Staple!

Ord: ___ ___

Plex
MAA4402 2838

More-Prac-B

Prof. JLF King
Wedn, 08Mar2023

NB. For short-answer:Write **DNE** if the object does not exist or the operation cannot be performed. NB: **DNE** $\neq \{\} \neq 0$.

Let **holom** abbreviate "holomorphic", and **harm.fnc** abbreviate "harmonic function". Use PS=Power Series, RoC=Radius-of-Convergence, and MacSe for "Maclaurin series"; a PS centered at 0. [Below, ITOf means "In Terms Of".]

B1: Short answer. Show no work.

___ a The IOP (Individual Optional Project) must be carefully TYPESET. It is due by 2PM on Thursday, 27Apr2023, slid *completely* under my office door, Little Hall 402 (northeast corner of top floor) Circle: Yes Cool! Thanks

___ b Subset $K \subset \mathbb{C}$ is ***compact*** if:

___ c On a subset $G \subset \mathbb{C}$, consider two cts parametrizations $\gamma,\sigma:[0,1]\to G$ which are loops; $\gamma(0)=\gamma(1)$ and $\sigma(0)=\sigma(1)$. A "***homotopy*** *in* G *from* γ *to* σ" is

___ d Write cos(-2**i**), which is real,
ITOf exp() and *finite*
add/sub/mul/div: cos(-2**i**)=

And cos(-2**i**) lies in circle the correct interval

$(-\infty,\frac{-1}{5}]$ $(\frac{-1}{5},\frac{1}{5}]$ $(\frac{1}{5},2]$ $(2,5]$ $(5,15]$ $(15,45]$ $(45,\infty)$

___ e Compute $\displaystyle\int_0^{2\pi} \frac{1}{\cos(\theta)+6}\,d\theta =$

[*Hint:* CoV $z=e^{i\theta}$.]

OYOP: *In grammatical English* ***sentences****, write your essay on every* 2^{nd} *line* (usually)*, so I can easily write between the lines.*

B2: Below, $h:\mathbb{C}\to\mathbb{C}$, and $S \subset \mathbb{C}$ is a closed-curve, and $w \in \mathbb{C}$ is an *appropriate* point.

α Detailing the precise conditions needed on h, S and w, *carefully* state the Cauchy Integral Formula Theorem.

β Recall the Cauchy Homotopy Thm: *Suppose closed-curves* S *and* R *are homotopic in an open set on which a fnc* f *is holomorphic. Then* $\oint_S f = \oint_R f$.

Use the above CHT to give a formal proof of the Cauchy Integral Formula Theorem. Also draw LARGE pictures showing the ideas in the proof.

NAME:

HONOR CODE: *"I have neither requested nor received help on this exam other than from my professor."*

Signature: