Math 157-01
Final Exam Information

The final exam is scheduled for Wednesday, December 11, 10am–11:50am, in Room 4270. Special office hours during finals week:

- Monday, December 9: 9:00am – 10:00am
- Tuesday, December 10: 9:00am – 10:00am
- Wednesday, December 11: 9:00am – 10:00am

Skills Checklist

1. Find the equation of a line (especially a tangent line).
2. Compute limits by substitution. For example, $\lim_{x\to 3}(x^2 - 5x + 1)$.
3. Know what to do with limits of the form $\frac{0}{0}$. For example, $\lim_{x\to 1}\frac{x^2-1}{x-1}$
4. Compute one-sided limits.
5. Find out if an infinite limit is $+\infty$ or $-\infty$.
6. Test for continuity (especially in piecewise defined functions).
7. Compute a derivative from the definition. $f'(x) = \lim_{\Delta x\to 0}\frac{f(x+\Delta x)-f(x)}{\Delta x}$
8. Apply standard differentiation rules, including the chain rule for compositions of functions.
9. Solve problems involving position, velocity, and acceleration. Know the difference between average velocity and instantaneous velocity.
10. Solve problems involving marginal revenues, marginal costs, and marginal profits.
11. Compute higher-order derivatives.
12. Compute derivatives of implicitly defined functions.
13. Set up and work out a straight forward related rate problem.
14. Find the absolute extrema of continuous functions on closed and bounded intervals.
15. Apply the first derivative test to determine intervals on which a function is increasing/decreasing.
16. Apply the second derivative test to determine intervals on which a function's graph is concave up/down.
17. Set up and work out a straight forward optimization problem.
18. Compute differentials. $dy = f'(x)dx$

19. Use differentials to approximate change. $\Delta y \approx f'(x)\,\Delta x$

20. Understand the relationship between the exponential and logarithmic functions (i.e. they are inverses).

21. Use the exponent laws, logarithm laws, and change-of-base formulas to rewrite expressions involving exponential and logarithmic functions.

22. Solve exponential and logarithmic equations.

23. Evaluate derivatives of exponential and logarithmic functions.

24. Solve problems involving exponential growth and decay.

25. Apply standard antidifferentiation rules to evaluate indefinite integrals. Do not forget to include $+C$ with your antiderivatives.

26. Understand the relationship between $\int_a^b f(x)dx$ and the area of the region under the graph of f.

27. Compute the average value of a function. Avg Value $= \frac{1}{b-a}\int_a^b f(x)dx$

28. Know and use the basic properties of definite and indefinite integrals.

29. Use the Fundamental Theorem of Calculus to compute $\int_a^b f(x)dx$.

30. Use substitution to evaluate definite and indefinite integrals.

31. Find the area between two curves.

32. Use integration by parts to evaluate indefinite integrals.