Matlab example: Multidimensional Newton's Method

Here is the textbook example, written out in a couple of files.
First, the function (whose root we are trying to find) is written. The point to notice here is that we output not just the value of the function, but also its Jacobian matrix:

```
function [y dy]=myfunction(x)
%Example function to try out Newton's Method
%
n=length(x);
y=zeros(size(x)); %Not necessary for a small vector
dy=zeros(n,n);   %Not necessary for a small matrix

y(1)=-x(1)^3+x(2);
y(2)=x(1)^2+x(2)^2-1;

dy(1,1)=-3*x(1)^2; dy(1,2)=1;
dy(2,1)=2*x(1);    dy(2,2)=2*x(2);
```

Next, we write a little Newton's Method function:

```
function x=multinewton(f,x,NumIters)
%Performs multidimensional Newton's method for the function defined in f
%starting with x and running NumIters times.

[y,dy]=f(x);
for j=1:NumIters
    s=dy\y;
    x=x-s;
    [y,dy]=f(x);
end
```

And here is the output, using a couple of iterations (compare with step 8 of the table on page 134):

```
>> format long
>> x=[1;2];
>> y=multinewton(@myfunction,x,7);
>> y'
ans =
   0.826031357654187   0.563624162161259
```