Study Guide 2

MATH 172 Lab: Sections 7 and 8

Lab Instructor (TA): Mohammed Kaabar

Student's Name:---

Student's ID:--------------------------

Note: *This study guide contains my practice questions that I think will be useful for preparing you for the second exam in Calculus II.*

Question 1: Evaluate the integral: $\int \cos(\sqrt[3]{x})\, dx$.

Question 2: Evaluate the integral: $\int \sqrt{\sin(x)} \cos^5(x)\, dx$.

Question 3: Evaluate the integral: $\int \sqrt[3]{\tan(x)} \sec^6(x)\, dx$.

Question 4: Evaluate the integral using trigonometric substitution: $\int \frac{1}{x^2\sqrt{4-x^2}}\,dx$.
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Question 5: Evaluate the integral: $\int \frac{4x}{(x^2-1)(x^2+1)}\,dx$.

Question 6: Solve the following differential equation:

$$\frac{dy}{dx} = \frac{(2x+y)^2 - 1}{(2x+y)+4} - 2$$

(There is no need to write your solution as $y(x)$ in this problem)

Question 7: Evaluate the integral: $\int \frac{\ln(x+1)}{x^3} dx$.

Question 8: Use the definition of improper integrals to evaluate the following integral: $\int_0^1 x ln(x) dx$.

Question 9: Use the definition of improper integrals to evaluate the following integral: $\int_0^1 \frac{1}{\sqrt{1-x}} dx$.

Question 10: Evaluate the integral: $\int \frac{x^3}{x^2+1}\,dx$.
(**Hint:** Use long division)

Question 11: Evaluate the integral: $\int \sec^3(x)\,dx$.

Question 12: Find the expression for the nth term for each of the following sequences, and then determine whether it is convergent or divergent:

Part a: $\left\{2, \frac{3}{\sqrt{2}}, \frac{4}{\sqrt{3}}, \ldots\right\}$

Part b: $\left\{1, \frac{1}{8}, \frac{1}{27}, \frac{1}{64}, \ldots\right\}$

Question 13: Determine whether the following sequences are convergent or not:

Part a: $\left\{\frac{ln(n)}{\mathrm{n}^2}\right\}_1^\infty$

(**Hint:** Use L'Hôpital's rule)

Part b: $\left\{e^{\sin\left(\frac{1}{n}\right)}\right\}_1^\infty$

Part c: $\left\{\frac{\sin(n)}{n^2}\right\}_1^\infty$

(**Hint:** Use sandwich theorem)

Question 14: Show the geometric series theorem.

Good Luck in Exam 2

Best of Luck

Mohammed K A Kaabar