

Study Sheet, Final

The test on Wednesday, August 2, 4:30-6:30 will cover Chapters 7 and 10-13.

Chapter 7: You should know the basic common integrals (antiderivatives), for example, the formulas 1-4, 6-12, and 16,17 in the Table of Integrals at the back of the book (p. 6). You should also know from previous calculus, or have picked it up from this semester, how to do integration by substitution. In Chapter 7 you should know how to do integration by parts (7.1), know how to integrate $\sin^2(x)$ and $\cos^2(x)$ (7.2) and trig integrals that can be done by simple substitution like $\int \sin^n(x) \cos(x) dx$ and $\int \frac{\sin(x)}{\cos(x)} dx$. No questions from 7.3 (trig substitution), know how to do partial fractions and integrate rational functions (7.4) and how to do improper integrals and apply the comparison test with the functions $\frac{1}{x^p}$ (7.8).

Chapter 10: You should know how to eliminate the parameter for simply defined parametric curves (10.1), find $\frac{dy}{dx}$ and use it to find the tangent line for parametric curves, find areas using the $\int y dx$ method, a compute arc length (10.2), convert between cartesian and polar coordinates and sketch the graph of simple polar curves (10.3), find areas in polar coordinates (10.4), know the standard equations for the conics and how to find vertices, foci, centers, for the conics (which often involves completing the square) (10.5).

Chapter 11: Know how to find limits of sequences (using limit laws (11.1), know how to recognize geometric series, when they converge, and the formula for their sum, know what happens to the sequence of terms and the sequence of partial sums when a series converges, the basic test for divergence (11.2), know how to apply the integral test to determine convergence or divergence of a series (11.3), know the p -series and when they converge and diverge and how to carry out the 2 comparison tests using them (11.4), know the alternating or 3-condition test and how to apply it (11.5), know the ratio test (11.6) and how to apply it to find the radius of convergence of a power series (11.8). Know how to do simple manipulations of power series to get new power series from known power series by substituting in an expression of x . Know how to do termwise differentiation or integration of power series of functions to find power series for their derivatives or integrals (11.9), know the formulas and how to compute the coefficients for the Maclaurin and Taylor series, how to find the first few terms of the Maclaurin or Taylor series for any function, how to stop or truncate to get the Taylor polynomial (11.10).

Chapter 12: Know the standard equation for the sphere and how to find it (12.1), how to add, subtract, scalar multiply, find the magnitude of vectors (12.2), know how to compute the dot product in two ways, how to use it to compute the angle between two vectors and to determine whether two vectors are perpendicular, and how to find the scalar projection, vector projection, and orthogonal projection of one vector on another (12.3). Know how to compute the cross product and how to use it to find areas of parallelograms and triangles (12.4). Know how to find the vector equations, parametric equations, and symmetric equations for a straight line, know the point-normal equation for a plane, and how to find an equation of the plane given 3 points in the plane (12.5). Know the standard equations for the ellipsoid, the elliptic paraboloid, and the hyperbolic paraboloid. (12.6).

Chapter 13 Given a space curve, know how to find the tangent vector and unit tangent vector at a point and how to find the vector or parametric equation of the tangent line (13.2). Know how to find its arc length (13.3). Know how to find the velocity vector (= the tangent vector), the speed, and the acceleration vector of a parametrized curve.