Introduction to *Mathematica*
Tables

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Mathematica has a feature called **Table** that is not present in *Maple*.

```
In[1]:= bb1 = Table[i^2, {i, 1, 5}]
```

```
Out[1]= {1, 4, 9, 16, 25}
```

The **TableForm** command will then cause the table to be shown as a table. This can be done in either of two ways.

```
In[2]:= TableForm[bb1]
```

```
Out[2]//TableForm=
1
4
9
16
25
```

```
In[3]:= bb1 // TableForm
```

```
Out[3]//TableForm=
1
4
9
16
25
```

Tables can consist of multiple columns and have labels for the rows and columns.

```
In[4]:= bb2 = Table[{10 i, 10 i^2}, {i, 1, 5}]
```

$$\text{Out[4]=}\begin{pmatrix} 10 & 10 \\ 20 & 40 \\ 30 & 90 \\ 40 & 160 \\ 50 & 250 \end{pmatrix}$$

Using the automatic labels, the elements of the table are labeled according to row and column number.

```
In[5]:= TableForm[bb2, TableHeadings → Automatic]
```

```
Out[5]//TableForm=
        1    2
1       10   10
2       20   40
3       30   90
4       40   160
5       50   250
```

You can have only row labels and not column labels.

```
In[6]:= TableForm[bb2, TableHeadings → {Automatic, None}]
```

```
Out[6]//TableForm=
1    10    10
2    20    40
3    30    90
4    40    160
5    50    250
```

You can also make up your own row and column labels.

```
In[7]:= TableForm[bb2, TableHeadings → {{"a", "b", "red", "blue"}, {"", "you"}}]
```

```
Out[7]//TableForm=
                you
a       10      10
b       20      40
red     30      90
blue    40      160
        50      250
```

In this example, the columns are incremented by 0.5

```
In[8]:= Table[i + j, {i, 1, 5}, {j, 2, 4, 0.5}] // TableForm
```

```
Out[8]//TableForm=
3    3.5    4.    4.5    5.
4    4.5    5.    5.5    6.
5    5.5    6.    6.5    7.
6    6.5    7.    7.5    8.
7    7.5    8.    8.5    9.
```

Tables don't have to be rectangular. Here, the table contains the values of the binomial expansion (i.e. Pascal's triangle.) Note that the values are aligned at the right edge.

```
In[9]:= TableForm[Table[Binomial[i, j], {i, 0, 8}, {j, 0, i}], TableAlignments → Right]
```

```
Out[9]//TableForm=
1
1    1
1    2    1
1    3    3    1
1    4    6    4    1
1    5   10   10    5    1
1    6   15   20   15    6    1
1    7   21   35   35   21    7    1
1    8   28   56   70   56   28    8    1
```

You can also retrieve single elements of a table. For example

```
In[10]:= bb4 = Table[{i, i^2, i^3}, {i, 1, 5}];
```

