Practice problem for midterm:

**Numerical Differentiation, integration, root finding, optimization**

1. All questions from quiz 1 practice problems
2. NME: Chapter 23 (problems: 23.1, 23.2, 23.6, 23.8, 23.9 , 23.12
3. Using First order derivatives with forward finite, backward finite, and centered finite differences
4. For second order derivative, use forward finite, backward finite, and centered finite differences
5. NME: Chapter 5:  5.1 (c), 5.2(b), 5.3 (b,c), 5.4 (b,c), 5.7 (c), 5.10, 5.11 (b)
6. NME: Chapter 6:  6.1, 6.2 (c, d, e), 6.3 (b), 6.7 (a,b,c), 6.9 (b,c), 6.10 (b,c,d), 6.11, 6.21

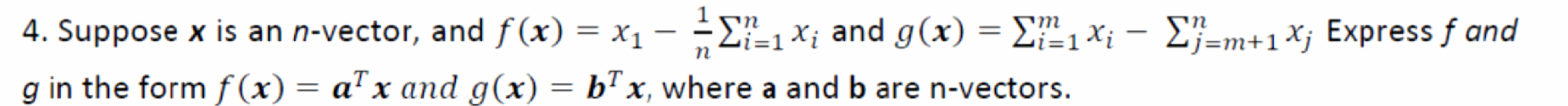
                                Example: 6.10,

1. NME: Chapter 21: 21.1 21.2, 21.3, 21.4, 21.10, 21.10, 21. 13
2. NME: Chapter 13: 13.1 (a,  use NR and compare), 13.2 (a,b,c), 13.3  (N.B: a. plot using excel/matlabplotlib),  13.5, 13.6 (a, c), 13.7, 13.8 (a, c),
3. NME: Chapter 14: Example 14.4,, Exercise: 14.5

**Vector**

1. Let’s a, b, c, and d are n – vectors. Prove:

*(a+b)T(c+d)= aTc + aTd + bTc  + bTd*

1. *Let a is an n-vector. And e1, e2, …..en are standard unit vector. Prove that (ei - ej)Ta = ai - aj*
2. *VMLS Book* 
   1. *1.1*
   2. *1.2, 1.6,*
   3. *1.9,*
   4. *1.10, 1.13, 1.18*

1. *VMLS: 2.1 (a, b,e); 2.4, 2.8 , 2.5*