

# MATH 2260

Midterm Exam III (makeup)

December 3, 2008

**NAME (please print legibly):** \_\_\_\_\_

**Your University ID Number:** \_\_\_\_\_

Please complete all questions in the space provided. Draw a box around your final answer. You may use the backs of the pages for extra space, or ask me for more paper if needed. Work carefully, and neatly (part of your grade will be based on how well your work is presented).

Try to complete the problems you find easier before going back to the harder ones. Good luck!

QUESTION	VALUE	SCORE
1	10	
2	10	
3	20	
4	10	
5	10	
<b>TOTAL</b>	<b>60</b>	

**1. (10 points)** Obtain the Maclaurin series for  $1/(1+x)^2$  from the Maclaurin series for  $-1/(1+x)$ .

**2. (10 points)** Find the first three terms in the Taylor series for  $\ln \sec x$  at  $a = 0$ . Hint: Can you find the first three terms for the Taylor series for  $\tan x$  at 0?

**3. (20 points)** Integrate

$$\int_0^1 \frac{\sin x}{x} dx.$$

to three decimal digits of accuracy using Taylor series. Be sure to explain why your answer has this much accuracy by estimating the error in your approximation to the integral.

**4. (10 points)** The function  $\sinh(x)$  is given by

$$\sinh x = \int_0^x \frac{1}{\sqrt{1+t^2}} dt.$$

Find the first three terms of a Taylor series for  $\sinh x$  from this expression.

**5. (10 points)** Find the first four terms of the Taylor series for  $e^{\sin x}$  by substituting the series for  $\sin x$  into the series for  $e^x$ .