

First Name: Last Name: ID:

Practice Final Exam (Math 19B, Fall 2019)

Time: 3 hours.

No calculators, cellphones, notes or other tools allowed.

Maximal score: 60 points (Each problem 3 points)

1. Compute $\int (6e^t - \sec^2(t))dt$.
2. Calculate the function $\int_x^{\pi/2} 3 \sin(t)dt$ of x .
3. Compute $\int_2^3 \frac{dx}{2x \ln(x)}$.
4. Compute $\int_0^8 \frac{dx}{4x^2+16}$.
5. Compute the area of the region inclosed by the curves $y = x$ and $y = x^3$.
6. Compute the volume of the solid obtained by rotating the region inclosed by the curves $y = x^2 - 4$ and $y = -x^2 + 4$ about the line $x = 5$.
7. Compute $\int x \cos(x)dx$.
8. Evaluate the integral $\int \frac{dx}{\sqrt{x^2+2x}}$.
9. Evaluate the integral $\int \frac{9x-x^2+8}{(x-1)(x+1)^2} dx$.
10. First make a substitution then use integration by parts to compute $\int_1^4 9e^{\sqrt{x}} dx$.
11. Determine the value of the improper integral $\int_1^{\infty} \frac{dx}{x^2}$.
12. Compute the length of $y = \frac{x^2}{4} - \frac{\ln(x)}{2}$ over $[1, 2e]$.
13. Compute the surface area of revolution of $y = 2x + 1$ about the x -axis over $[1, 3]$.
14. Determine $\lim_{n \rightarrow \infty} \ln\left(\frac{2n^2+3}{n^2+5}\right)$.
15. Determine $\frac{2^3}{5} + \frac{2^4}{5^2} + \frac{2^5}{5^3} + \dots$.
16. Does $\sum_{n=1}^{\infty} \frac{1}{n+2019}$ converge?
17. Does $\sum_{n=1}^{\infty} \frac{(-1)^n}{n}$ converge?
18. Does $\sum_{n=1}^{\infty} \frac{7^n+8^n}{9^n}$ converge?
19. Find the interval of convergence of the power series $\sum_{n=0}^{\infty} \frac{x^n}{(n!)^2}$.
20. What is the MacLaurin series of $\sin(2x)$?