Assignment 1: Expressions and Functions (0.1) **Name**_____
Please provide a handwritten response.

1a. *Maple* can be used just like an ordinary calculator; addition is denoted by **+,** subtraction by **-,** multiplication by ***,** and division by **/**. For example, $\frac{3.017(56+45.26)}{-97.3}$ would be represented in *Maple* by

```
3.017*(56+45.26)/(-97.3);
```

Execute this command and record the result below; does your calculator confirm your result?

1b. Exponents are denoted in *Maple* using the **^** symbol, located above the "6" on your keyboard. Execute the command **4^2;** and record the result below; repeat with **27^(1/3);** *Maple* does not compute the result unless you request *Maple* to evaluate the expression. Enter the command **evalf(%);**. The **%** always refers to the last entry you have made. (Note: Versions earlier than Release 5.0 use **evalf(");**.) Are the results correct? Explain.

1c. Find $\sqrt{25}$ by executing **sqrt(25);**, and record the result below. Is the answer correct?

1d. In general you can ask *Maple* about commands or variables using **?**. For example, execute **?sqrt;** and record the calling sequence and parameters below.

1e. What happens when you execute **sqrt(26);** to find $\sqrt{26}$? The reason *Maple* does not give you a decimal answer is that $\sqrt{26}$ is an irrational number, and therefore cannot be exactly expressed as a decimal. However, we can apply the **evalf** command to get an approximate decimal value. Execute the command **evalf(sqrt(26));** (careful with those parentheses!) and record the result below. Finally, execute **sqrt(26.);** (note the decimal point); does this give the "exact" value or a decimal? Why?

2a. You can also apply these operations to a variable, say *x*, to create algebraic expressions in *Maple*; for example, the expression $\frac{x^2+7x-11}{x^2-4}$ would be represented by

```
(x^2+7*x-11)/(x^2-4);
```

(Note that a multiplication symbol ***** is necessary between the **7** and the **x**. There is no "understood" multiplication in *Maple.*) Execute this command and record the output below.

2b. Often we want to substitute a particular value of x, say $x = 2.3$ into an expression like the one above; this is done in *Maple* by applying the **subs** command. In this particular example we would type

```
subs(x=-2.3,(x^2+7*x-11)/(x^2-4));
```

Execute this command and record the result below; does your calculator give the same result?

3a. Just as in precalculus, we can also use our expression $\frac{x^2+7x-11}{x^2-4}$ to define a rational function $f(x)$ in *Maple*. Execute the command

```
f:=x->(x^2+7*x-11)/(x^2-4);
```

and record the result below. (The arrow **->** is made of two characters, a hyphen - followed by a "greater than" sign **>** found just to the left of the question mark on your keyboard. Make sure you type **:=** and not just **=**. The **:=** must be included for *Maple* to define a function properly.)

3b. Execute the command **f(-2.3);** to calculate $f(-2.3)$; your result should agree with that of Question **2b**. Does it? (If you have a problem, then your function **f** may not have been defined properly in Question **3a**.)

3c. Execute the command **f(2);** to try to calculate $f(2)$ and describe the result below. Explain why any attempt to calculate $f(2)$ in this case would cause an error message.

3d. Make *Maple* "forget" about our definition of **f** by executing the command **unassign('f');** (Be sure to enter the ' before and after the f. You will not see any output from this command.) Execute the command **f:=x->sqrt(x+1);** and use *Maple* to evaluate *f(0), f(3), f(-1),* and *f(1/2)* by executing the commands **f(0);**, **f(3);**, **f(-1);**, and **f(1/2);**. Neatly record the results below.