# Getting Started With Basic Calculation

Save your current worksheet as number1.mws. Remember to save frequently in case of system shut downs in the middle of a work session! In the text mode (click on the cap T button) place your name(s) and date at the top of your worksheet. At the end of this session you will print out and turn in your worksheet.

We begin by experimenting with some very basic calculations. The intent is to learn some basic MAPLE syntax, while observing some of the neat features of a Computer Algebra System (CAS). We will also review some basic concepts from arithematic.

Preform the following calculations with MAPLE. You must reenter the calculation mode (click on the [> button). As you do these exercises enter notes and comments onto your worksheet in text mode. In particular, the author of these worksheets sometimes purposefully leaves off certain required MAPLE syntax. He is either sadistic or he is trying to make a point. Let's assume the latter for now. The first example is in the first problem below. A CAS requires some syntaxual thing to tell it when you are through giving it instructions on what you want it to do and ready for it to do them. Try the first calculation just as indicated, look at the error message and see if you can figure out what syntax is required by MAPLE to tell it that you are ready for it to do its thing.

```
> 6 + 2
```

Another example of "omitted" required MAPLE syntax is in the next problem. It's more subtle and you may have to ask.

```
> 2 (3 + 5)
```

$$> \left(\frac{1}{5}\right)^2 + 2$$

```
> evalf(%);
```

$$> \frac{13 - 3}{7}$$

```
> evalf(%);
```

$$> \frac{(8^2 - 3^3)(5 - 22)}{8 - 4^2}$$

```
> evalf(%)
```

$$> \frac{27!}{10!\ 17!}$$

```
> binomial(27, 10)
> binomial(100, 50)
>
```

```
> 100!/(50! 50!)
```

This expression is called the "binomial coefficient" and sometimes referred to as "100 choose 50." Do you know why?

```
> 1+2/3
> evalf(%)
> 1/2+1/3+1/4
> evalf(%)
> 2/(3*4);
> evalf(%)
> Digits := 50
> sqrt(1/8)
> evalf(%)
> (2/3)*(6/7);
> evalf(%)
> Digits := 10
> sqrt(2)/3
> evalf(%)
```

If eval is short for "evaluate" what do you think the "f" in the command evalf stands for?

```
> 200!
> 200! + 1
> 100!/2
> 1/6!
> evalf(%)
> 1/6!+1
> evalf(%)
> 1/6!+10
> evalf(%)
```

```
> 1/6! + 100
> evalf(%)
> 1/50!
> 1/50! + 1
> evalf(%)
```

1. Explain the meaning of the term "floating point arithematic."

```
> convert(.3333333333333333333, fraction)
> convert(sqrt(2), fraction)
> convert(evalf(sqrt(2)), fraction)
```

2. This last response is very misleading. Why?
3. Experiment with the **convert(expression,fraction)** command to determine if it is an "exact operation" or some sort of "approximate operation." Which is it? Continue .

```
> Pi;
> Digits:=100;
> evalf(Pi);
> convert(%,fraction);
> convert(%%,fraction,exact);
```

Change the above number of digits to 10 and reexecute the last three commands. Finally, change to 4 digits and reexecute.