Math 128
Midterm Examination 2 – October 21, 2008

Name _____

6 problems, 100 points.

Instructions: Show all work – partial credit will be given, and "Answers without work are worth credit without points." You don't have to simplify your answers. You may use a simple calculator that is not graphing or programmable. You may have a 3x5 card, but no other notes.

1. (9 points each) Evaluate the following:

   (a) $\int x \cos 3x \, dx$

   (b) $\int_1^e \frac{\ln x}{x} \, dx$

(c) $\displaystyle\int_1^{\infty} \frac{x}{(x^2+3)^5}\,dx$

2. Consider the function $f(x) = \cos x^2$.

(a) (4 points) Calculate M_3 for the integral $\displaystyle\int_{-2}^{1} \cos x^2\,dx$.

(b) (8 points) Find an upper bound A for $|f''(x)| = \left|\dfrac{d^2}{dx^2}\cos x^2\right|$ on the interval $[-2, 1]$.

(c) (4 points) Using your result from part (b), find an n so that the midpoint rule approximation M_n is accurate to 0.0025 for the integral $\displaystyle\int_{-2}^{1} \cos x^2\, dx$.