

Math 130  
Spring 2003  
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(1)

## Review Sheet

Things to know:

Chapter 7: Techniques of integration  
integration by parts

trig integrals:  $\int \sin^m x \cos^n x \, dx$

$$\int \tan^m x \sec^n x \, dx$$

trig substitution

rational functions

improper integrals

Approximate integration

left-end right-end point rules

trapezoidal rule

mid point rule

Simpson's rule

Chapter 8: Applications

arc length:  $s = \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2} \, dx$

and  $s = \int_c^d \sqrt{1 + \left(\frac{dx}{dy}\right)^2} \cdot dy$

Surface area: Basic idea, but need not  
know formula

## Review Sheet (cont'd)

Chapter 10) Parametric equations and polar coordinates

$$\begin{cases} x = f(t) \\ y = g(t) \end{cases}$$

find tangents and areas, arc length

polar coordinates: graph polar curves  
find areas  
(NOT arc length)

Chapter 11: Inf sequences and series

Convergence/Divergence Tests

$n$ -th term test

integral test

comparison test

limit comparison test

ratio test

$n$ -th root test

alternating series test

conditional/absolute convergence

error estimates (integral test & alternating series test)

power series (interval of convergence)

expanding a given function in a  
Taylor / MacLaurin series

new series from old series  
(e.g. by differentiating & integrating)

Series to know:

geometric series

$e^x$

$\sin x$

$\cos x$

$\tan^{-1} x$