Math 31B
Integration and Infinite Series

Midterm 1

Instructions: You have 50 minutes to complete this exam. There are 8 questions, worth a total of 10 points. This test is closed book and closed notes. No calculator is allowed. Please write your solutions on the scantron. Do not forget to write your name, section, and UID in the space below, as well as in your scantron.

Name: _____

ID number: _____

Section: _____

Question	Points	Score
1	1	
2	1	
3	1	
4	2	
5	1	
6	1	
7	2	
8	1	
Total:	10	

Problem 1. *1pts.*

Find the derivative of $f(x) = \frac{e^{x^2}}{x}$ at $x = 1$.

(a) $\boxed{e}$

(b) $2e$

(c) $\frac{e}{2}$

(d) e^2

Problem 2. *1pts.*

Find the inverse of $f(x) = \frac{1}{7x-3}$ at $x = 1$.

(a) $\frac{1}{7}$

(b) $\frac{2}{7}$

(c) $\frac{3}{7}$

(d) $\boxed{\frac{4}{7}}$

Problem 3. *1pts.*

Find the derivative of $f(x) = x^{3x}$ at $x = \frac{1}{3}$.

(a) $1 + \ln(3)$

(b) $\boxed{1 - \ln(3)}$

(c) $3 + 3\ln(3)$

(d) $3 - 3\ln(3)$

Problem 4. *2pts.*

Find the limit of $f(x) = \sec(x) - \tan(x)$ at $x = \frac{\pi}{2}$.

(a) 1

(b) $\boxed{0}$

(c) $+\infty$

(d) $-\infty$

Problem 5. *1pts.*
Find the integral of $f(x) = \frac{1}{\sqrt{1-16x^2}}$ between 0 and $\frac{1}{4}$.

(a) π

(b) $\frac{\pi}{2}$

(c) $\frac{\pi}{4}$

(d) $\boxed{\frac{\pi}{8}}$

Problem 6. *1pts.*

Find the integral of $f(x) = e^{-x} \sinh(x)$ between 0 and $\frac{1}{2}$.

(a) $\boxed{\frac{1}{4e}}$

(b) $\frac{1}{4\cosh(1)}$

(c) $\frac{1}{4\sinh(1)}$

(d) $\frac{1}{4\tanh(1)}$

Problem 7. *2pts.*

Find the integral of $f(x) = x \ln(x)$ between 1 and 2.

(a) $\ln(2) + \frac{3}{4}$

(b) $\ln(4) + \frac{3}{4}$

(c) $\ln(2) - \frac{3}{4}$

(d) $\boxed{\ln(4) - \frac{3}{4}}$

Problem 8. *1pts.*

Find the integral of $f(x) = \frac{3x^2 - 4x + 5}{x^3 - x^2 + x - 1}$ between 2 and 3.

(a) $\boxed{\frac{1}{2}\left(\ln(32) + 6\arctan(2) - 6\arctan(3)\right)}$

(b) $\frac{1}{2}\left(\ln(32) + 6\arctan(3) - 6\arctan(2)\right)$

(c) $\frac{1}{2}\left(\ln(16) + 6\arctan(2) - 6\arctan(3)\right)$

(d) $\frac{1}{2}\left(\ln(16) + 6\arctan(3) - 6\arctan(2)\right)$