

# Calculus 1 — Outline for Exam 2

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## Main ideas

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

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

- D. Implicit differentiation
- E. Logarithmic differentiation
- F. Interpreting derivatives: tangent lines, velocity, and acceleration.

## Skills you should have

1. Be able to compute the derivative using the definition of the derivative; that is, using  $\lim_{h \rightarrow 0} \frac{f(x+h) - f(x)}{h}$  instead of the derivative rules
2. Be able to compute derivatives using the various derivative rules and formulas
3. Be able to compute derivatives of implicitly defined functions, e.g.  $\sin(xy) = x^2 + e^y$
4. Be able to compute derivatives of functions using logarithmic differentiation, e.g.  $y = x^{\sin x}$
5. Be able to use the graph of  $f(x)$  to estimate and sketch  $f'(x)$  (using slopes)
6. Be able to compute tangent lines
7. Be able to answer questions about velocity and acceleration given a position function

## How to study

- I. Review core topics
- II. Work *lots* of problems all of the way through—focus on WebAssign problems and Worksheet 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