

# Defining and Plotting a Function of Two Variables <sup>1</sup>

1. Enter the following commands:

```
syms x y
ezmesh(sin(x)*cos(y), [0,10,0,10])
```

2. Click on **Tools** and then click **Rotate 3D**. Point at the graph, press the left mouse button and hold it down, and then move the pointer around slowly. The graph should rotate. Move it until you find the best picture possible (in your opinion).
3. Use ezmesh to plot the function  $f(x, y) = x^2 - y^2$ . First use the same domain as in #1 and then use  $[-2, 2, -2, 2]$ . Which is a better picture?
4. Plot the function  $f(x, y) = \sin x^5 * \cos y$  using the default domain, i.e. omit it from the command. What are the problems with the resulting graph?
5. Carefully sketch by hand the “best” graphs for the two functions in #1 and #3. Be sure to clearly label axes.
6. Explain briefly why the plot of the function in #4 does not represent the true graph of the function. Use complete sentences and standard mathematical notation.

The goal of this project is to familiarize the user with the higher dimensional plotting capabilities of the program and to introduce them to the notion that views and domains must be adjusted to obtain a useful picture. The problem of plotting rapid oscillations is reviewed.

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