Exam 4 Review
CE Math 1050

This exam will cover sections 7.1-7.4, 8.1-8.4, and 9.1-9.3 and 9.5 of the the textbook. The following are the learning objectives which can be tested on this exam.

1. Given the equation of a conic, be able to identify the conic and write the conic in standard form. (7.1-7.4) NOTE: This material is not covered directly in any one section, but there are many practice problems in the chapter review: pp. 537: 1-20 (9th edition).

2. Be able to find the equation of a parabola given a description (i.e. vertex and focus; focus and directrix; directrix and vertex; etc.). Given an equation of a parabola, be able to find the vertex, focus, and directrix and/or graph the equation. (7.2)

3. Be able to find the equation of an ellipse given a description (i.e. center, vertex, and focus; foci and vertices; foci and major axis length; etc.) Given an equation of an ellipse, be able to find the center, vertices, and foci and/or graph the equation. (7.3)

4. Be able to find the equation of a hyperbola given a description (i.e. center, focus, and vertex; focus and vertices; vertices and asymptote; etc.). Given an equation of a hyperbola, be able to find the center, foci, vertices, and asymptotes and/or graph the equation. (7.4)

5. Be able to solve a linear system in two or three variables using the methods of substitution or elimination. Be able to determine when a system is inconsistent. If a system is dependent, be able to express the solutions using set notation. (8.1)

6. Be able to write a system of linear equations as an augmented matrix, or an augmented matrix as a system of equations. Be able to perform the indicated row operation on a given augmented matrix (p. 568:17-24). (8.2)

7. Be able to solve a system of equation using row operations. Given the reduced row echelon form of a matrix, be able to determine whether the system is consistent or inconsistent. If the system is consistent, give the solution (p. 568:25-36). (8.2)

8. Know when Cramer's Rule can be used to solve a system of equations. Be able to set up the solutions when using Cramer's Rule to solve a system of equations in 2 or 3 variables, or use Cramer's Rule to solve for a given variable. Be able to take determinants of matrices. (8.3)

9. Know when matrices can be added, subtracted, or multiplied. Be able to calculate these by hand. Be able to find the inverse of a 2 by 2 or (simple) 3 by 3 matrix by hand. Be able to use inverse matrices to solve a system of equations, when possible. (8.4)

10. Be able to find terms of a sequence given a formula for the n^{th} term. Be able to find terms of a sequence which is defined recursively. Given the first several terms of a sequence $\{a_n\}$, be able to find a formula for a_n. (This includes arithmetic and geometric sequences and those in 9.1: 27-34.) Be able to determine whether a sequence is algebraic or geometric. Know how to evaluate a factorial. (9.1, 9.2, 9.3)

11. Be comfortable with summation notation. Be able to write out a sum or be able to express a sum using summation notation. Memorize the formulas $\sum_{k=1}^{n} c = nc$ and $\sum_{k=1}^{n} k = \frac{n(n+1)}{2}$. Be able to use those formulas and the formulas for $\sum_{k=1}^{n} k^2$ and $\sum_{k=1}^{n} k^3$ to find the sum of a sequence. The formulas for $\sum_{k=1}^{n} k^2$ and $\sum_{k=1}^{n} k^3$, will be given on the formula sheet, if applicable. (9.1)

12. Be able to find the common difference for an arithmetic sequence. Be able to find a formula for the n^{th} term of an arithmetic sequence $\{a_n\}$ when given either (a) the common difference and a term, or (b) two terms of the sequence. Given a sum of terms of an arithmetic sequence, be able to evaluate the sum (see 9.2: 37-52). (9.2)

13. Be able to find the common ratio for a geometric sequence. Be able to find a formula for the n^{th} term of a geometric sequence when given either (a) a term and the common ratio or (b) a list of the first several terms. (9.3)

14. Given an **infinite** sum of terms of a geometric sequence (infinite geometric series) be able to tell whether the series converges or diverges. If the series converges, be able to find the sum. Be able to find the sum of the first n terms of a geometric sequence. (9.3)