

Math 1B - Final Review Sheet

For the Final, you should know

- 1) How to Calculate and/or estimate the definite integral of a function from a graph.
- 2) How to evaluate a definite integral using the fundamental theorem of Calculus.
- 3) How to find the family of functions equivalent to an indefinite integral using the fundamental theorem of Calculus.
- 4) Know how to find the derivative a function expressed as an integral.

That is given $g(x) = \int_a^x f(t) dt$ find $\frac{dg}{dx}$

- 5) Know how to find anti-derivatives using the following methods:
 - A) Substitution rule including trigonometric substitution.
 - B) Integration by parts
 - C) Integration using partial fractions
 - D) Trigonometric integrals of the form $\int \sin^n(x) \cos^m(x) dx$ where n and m are natural numbers that can be odd or even.
- 6) Know how to approximate definite integrals using left rectangle, right rectangle, mid-point, trapezoidal rule and Simpson's rule.
- 7) Know how to evaluate improper integrals that are convergent.
- 8) Know how to use the comparison theorem to show that an improper integral converges or diverges.
- 9) Know how to find areas between curves.
- 10) Know how to find areas of functions described by parametric equations
- 11) Know how to find volumes using parallel cross sections.

- 12) Know how to find the arc length of a function given explicitly or by a parametric equation.
- 13) Know how to find the average value of a function.
- 14) Know how to find the centroid of a plate
- 15) Know how to find the area enclosed by a curve given with polar coordinates.
- 16) Know how to find the arc length of a curve given with polar coordinates.
- 17) Know how to interpret a direction field
- 18) Know how to use Euler's method for solving a differential equation numerically.
- 19) Know how to find the solution(s) for a linear differential equation with initial conditions.
- 20) Know how to find an implicit or explicit solution to a differential equation by separation of variables.
- 21) Know how to find the orthogonal trajectory of a family of curves.