In[11]:=
```
bb4 // TableForm
```

Out[11]//TableForm=

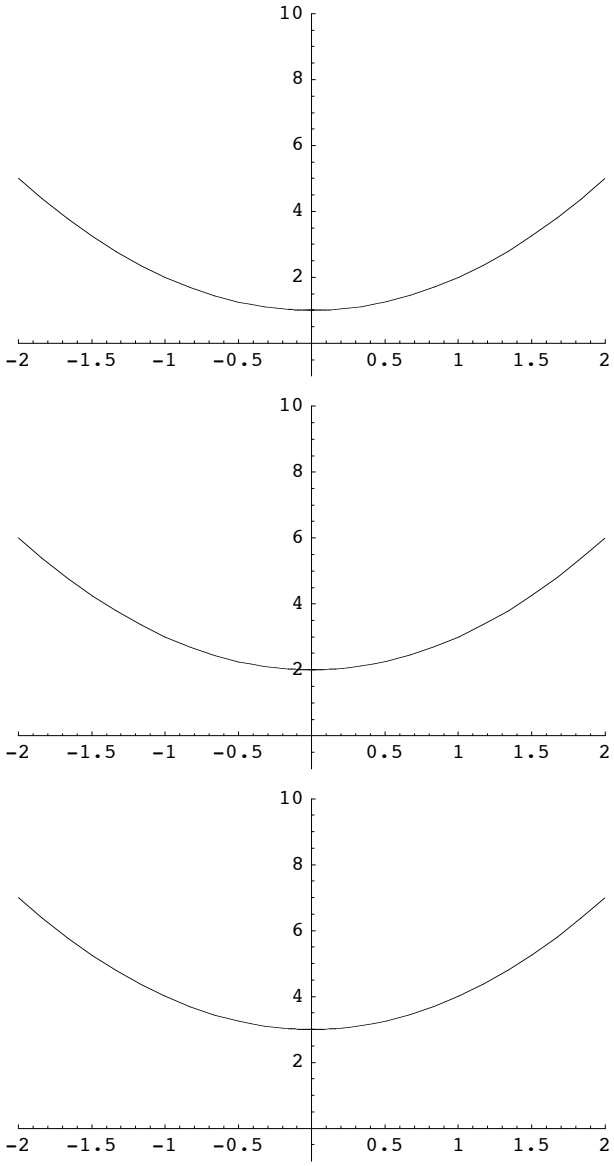
1	1	1
2	4	8
3	9	27
4	16	64
5	25	125

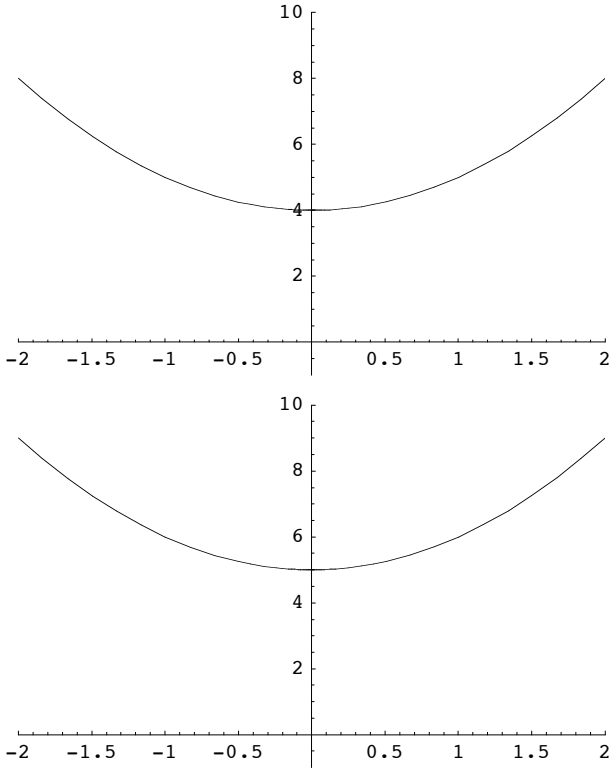
In[12]:=
```
bb4[[2, 3]]
```

Out[12]= 8

The values in the table can be anything, including graphics.

In[13]:=
```
bb5 = Table[{i, Plot[i + x^2, {x, -2, 2}, PlotRange -> {{-2, 2}, {-1, 10}}]}, {i, 1, 5}]
```





Out[13]=
$$\begin{pmatrix} 1 & \text{-Graphics-} \\ 2 & \text{-Graphics-} \\ 3 & \text{-Graphics-} \\ 4 & \text{-Graphics-} \\ 5 & \text{-Graphics-} \end{pmatrix}$$

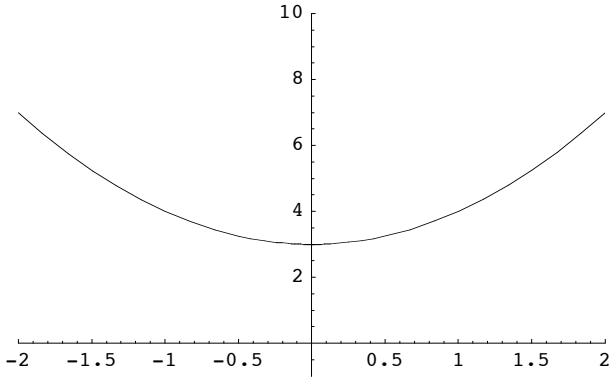
The element in the third row and the second column is a graph.

In[14]:= **bb5[[3, 2]]**

Out[14]= -Graphics-

This element can be displayed using the **Show** command

```
In[15]:= Show[bb5[[3, 2]]]
```




```
Out[15]= -Graphics-
```

You Try It!

1. Create a table showing the values of the trig functions for 0, 30, 45, 60, 90, 180, and 270 degrees and label the table accordingly
2. Create a table with the six trig. functions and the six inverse trig. functions and their derivatives and integrals. Label the table accordingly.