

Math 417 Midterm

October 20, 2017

Rules: This exam is closed book and closed notes, and no calculators are allowed. There are five questions on this exam, weighted equally.

Write all of your answers in $a + bi$ form.

1) Find the value of $\int_{|z|=2} \frac{e^{\frac{\pi iz}{2}}}{z-1} dz$.

2) Determine $\text{Log}(2\sqrt{3} + 2i)$ and $\log(2\sqrt{3} + 2i)$.

3) Show that

$$\left| \int_{|z|=2} \frac{e^z}{z^2 + 2} dz \right| \leq 2\pi e^2$$

4) Let C be the contour that is a line segment starting at the origin and ending at $3 + 2i$. Using an explicit parameterization, determine $\int_C \bar{z} dz$, and then any way you want determine $\int_C z dz$.

5) Find all complex numbers z such that $z^3 = 8i$.