Homework Set 3 (Selected from Chapters 4-6)

1. The following sequences were given in the first homework set, and were found to converge for certain starting conditions. Interpret each as $a_{n+1} = F(a_n)$, and find the fixed points for F in each case, and whether or not they are attracting or repelling.

   (a) $a_{n+1} = 1/(1 + a_n)$

   (b) $a_{n+1} = \dfrac{1}{2}(a_n + 6)$

   (c) $a_{n+1} = \dfrac{1}{2}\left(a_n + \dfrac{c}{a_n}\right)$, where $c > 0$ (c is fixed- Your limit will depend on c).

2. Exercise 4(d,g) on page 50. To get a plot in Matlab, use the commands:

   ```
   x=linspace(-4,4);  %Creates an array for the domain
   yd=sin(x);  %For problem d
   yg=x-x.^3;  %For problem g- Be sure to use .^
   figure(1)
   plot(x,yd);  %Use:  plot(x,x,x,yd); to also plot y=x
   figure(2)
   plot(x,yg);  %Use: plot(x,x,x,yg); to also plot y=x
   ```

3. Exercises 1(a,b,j,k) on p. 67. Use Matlab for the sketches and describe the bifurcation (Two scripts are online- One does 1(c,d), the other does 1(e,f)- These are `Ch6HW1.m` and `Ch6HW1e.m`

4. Exercises 6-14 on p. 67. Use Matlab for the graphs, and just hand-sketch what you need when you write up the solutions.