

Lecture on Jul. 3rd, 2017: Review for Calculus 1

1 Limits

- Definitions of left limit, right limit, and limit.
- Definition of continuity.
- L'Hopital's Rule.

2 Derivatives

- Definition of derivative.
- Interpretations of derivative.
 - Slope of the tangent line.
 - Instantaneous rate of change.
 - velocity, if for $f(x)$, x is time and $f(x)$ is position.
- Formulas and properties of derivative.
 - Derivative of constant function.
 - Power Rule.
 - Derivative of sums, products and quotients.
 - Chain Rule.
 - Derivatives of exponential and logarithmic functions.
 - Velocity, if for $f(x)$, x is time and $f(x)$ is position.
- First derivative and monotone property of functions.
- Second derivative and concavity of functions.
- Local extrema.

3 Integrals

- Definition of antiderivative.
- Definition of indefinite integral.
- Formulas and Properties of indefinite integral.

- Integral of power functions, x^{-1} , and exponential functions.
 - Linear property, integral of sums.
- Definition of differentials.
- Definition of Riemann sum.
- Definition of definite integral.
- Properties of definite integral.
- Fundamental Theorem of Calculus.
- Integral by parts.