

Important: What is in the formula sheet and what is not

The formula sheet that is given out with the exam is the only formula sheet that you may use during the exam. You may not use any other notes. You may not use any books. You may not use any calculators. You may not use any electronic devices.

What is *not* in the formula sheet for the Midterm 1 exam:

(1) Straightforward facts from Calc I which you *must* know to do computations in Calc II: Derivatives and integrals of most standard functions, including trigonometric functions and their inverses, ln and exp. (But the antiderivative of sec is given because it is particularly unusual.)

(2) Formulas and procedures of Calc II that you have just learned, and which are being tested, such as integration by parts and partial fractions.

In Example 7 (page 436) of section 7.3, it is necessary to evaluate $\int \sec^3 x \, dx$. The textbook uses a reduction formula. If you have to evaluate $\int \sec^3 x \, dx$ during an exam, then you cannot do this. There are no reduction formulas on the formula sheet. During an exam, you would have to use integration by parts and the trigonometric identity $\sec^2 x - 1 = \tan^2 x$ (which does appear on the formula sheet in the form $1 + \tan^2 x = \sec^2 x$) to obtain

$$\begin{aligned}\int \sec^3 x \, dx &= \int \sec^2 x \sec x \, dx = \tan x \sec x - \int \tan x (\tan x \sec x) \, dx \\ &= \tan x \sec x - \int (\sec^2 x - 1) \sec x \, dx \\ &= \tan x \sec x - \int \sec^3 x \, dx + \int \sec x \, dx\end{aligned}$$

and you would rewrite the above as

$$2 \int \sec^3 x \, dx = \tan x \sec x + \int \sec x \, dx,$$

which would give you

$$\begin{aligned}\int \sec^3 x \, dx &= (1/2) \tan x \sec x + (1/2) \int \sec x \, dx \\ &= (1/2) \tan x \sec x + (1/2) \ln |\tan x + \sec x| + C.\end{aligned}$$

In Example 8 (page 437) of section 7.3, it is necessary to evaluate an integral of the type $\int \sin(ax) \cos(bx) \, dx$. The textbook simply copies from a table of integrals. If you have an integral of this type on an exam, then you cannot do this. We give you very few integrals on the formula sheet. This is why the formula sheet includes an identity for $\sin A \cos B$. During an exam, you would write

$$\begin{aligned}\int \sin(ax) \cos(bx) \, dx &= \frac{1}{2} \int \sin((a-b)x) \, dx + \frac{1}{2} \int \sin((a+b)x) \, dx \\ &= -\frac{1}{2} \frac{\cos((a-b)x)}{a-b} - \frac{1}{2} \frac{\cos((a+b)x)}{a+b} + C.\end{aligned}$$

Homework exercises of this type (Example 8) should be done this way, using the relevant formulas on the formula sheet. There are three formulas of this nature on the formula sheet.