# Chapter 5

## Exercises

### 5.3

1. As , the Newton iteration is given as follows, when f(x) = 0 needs to be solved.
2. Given an initial guess of 4-bit accuracy, to obtain 24-bit accuracy, the number of iterations required is . For 53-bit accuracy .

### 5.4

Let . Then, . Hence, to solve f(x) = 0 the Newton iteration is as follows:

### 5.6

1. As and , the iterative scheme is not convergent.
2. As and , the iterative scheme is locally convergent.
3. , the fixed-point iteration function given by Newton’s method is .

### 5.9

## Computer Problems

### 5.2

The termination criteria used for each function was that the computation for each function was repeated a maximum of ten times per method and the tolerance of error was set as 10-10.

The output obtained for each function with all 3 methods is shown below.

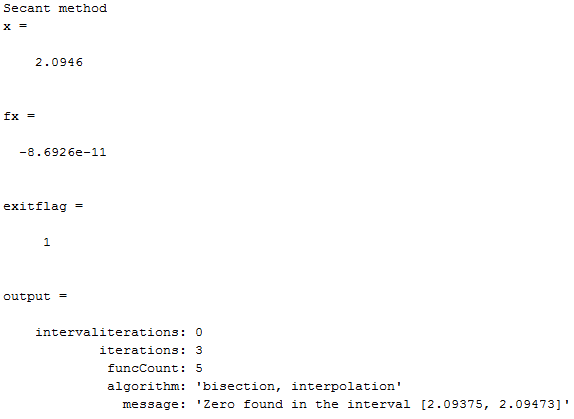
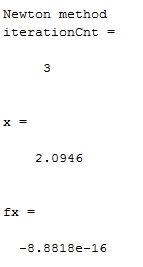
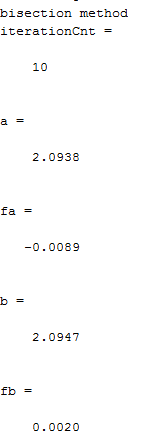
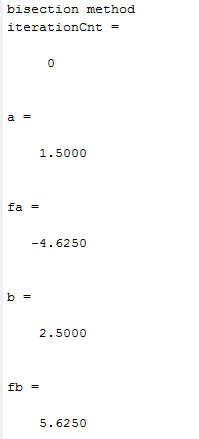


Figure 1: Part a

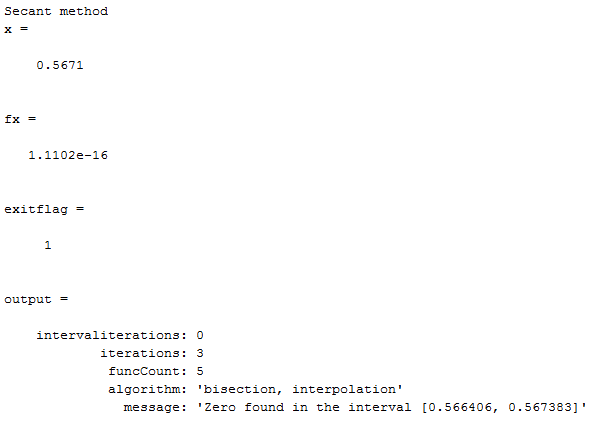
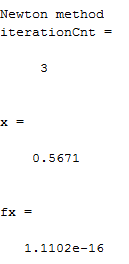
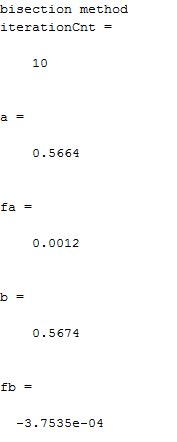
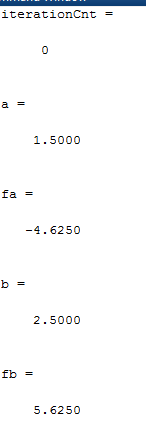


Figure 2: Part b

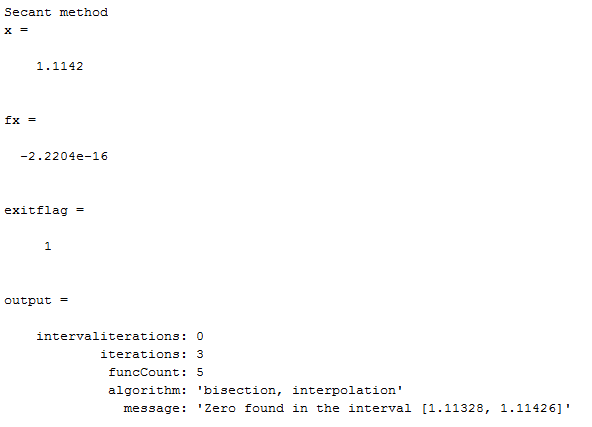
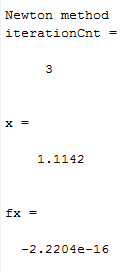
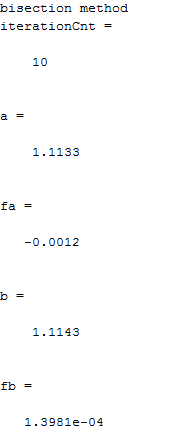


