MAC 2312 Calculus 2 **Sample Test 1** 1 Feb 2001

Show **ALL** work for credit; be neat; and use only **ONE** side of each page of paper. Do **NOT** write on this page. Calculators can be used for graphing and calculating only. Give exact answers when possible.

Helpful facts:

$$\frac{cx+d}{(x-a)(x-b)} = \frac{1}{a-b}\left(\frac{d+ca}{x-a} - \frac{d+cb}{x-b}\right)$$

$$\cos(ax)\sin(bx) = \frac{1}{2}\left(\sin((a+b)x) - \sin((a-b)x)\right)$$

$$\sin(ax)\sin(bx) = \frac{1}{2}\left(-\cos((a+b)x) + \cos((a-b)x)\right)$$

$$\cos(ax)\cos(bx) = \frac{1}{2}\left(\cos((a+b)x) + \cos((a-b)x)\right)$$

$$\int \frac{dx}{a^2+x^2} = \frac{1}{a}\arctan\frac{x}{a} + C \qquad \int \frac{dx}{\sqrt{a^2-x^2}} = \arcsin\frac{x}{a} + C$$

$$\int e^{ax}\sin(bx)\ dx = \frac{1}{a^2+b^2}\left(ae^{ax}\sin(bx) - be^{ax}\cos(bx)\right) + C$$

$$\int e^{ax}\cos(bx)\ dx = \frac{1}{a^2+b^2}\left(ae^{ax}\cos(bx) + be^{ax}\sin(bx)\right) + C$$

$$\sin^2 x = \frac{1}{2}\left(1-\cos 2x\right) \qquad \cos^2 x = \frac{1}{2}\left(1+\cos 2x\right)$$

Roughly 4 – 5 problems like those from pages 373–374 of the text. For example 14, 15, 33, 45, 48, 69, 76, 85 provide a range of techniques.

A Problem or two from the review section, pages 369 – 371 of the text. For example, I could collect 30 – 33 into one problem, but I would add one so it would have 5 parts. (Easier to grade as all problems are worth the same 10 points.)

A problem or two from the homework.

Similar problems. I've been known to take examples from the book or to rephrase a problem even to turning it on its head.

A problem or part of a problem that requires a calculator to compute an integral approximation like simpson's rule.

A Maple syntax problem, find the errors in an input statement.

Problems that are really Calculus I problems, but require the integration techniques of this chapter. Like find $F(x)$ such that $F(2) = 3$ and $F'(x) = x\sin x$. Or find the area under the curve of $f(x) = 1/x^3$ from $x = a$ to $x = \infty$.

Some problems will be wordy and/or pictorial.