HPC Tutorial Topics Chapter 2

1. Perform operations with complex numbers.

2. Simplify expressions involving square roots of negative numbers.

3. Use vertex form of a quadratic equation. Identify the vertex, axis of symmetry, $x$ and $y$ intercepts, domain and range. (No calculator)

4. Find the zeros of a polynomial function in factored form and identify their multiplicities.

5. Divide polynomials using long division.

6. Find polynomial function with real coefficients given real and imaginary zeros and the value of the function.

7. Explain what the multiplicities of the zeros of a polynomial function tells you about its graph.

8. Solve word problems to find maximum or minimum values.

9. Use the rational root theorem to list all the possible rational zeros of a polynomial function.

10. Use synthetic division with imaginary numbers to find all the complex zeros of a polynomial function.
11. Identify all asymptotes from a rational equation.

12. Use limit notation to describe the behavior around vertical asymptotes and to describe the end behavior of a rational function.

13. Solve polynomial inequalities in factored form without a calculator.

14. Solve rational inequalities without a calculator.

15. Solve direct and inverse variation problems.

16. Explain when a rational function has a slant asymptote and how to find its equation.

17. Explain the three cases for determining horizontal asymptotes given a rational function.