

Math 1B Midterm 1 2011 Feb 17 2:00pm-3:30pm

You are allowed 1 sheet of notes. Calculators are not allowed. Each question is worth 3 marks, which will only be given for correct working and a clear and correct answer in simplified form. Write the final answer to each question on the cover-sheet, and attach the cover-sheet to your bluebook.

1. Evaluate the integral $\int_1^2 x^3(\ln x)^2 dx$.
2. Evaluate the integral $\int_0^{2\pi} \cos(3x) \sin(7x) dx$.
3. Evaluate the indefinite integral $\int \frac{1}{\sqrt{1+4t^2}} dt$.
4. Evaluate the indefinite integral $\int \frac{1}{(x+1)(x+2)} dx$.
5. Use Simpson's rule with 3 points to approximate the integral $\int_0^2 \frac{1}{2^x+1} dx$.
6. Find the value of the constant C for which the integral

$$\int_0^{\infty} \left(\frac{x}{x^2+1} - \frac{C}{x+1} \right) dx$$

converges, and evaluate the integral for this value of C .

7. Sketch the curve given by $y = 2 \cos(t)$, $x = 2t + 2 \sin(t)$ for $-\pi \leq t \leq \pi$ and find its length.
8. Find the area of the surface obtained by rotating the curve $y = 2 \cosh(x/2)$ for $0 \leq x \leq 2$ around the x -axis.