Plex
MAA4402 2838

**Class-Prac-C**

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**Abbrevs.** Let **SCC** mean "positively oriented simple-closed-contour". For a SCC $C$, have $\mathring{C}$ be the (open) region $C$ encloses, and let $\widehat{C}$ mean $C$ together with $\mathring{C}$. So $\widehat{C}$ is $C \cup \mathring{C}$; it is automatically simply-connected and is a closed bounded set.

Use P.V. for "principal value", and Log() for P.V of logarithm. Use ln() for natural logarithm.

Let $U$ be SCC $\mathrm{Sph}_1(0)$, a circle of radius 1.

**Prac-C1:** Short answer. Show no work.

Write **DNE** in a blank <u>if</u> the described object does not exist or if the indicated operation cannot be performed.

a $\displaystyle\int_{-\infty}^{\infty} \frac{1}{[x^2+1]^2}\,\mathrm{d}x =$ ⌊. . . . . .⌋.

b Compute $\displaystyle\int_0^{2\pi} \frac{1}{2+\sin(\theta)}\,\mathrm{d}\theta =$ ⌊. . . . . .⌋.

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

c State (but do not prove) MaxMP thm: ⌊. . . . . .⌋

⌊. . . . . .⌋

⌊. . . . . .⌋

⌊. . . . . .⌋.

**Prac-C2:** Prove: THM *Suppose $f\colon D \to \mathbb{C}$ is holomorphic on path-connected open $D$. If $|f|$ is constant on $D$, then $f$ is constant on $D$.*

**Prac-C3:** i Carefully state the Cauchy Inequality thm.

ii Prove Cauchy's Inequality directly from GCIF.

**Prac-C4:** $\alpha$ State the Gauss Mean value thm.

$\beta$ Derive Gauss-MVT directly from CIF.