Outline of Spring Test 4 Topics

Algebra 2 Honors

May 4, 2011

The following are the major topics we have covered that may be on the fourth test. I have included a few sample Exeter problems for each topic, but there are typically others that I have not listed. I have also included some problems we skipped which will provide extra practice. Note that some problems use techniques to solve them that might not be obvious, and some problems also use a combination of more than one technique. The test and final will cover up to problem 97:1. Calculators will not be allowed.

1. Series. Know the definition and properties of arithmetic and geometric series. Be able to determine a series from given information and give the closed form. Be able to calculate the closed form of the geometric series

$$S_n = \sum_{k=0}^{n} ar^k = a + ar + ar^2 + \cdots + ar^n$$

and understand when this series converges as $n \to \infty$ as well as be able to calculate $\lim_{n\to\infty} S_n$. Be able to apply series to solve problems, including converting repeating decimals to fractions. (70:3, 71:1-4, 72:1, 72:8-9, 74:3-6, 77:5, 78:4, 78:6, 80:1-2, 81:3, 82:1-3, 83:7, 84:4, 84:6, 85:3-4, 88:1, 89:1-2, 90:1, 92:6, 95:6)

2. Exponential and Logarithmic Functions. Understand the basic properties of these two functions, how they relate to each other, and how to plot them, including key points and asymptotes. Be able to translate the functions horizontally and vertically. Know the difference between exponential growth and decay. Know how to calculate half life. Be able to determine the number of digits of a large number. (59:3, 60:10, 63:4-6, 64:1-2, 66:7, 69:6, 70:1-2, 71:1, 74:2, 84:5, 89:10, 96:10, 97:1)

3. Combinatorics and Probability. Know basic techniques for counting and for determining the probability of an event occurring. Understand the difference between counting when order matters (permutations) and doesn't matter (combinations). Understand Pascal's triangle and how it applies to binomial coefficients. (66:1-2, 66:5, 76:9, 81:2, 82:4, 83:1-4, 84:1-3, 87:4-5, 88:9-10, 89:6-7, 90:2-6, 91:1-2, 92:1, 92:4, 93:5, 93:9, 94:1, 94:3, 94:6-8)

4. Hyperbolas. Be able to put an equation of a hyperbola into standard form and to plot it, including vertices, foci and asymptotes, and be able to write the equations of the asymptotes. Given the definition of a hyperbola, be able to derive the equation in standard form. Be able to write a hyperbola in parametric form. (79:1-2, 80:3, 82:5-6, 83:9, 84:5, 86:9)

5. Functions. Understand what domain and range of a function are and be able to write them in interval notation. Understand the concept of 1-1 and how to determine if a function has an inverse. Know how a function relates to its inverse. Be able to plot $\sin^{-1} x$, $\cos^{-1} x$, $\tan^{-1} x$ and know their domain and range. (73:5-6, 75:4, 76:3-4, 81:4, 89:9-10)

6. Not on the test or final: Sinusoidal functions (80:5, 80:7, 83:8) and Markov Chains (69:1-4, 72:5).