1. Section 2.2 (Page 65): 8

2. The iteration $x_{n+1} = 2 - (1+c)x_n + cx_n^3$ will converge to $s = 1$ for some values of c (provided that x_0 is chosen sufficiently close to s). Find the values of c for which this is true. For what values of c will the convergence be quadratic?

3. Write a Matlab code for Newton's method to find a (non-zero) root of the system

$$x - x^2 - y^2 = 0, \qquad y - x^2 + y^2 = 0$$

   starting with $x_0 = 0.5, y_0 = 0.5$. Use

```
format long
```

   and stop when both components of two successive iterates agree to 14 decimal places. Display the approximations given and the size of the functions at each iteration.

4. Solve the last problem by using *Matlab's* solve routine.

   To run this program, type

```
options = optimset(Display, iter);
x0 = [0.5,0.5]
[x,fval] = fsolve(@fcnns,x0,options)
```

   where fcnns is the name of the M-file defining the functions. Note that Matlab expects the functions to be defined as a vector. See the Matlab help page and the link on my course webpage about matlab for further instructions.