

# Double Integrals <sup>1</sup>

1. Enter the following commands:

```
format long ..... Sets the number of digits displayed to 15.  
f = inline('x*y^2') ..... Defines a function.  
f(2, 3)  
dblquad(f, 0, 1, 0, 1)
```

Calculate this double integral by hand to confirm the answer. To get an explanation of the command, you may want to enter: `help dblquad`

2. Next try to use `dblquad` to integrate the following functions on the same domain as above:

```
f = inline('x^2*y^2')  
f = inline('x.^2*y^2')  
f = inline('x.^2*y.^2')
```

Calculate this double integral by hand to determine which of the outputs is correct. You should conclude the following: for the `dblquad` command to work properly, `x` must be a vector and `y` must be a scalar.

3. The following is a trick that can be used for double integrals on regions that are not square:

```
f = inline('(x.^2*y^2).*(x+y <= 1)')  
dblquad(f, 0, 1, 0, 1)
```

This should calculate the integral of  $x^2y^2$  on the triangle with corners at  $(0,0)$ ,  $(1,0)$ , and  $(0,1)$ . Calculate this integral by hand to confirm the calculation above.

4. Write a brief report including your hand calculations. Use complete sentences and standard mathematical notation.

The goal of this project is to familiarize the user with the double integration capabilities of the program. Just as hand calculations of multiple integrals are tricky, so are computer calculations.

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