

# Math 172-01

## Final Exam Information

Your final exam will consist of a 50-point take-home portion and a 100-point in-class portion. The take-home portion is due Thursday, December 15, at 1:00pm. The in-class portion is scheduled for Monday, December 12, 10am–11:50am, in Room 4270. Special office hours during finals week:

- Monday, December 12: 12:00pm–1:00pm
- Tuesday, December 13: 10:00am–12:00pm
- Wednesday, December 14: 12:00pm–1:00pm
- Thursday, December 15: 12:00pm–1:00pm

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## Skills Checklist for Final Exam

1. Set up and evaluate the definite integral that gives the length of the curve described by the equation  $y = f(x)$  for  $a \leq x \leq b$ .
2. Set up and evaluate definite integrals that give volumes of solids of revolution.
3. Find the center of mass of a thin plate covering a region in the  $xy$ -plane.
4. Understand the relationship between a function and its inverse:

$$y = f(x) \text{ iff } f^{-1}(y) = x.$$

Be able to use this to evaluate the inverse function.

5. Evaluate the derivative of the inverse function:  $(f^{-1})'(a) = 1/f'(f^{-1}(a))$ .
6. Use the horizontal line test and other techniques to determine whether a function has an inverse. Carry out the steps to find the inverse of  $f$ .
7. Be able to evaluate derivatives and integrals involving the transcendental functions.
8. Evaluate limits involving indeterminate forms.
9. Apply L'Hôpital's rule to evaluate certain indeterminate forms.
10. Use basic trig identities and algebraic techniques (long division, separating integrands, simplifying, etc.) to evaluate integrals.
11. Apply integration-by-parts.
12. Evaluate trigonometric integrals.
13. Use trigonometric substitution to evaluate integrals.
14. Find the partial fraction decomposition of a rational function and use it to integrate the function.

15. Write improper integrals as limits and evaluate.
16. Determine limits of sequences.
17. Apply the basic convergence tests to determine whether a series converges or diverges.
18. Find the sum of a geometric or telescoping series.
19. Approximate the sum of an alternating series and find an error bound.
20. Determine the radius and interval of convergence of a power series. Remember to check interval endpoints.
21. Determine Taylor and Maclaurin polynomials.
22. Determine Taylor and Maclaurin series.