Matrix Arithmetic in Excel

Figure 3.1 Matrix operations in Excel.

Any rectangular group of cells in an Excel spreadsheet can be considered to be a matrix. Let's start with an example of **matrix multiplication**. Do the following:

- Type in the 2x3 and 3x2 matrices shown in Fig. 3.1.

- Name the 2x3 matrix "eric" and the 3x2 matrix "mike" by selecting them and then typing the names into the Name Box (in the figure's upper left corner, where it presently says J2).

- Select an empty 2x2 group of cells where the product will go (as shown in the figure).

- Start typing: =mmult(eric,mike)

- Hold down the Control and Shift keys, and while holding them down, press Enter.

Note the following: Matrix multiplication is done with the mmult function. Selecting a range of the right size to hold the product *before typing* is crucial and so is holding down the Ctrl and Shift keys *after typing* while pressing Enter.   Naming the matrices is not necessary. We could also type in =mmult(B3:D4,F2:G4).

Calculating an inverse matrix is done with the minverse function. Assuming that "sam" is the name of a 3x3 matrix, do the following:

- Select an empty 3x3 range of cells where the inverse will go.

- Start typing: =minverse(sam)

- Hold down the Control and Shift keys, and while holding them down, press Enter.

Calculating the determinant is easier than either multiplication or inversion since the determinant is a number, not a matrix. We need just type this function into a cell: =mdeterm(sam)

Matrix Arithmetic in Maple

See page 33 for basic information on using Maple. To do the same matrix arithmetic with Maple that we did above with Excel we:

Start by loading the linear algebra library.

```
> with(LinearAlgebra);
```

Then we define several matrices. Here is one possible syntax.

```
> eric:=Matrix(2,3,[2,3,1,4,5,5]);
> mike:=Matrix(3,2,[3,5,1,9,1,4]);
> sam:=Matrix(3,3,[1,3,0,2,1,-1,4,1,0]);
```

Then we do the matrix multiplication, the matrix inversion and the determinant like this:

```
> eric.mike;
> sam^(-1);
> Determinant(sam);
```