

MA-163 (W,07)
Information & Formulas
For Test 3

Read (and follow) these instructions!

GENERAL INSTRUCTIONS: Except where indicated, do the problems on the paper provided.

Use one sheet of paper for each problem.

Show your work neatly and logically for all problems. Your work will be graded.

For all applied problems, define variables, show any coordinate system you use, draw careful pictures, etc. Answer questions in sentences, including units of measurement. Use calculus on all problems.

If you can't find an antiderivative to evaluate a definite integral, you should use numerical integration to get an approximate result. If you do that, you must tell the value of n and the method your using.

Give all answers both exactly and approximately. (An "exact" answer usually involves π or e and/or radicals, fractions, etc. Simplify your exact answer as much as possible.)

Note: If you need help solving an equation, you may ask me after you've simplified the equation as much as you can. Possibly I'll help you for some points off. Also, **if you need a formula**, ask me and, if it's not too basic, I'll give it to you

Formulas:

$$\text{Arc Length: } \int_a^b \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx \text{ or } \int_c^d \sqrt{1 + \left(\frac{dx}{dy}\right)^2} dy$$

$$\text{Surface Area: } \int_a^b 2 y ds \text{ or } \int_c^d 2 x ds \text{ where } ds = \sqrt{1 + \left(\frac{dy}{dx}\right)^2} dx \text{ or } ds = \sqrt{1 + \left(\frac{dx}{dy}\right)^2} dy$$

$$\text{The y-value of the centroid of the lamina in Problem 3 is } \bar{y} = \frac{\frac{1}{2} \int_a^b ((f(x))^2 - (g(x))^2) dx}{\int_a^b (f(x) - g(x)) dx}.$$

The hydrostatic force on an object submerged in a liquid at a given depth is the product

("weight" density of the liquid)·(area of the object)·(depth)

The work done to move an object a particular distance is the product

(weight of the object)·(distance)

Integration formulas are on a separate page.