

University of Nevada, Reno — MATH182 (Calculus 2)
Final Exam Sample test. Spring 2019

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Name: _____

To receive full credit for a problem you must show all necessary work.

1. Compute the definite integral $\int_e^{e^2} \frac{1}{x(\ln x)^3} dx$

Solution: See Question 2. in Midterm 1 Sample test.

2. Compute the integral $\int x \cos 2x dx$

Solution: See Example 2. in §7.1.

3. Let S be a solid obtained by rotating about the y -axis the region bounded by $y = x^4$ and $y = 4$. Find the volume of S .

Solution: See Question 6. in Midterm 1 Sample test.

4. Evaluate the integral $\int \frac{1}{x^2\sqrt{x^2+9}} dx$

Solution: See Example 4 in §7.3.

5. Evaluate the integral $\int \sec^6 x \, dx$

Solution: See Question 2. in Quiz 10.

6. Evaluate the integral $\int \frac{x^3 + x^2 - 3x}{x - 1} \, dx$

Solution: See Example (3). in §7.4.

7. Use the arc length formula to find the length of the curve $y = 2x^{3/2} - 3$, for $1 \leq x \leq 4$.

Solution: See Example 2. in §8.1.

8. Calculate the center of mass (centroid) of a lamina with density $\rho = 3$ and shape R bounded by $y = x$, $y = -x$, $x = 2$.

Solution: See Example 5. in §8.3

9. Solve $\frac{dy}{dx} = 4x^3y$ with the initial condition $y(0) = 3$.

Solution: See Example 4. in §9.3

10. (**Solution:** See Example 6. in §9.1)

(1) For what values of r does the function $y = e^{x^r}$ a solution for $y' = 3x^2y$?

(2) Find a solution of differential equation $y' = 3x^2y$ with initial condition $y(0) = 2$.

11. Determine whether the series $\sum_{n=0}^{\infty} \frac{10^n}{n!}$ converges.

Solution: See Question 4. in Midterm 2 Review.

12. Find the radius of convergence and interval of convergence of the series $\sum_{n=0}^{\infty} \frac{x^n}{n2^n}$.

Solution: See Question 5. in Midterm 2 Review.

13. (Multi-choice) [Solutions: Midterm 3 Review. Question 8] Determine whether the series is convergent or divergent.

(1.) $\sum_{n=1}^{\infty} \frac{\sin n}{n^2}$ (A) absolutely convergent. (B) conditionally convergent. (C) divergent.

(2.) $\sum_{n=1}^{\infty} \frac{1000}{\sqrt{n^2+1}}$
(A) absolutely convergent. (B) conditionally convergent. (C) divergent.

(3.) $\sum_{n=1}^{\infty} (-1)^n \frac{1000}{\sqrt{n^2+1}}$
(A) absolutely convergent. (B) conditionally convergent. (C) divergent.

(4.) $\sum_{n=1}^{\infty} (-1)^n \cos\left(\frac{1}{n^2}\right)$
(A) absolutely convergent. (B) conditionally convergent. (C) divergent.

14. (Multi-choice) (Example 4 in §9.1)

Which of the following functions are solutions of the differential equation $y'' = -9y$?

(A) $2 \sin 3x$ (B) e^{3x} (C) e^{-3x} (D) $3 \cos 3x - \sin 3x$ (E) $3 \sin(x)$ (F) $2 + \sin(3x)$