Homework Assignment 1

Due October 6, 2010

1. Determine machine epsilon in both double and single precision for Excel Visual Basic. Here is a program to do this in single precision:

```vba
Option Explicit
Function MachEps() As Single
    Dim eps As Single, eps1 As Single, eps2 As Single
    eps = 1
    Do
        eps1 = 1 + eps
        eps2 = eps1 - 1
        If (eps2 <= 0) Then
            Exit Do
        End If
    End Do
    eps = eps / 2
    Loop
    MachEps = eps
End Function
```

Please provide a copy of the double precision code, and the two machine epsilon values for single and double precision.

2. Do the following problems from the text: 4.3, 4.4, 4.12, 4.19 on pages 105–106. For problem 4.19, compute the derivatives for $-2.00, -1.75, -1.50, \ldots, 2.00$ using an Excel spreadsheet. Graph the exact derivative and each of the three approximations for the first derivative on one graph, then do the same for the second derivative.