Figure 3: Part c

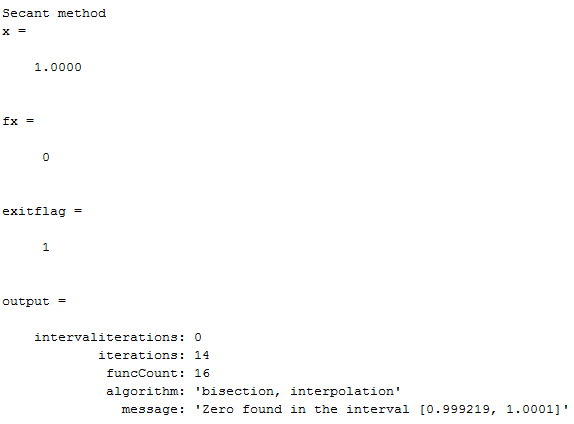
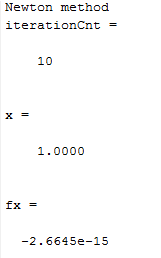
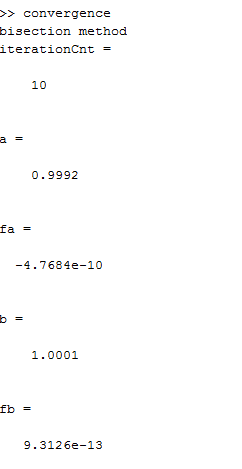
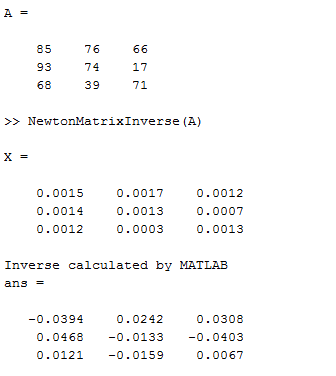


Figure 4: Part d

### 5.17

CHECK THIS

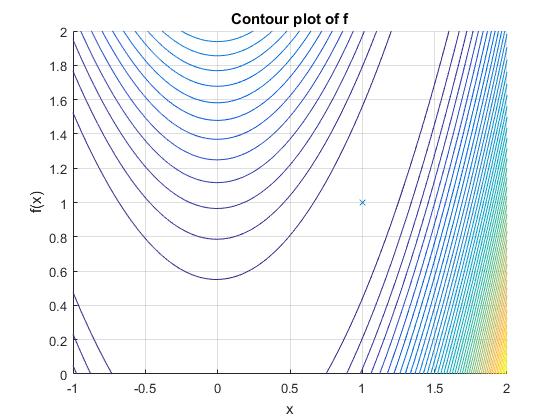


# Chapter 6

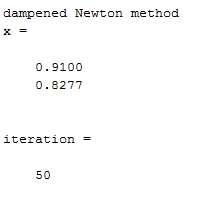
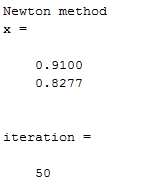
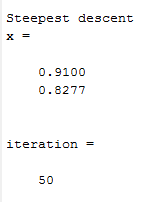
## Computer Problems

### 6.9

The plot of the path taken in plane by the solutions for each method is given below



Final solutions obtained from each method after a suitable number of iterations is provided below

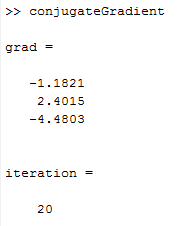


### 6.11

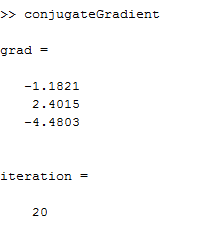
// incomplete code

### 6.12

The solution below is obtained for the Fletcher Reeves algorithm.



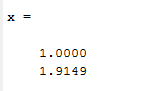
The solution below is obtained for Polak Ribiere algorithm.



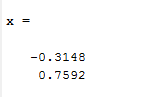
The tolerance was set as 10­-5 and the function successfully converged to the solution in n steps for an arbitrary quadratic function of n variables.

### 6.13

1. The solution obtained from MATLAB is given below



1. The solution obtained from MATLAB is given below



### 6.19 (a)

The solution obtained from MATLAB for all unknown x is shown below

