

Calculus 1 — Outline for Exam 2

Main ideas

- A. Derivative rules including product, quotient, and chain (composition)
- B. Derivative formulas for power, trigonometric, inverse trig., exponential, and logarithmic functions:

$$x^n, e^x, a^x, \ln x, \log_a x, \sin(x), \cos(x), \tan(x), \sec(x), \sin^{-1}(x), \tan^{-1}(x)$$

- C. Implicit differentiation
- D. Logarithmic differentiation
- E. Interpreting derivatives: tangent lines, velocity, and acceleration.
- F. Applications of differentiation to *related rates*

Skills you should have

1. Be able to compute derivatives using the various derivative rules and formulas
2. Be able to compute derivatives of implicitly defined functions, e.g. $\sin(xy) = x^2 + e^y$
3. Be able to compute derivatives of functions using logarithmic differentiation, e.g. $y = x^{\sin x}$
4. Be able to compute tangent lines
5. Be able to answer questions about velocity and acceleration given a position function
6. Be able to solve related rates problems
 - (a) Pay close attention to what is constant with respect to time and what is not
 - (b) Make sure to practice finding relating equations, e.g. Pythagorean Theorem, similar triangles, area formulas, trig. formulas, etc. (I will give you volume formulas if you need them.)

How to study

- I. Review core topics
- II. Work *lots* of problems all of the way through—focus on WebAssign problems and Group Work problems
- III. Practice doing several problems in a short amount of time (by timing yourself)
- IV. Come talk with me if you have any questions