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Table 1: Table Caption

## 1 Lesson 4: Fragments, Definitions, Automatic Substitution, and Math Names

Fragments can be used to enter several lines of text, formatting, and/or mathematics. For example, we can create a floating table using and existing fragment. (*enter the table fragment here*)

Often we want to create our own fragments. As a simple example we will create a fragment that produces the following environments:

**Example 1** *Solution 2*

**Example 3** *Solution 4*

**Example 5** *Solution 6*

When writing exams I may create the fragments

**Exercise 7** *Compute*  $\int dx$

**Solution 8**

$$\int (4x^2 - 7x + 1.0) dx =$$

Mathematical definitions are also useful. For example, I can define  $f(x) = 4x^2 - 7x + 1$ . Next, I use the fragment `myint.frg` and the function  $f(x)$  to generate the problem...

$$f'(x) = 8x - 7$$

I use Automatic Substitution all the time. For example, to enter  $\geq$  into a document you can use the menu item to the left (on my display). However, when I type *ge* in math mode I get  $\geq$ . Likewise,

**Example 9** *To create an automatic substitution for the symbol  $\checkmark$  we use the go to the tools menu and select Automatic Substitution.*

Math Names can be especially useful. Examples include

We can create our own math names. Let's create the math name a1, f1, and f2 b3 b6 b6

**Example 10** Define  $f_1(x) = -3x^2 + 1$  and write  $f(x) = f_1(x)$  . Now set  $f_2(x) = x \cos x$  and write  $f(x) = x \cos x$

## 2 Project 4

Instructions: Create a file containing the items contained in this document. Submit .tex and .pdf versions of your file to [teprice@uakron.edu](mailto:teprice@uakron.edu). The name of your files should be of the form **yourlastname04.tex** and **yourlastname04.pdf**. All calculations should be done using the CAS in SWP.

**Exercise 11** Define a fragment that generates

$$\sum_{n_1=0}^{\infty} a_{n_1} x^{n_1}$$

Note that your fragment should be in display mode and that  $n_1$  is a Math Name.

**Exercise 12** Make your Math Name an Automatic Substitution and write the following sum.

$$\sum_{n_1=1}^{10} \sqrt{n_1}$$

Evaluate this sum.

$$\sum_{n_1=1}^{10} \sqrt{n_1} = \sqrt{2} + \sqrt{3} + \sqrt{5} + \sqrt{6} + \sqrt{7} + \sqrt{8} + \sqrt{10}$$

**Exercise 13** Generate a fragment of your choosing and place it here:

**Exercise 14** Use the Define tool to define the function

$$g_1(x) = \frac{e^x}{10}$$

Next, type  $g(x)$  and with the indicator located somewhere in this expression use the plot tool to graph  $g$ . Include the label: Graph of  $g$

**Exercise 15** Generate at least two Automatic Substitutions of your choice and include them in this document. For example, Heaviside