

MA-163 (W,07)
Instructions and a Short Table of Integrals for Test 2

Instructions for Test 2:

You may **not** use a calculator on this test except for Problem 1b and Problem 2. (Even for those, a calculator should not be necessary.) After you've done those two problems, put away your calculator. If you want to go back and revisit one of those problems, tell me before you get out your calculator again.

Do the problems on the paper provided, numbering the problems clearly. Be sure your name is on each paper. You **must** show your work in detail. Neatness, notation and logic all count in the grading. Do **not** try to cram all your work in a small space. You might want to use a different sheet of paper for each problem. (You'll have to rewrite the integral you're trying to find on your answer sheet.)

Note: If you find an integral in one problem, you may use that result in any subsequent problems without rederiving it. You may also use the integrals on the Short Table of Integrals I've provided.

Give exact values for definite integrals.

The point value for each problem is given next to the problem. The test has 165 possible points for the required problems plus up to 140 possible EXTRA CREDIT points. But remember -- it's better to be sure you've got the required problems right than to do some of the EC problems!

$\int u \, dv = uv - \int v \, du$	$\int \csc u \cot u \, du = -\csc u$
$\int e^u \, du = e^u$	$\int \csc^2 u \, du = -\cot u$
$\int \frac{du}{u} = \ln u $	$\int \cot u \, du = \ln \sin u $
$\int u^n \, du = \frac{1}{n+1} u^{n+1} \quad (n \neq -1)$	$\int \csc u \, du = \ln \csc u - \cot u $
$\int \cos u \, du = \sin u$	$\int \frac{du}{u^2 + a^2} = \frac{1}{a} \arctan \frac{u}{a}$
$\int \sin u \, du = -\cos u$	$\int \frac{du}{\sqrt{a^2 - u^2}} = \arcsin \frac{u}{a}$
$\int \sec^2 u \, du = \tan u$	$\int \frac{du}{u \sqrt{u^2 - a^2}} = \frac{1}{a} \operatorname{arcsec} \frac{u}{a}$
$\int \sec u \, du = \ln \sec u + \tan u $	$\int \sqrt{u^2 + a^2} \, du = \frac{u}{2} \sqrt{u^2 + a^2} + \frac{a^2}{2} \ln(u + \sqrt{u^2 + a^2})$
$\int \sec u \tan u \, du = \sec u$	$\int u \sqrt{u^2 + a^2} \, du = \frac{1}{3} (u^2 + a^2) \sqrt{u^2 + a^2}$
$\int \tan u \, du = \ln \sec u $	$\int u^2 \sqrt{u^2 + a^2} \, du = \frac{u}{8} (2u^2 + a^2) \sqrt{u^2 + a^2} - \frac{a^4}{8} \ln(u + \sqrt{u^2 + a^2})$
$\int \cos^2 u \, du = \frac{1}{2} (u + \sin u \cos u)$	