

Math 4200
Friday 9/30

(1)

Exam Monday!

You are responsible for key definitions & theorems;

you may be asked about these explicitly or implicitly.

HW problems & Chapter review problems (Chptr 1 all, Chptr 2 12, 3, 4, 5, 9, 13, 14, 15, 17, 19, 21) are good to understand.

Chptr 1

complex numbers

$+$, $\cdot$, $-$, $| \cdot |$

polar form

De Moivre & Euler

finding roots

elementary fns

e^z , z^n

$\cos z$, $\sin z$, $\cosh z$, ...

$\log z$

complex differentiable

def

real interpretation

affine approximations

CR

differentiation rules

standard ones

chain rules (2!)

conformal

Inverse Fcn Thm

branches of multivalued fns.

Chptr 2

contour integrals

def

real form

properties,

$\gamma_1 + \gamma_2$, $-\gamma$

estimates (Δ ineq stuff)

FTC

path independence

homotopy

simply connected

convex, star-shaped

"rectangle thm"

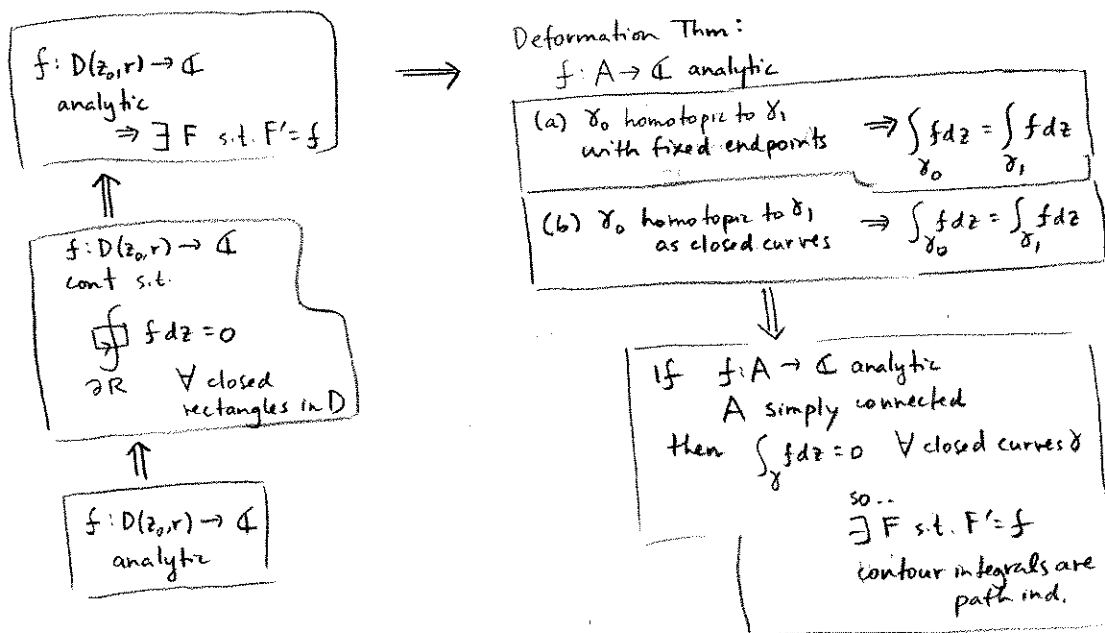
deformation thm

antiderivs in simply connected domains

$\text{complex diffble} \iff \text{complex affine approx} \iff \text{real affine approx} \iff C^1 \text{ with rot-dil deriv matrix}$
 $\Downarrow$ "rotation-dilation" deriv matrix

A open, connected, $f: A \rightarrow \mathbb{C}$

$\exists F \text{ s.t. } F' = f \iff \text{contour integrals are path ind.} \iff \text{contour integrals over closed curves are zero}$



In §2.2 we proved weaker forms of Def Thm's (a), (b), using Green's Thm:

If $\gamma = \partial A$ is the oriented boundary of a region, and if $f: A \rightarrow \mathbb{C}$ is analytic and C^1 on $\partial(A)$, then

$$\int_{\gamma} f(z) dz = 0$$

can you explain each arrow?
(and box)