Senior Seminar
Homework for Chapter 6

Find the roots of the following polynomials:

1. $x^3 + x + 1 = 0$.

2. $x^3 - 3x^2 + 4 = 0$.

3. $x^3 - 6x^2 + 18x + 18 = 0$.

4. $x^4 - 19x^2 - 10x + 44 = 0$. Hint: $x^4 - 19x^2 - 10x + 44 = (x^2 - 7)^2 - 5(x+1)^2$.

Remember, for a depressed cubic, if the first root is not an integer, then long division is not advised. Use the method that the other solutions are $\omega t - \bar{\omega} u$ and $\bar{\omega} t - \omega u$ where

$$\omega = \frac{-1 + i\sqrt{3}}{2} \quad \text{and } \bar{\omega} = \frac{-1 - i\sqrt{3}}{2}.$$