

Math 15200/14 lectures outline

I will update this document after every lecture to keep track of what we covered, and to indicate what I plan to cover in the next lecture.

WEEK 1

10/1/19. Sections 2.1, 2.2

- intuitive definition of limit
- rigorous (ϵ, δ) -definition of limit

10/3/19. Sections 2.2

- rigorous (ϵ, δ) -definition of limit
- some examples to show when $\lim_{x \rightarrow c} f(x) = L$ and when $\lim_{x \rightarrow c} f(x) \neq L$
- one-sided limits

WEEK 2

10/8/19. Sections 2.4–2.6, 3.1–3.5

- continuity
- intermediate value theorem, extreme value theorem
- derivative
- sum rule, product rule, chain rule

10/10/19. Sections 4.1, 5.1–5.2

- mean value theorem
- definite integrals, Riemann sums

WEEK 3

10/15/19. Sections 5.3–5.6

- fundamental theorem of calculus
- area between curves
- indefinite integrals

10/17/19. Sections 5.6–5.8

- indefinite integrals
- u -substitution
- more properties of definite integral

WEEK 4

10/22/19. Midterm 1

10/24/19. Sections 5.8–5.9, 6.1

- more properties of definite integral
- average of a function, mean value theorem for integrals
- other ways to interpret the definite integral

WEEK 5

10/29/19. Sections 6.1–6.3

- examples: area/volume of pyramid, square, circle, sphere

10/31/19. Sections 6.2–6.3, 7.1

- disk/washer method
- shell method
- inverse functions

WEEK 6

11/5/19. Sections 7.1–7.2

- inverse functions
- basic properties of the logarithm function

11/7/19. Sections 7.2–7.3

- the natural logarithm

WEEK 7

11/12/19. Midterm 2

11/14/19. Sections 7.3–7.5

- integrals of $\tan x$, $\cot x$, $\sec x$, $\csc x$
- the natural logarithm and exponential function
- other bases: $\log_p x$ and p^x

WEEK 8

11/19/19. Sections 7.6, 7.7

- exponential growth/decay
- inverse trig functions
- derivatives of arcsin and arctan

11/21/19. Sections 8.2, 8.3

- integration by parts
- Pythagorean trig identities

WEEK 9

11/26/19 (**planned**). Sections 8.3, 8.4

- Integrating products of trigonometric functions
- Integration via trigonometric substitution

WEEK 10

12/3/19 (**planned**). Sections ??

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