MATH 122 – Fall 96

Main topics for the Final Exam

0. Review of techniques of integration, limits, and infinite series

- Inverse trigonometric functions. (Sec 8.2)
- Techniques of integrations . (Sec 9.3, 9.4, and 9.5)
- Indeterminate limits and L'Hôpital's rule. (Sec 8.3 and 8.4)
- Sequences and series. (Sec 11.2 and 11,3)
- Taylor polynomial and series. (Sec 11.4)

1. Algebra of vectors and parametric curves

- Operations with vectors in two and three dimensions. (Sec 12.3 and 13.1)
- Dot product, angle between vectors, and distance. (Sec 12.3 and 13.1)
- Cross product and area of parallelograms. (Sec 13.2)
- Equations of lines and planes. (Sec 13.3)
- Parametric curves, velocity and acceleration.(Sec 12.1, 12.4, and 13.4)

2. Differential calculus of functions of several variables.

- Visualizing graphs, level curves, and color maps. (Sec 13.6 and 14.2)
- Partial derivatives and chain rules. (Sec 14.3 and 14.7)
- Maxima and minima and the second derivative test. (Sec 14.5 and 14.10)
- Tangential plane and normal vector to a surface; differentials. (Sec 14.4, 14.6, and 14.8)
- Directional derivatives and direction of maximum increase. (Sec 14.8)
- Lagrange multipliers with one constraint. (Sec 14.9)

3. Integral calculus of function of several variables.

- Double integrals and area and volume by double integration. (Sec 15.2 and 15.3)
- Polar coordinates. (Sec 10.2, 10.3, and 15.4)
- Triple integrals. (Sec 15.6)
- Cylindrical and spherical coordinates. (Sec 13.7 and 15.7)

4. Calculus with vector fields.

- Vector fields, divergence and curl. (Sec 16.1)
- Line integrals with respect to arc length. (Sec 12.2, 13.5, and 16.2)
- Line integrals of vector fields and work. (Sec 16.2)