letters and use square brackets. This is always true. This will help you guess what commands might look like. However, if you can't guess you can use Help. Pull down the Help menu Documentation Center. Type "absolute value" as a search term. There are a number of commands, but Abs is the most relevant. Click on it

to get a full page about using Abs. You can now try it by typing in the main window:

```
Abs[-2]
```

- (8) Now you're ready for calculus. Define a function j using

```
j = Sin[2 x + x^2]
```

Compute the derivative of j by using the command:

```
D[j, x]
```

Define a new function called k which is the derivative of j using the command

```
k=D[j,x]
```

Evaluate the function k at $x = 4$, using the command

```
k /. x -> 4
```

Note: In this last command, do not add spaces between any of the characters.