1. [10 pts] In Assignment 1 we used Taylor’s Theorem to solve Exercise 1.4 on p. 12 of Simmonds and Mann Jr. Solve the same problem using the expansion method.

2. [10 pts] Use the expansion method to find $O(\epsilon^2)$ approximations for each of the three roots of

$$x^3 + \epsilon x^2 + 1 = 0.$$  

**Note.** For this problem it’s useful to make use of the identity $e^{i\pi} = -1$.

3. [10 pts] Exercise 1.7 on p. 17 of Simmonds and Mann Jr.

4. [10 pts] Approximate the real-valued root of

$$(x - 1)^3 + \epsilon x = 0$$

with an error $o(\epsilon)$.

5. [10 pts] Approximate the four roots of

$$(x - 1)^2(x^2 - 4) - \epsilon = 0,$$

with an error $o(\epsilon)$. 
