Math 31B
Integration and Infinite Series

Midterm 2

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	2	
2	1	
3	1	
4	1	
5	1	
6	1	
7	1	
8	2	
Total:	10	

Problem 1. *2pts.*

Determine whether $\int_0^{\pi/2} \sec(\theta)d\theta$ converges and, if so, evaluate it.

(a) $\boxed{\text{It does not converge.}}$

(b) It converges but it cannot be evaluated.

(c) $\frac{1}{2}$

(d) 1

Problem 2. *1pts.*

Determine whether $\int_0^\pi \frac{dx}{x^2-5x+6}$ converges and, if so, evaluate it.

(a) $\boxed{\text{It does not converge.}}$

(b) It converges but it cannot be evaluated.

(c) $\ln(1)$

(d) $\ln(2)$

Problem 3. *1pts.*

Compute the arc length of $y = \frac{x^2}{4} - \frac{\ln(x)}{2}$ in $[1, 2e]$.

(a) It is not finite.

(b) It is finite but it cannot be evaluated.

(c) $\boxed{e^2 + \frac{\ln(2)}{2} + \frac{1}{4}}$

(d) $e^2 + \frac{\ln(2e)}{2}$

Problem 4. *1pts.*

Compute the surface area of revolution about the x-axis of $y = (4 - x^{2/3})^{3/2}$ in $[0, 8]$.

(a) It is not finite.

(b) It is finite but it cannot be evaluated.

(c) $\boxed{\dfrac{384}{5}\pi}$

(d) $\dfrac{12}{5}\pi$

Problem 5. *1pts.*
For $f(x) = \frac{\ln(x)}{x}$, calculate the Taylor polynomial $T_3(x)$ centered at $a = 1$ and evaluate it at $x = \frac{1}{2}$.

(a) $\boxed{-\frac{53}{48}}$

(b) $\frac{53}{48}$

(c) $-\frac{48}{53}$

(d) $\frac{48}{53}$

Problem 6. *1pts.*

Find the maximum possible size of the error between $f(x) = \cos(x)$ and $T_5(x)$ around $a = 0$ when evaluated at $x = 0.25$.

(a) $\frac{1}{1474560}$

(b) $\frac{1}{4096}$

(c) $\boxed{\frac{1}{2949120}}$

(d) $\frac{1}{737280}$

Problem 7. *1pts.*

Compute the limit of the sequence with general term $a_n = (2^n + 3^n)^{1/n}$.

(a) 2

(b) $\boxed{3}$

(c) $\frac{2}{3}$

(d) $\frac{3}{2}$

Problem 8. *2pts.*

Compute the limit of the recursive sequence given by $a_1 = \sqrt{3}$ and $a_{n+1} = \sqrt{3a_n}$.

(a) $\boxed{3}$

(b) 0

(c) The sequence does not converge.

(d) The sequence converges but the limit cannot be found.