

M417

Fall 1996

hw3.tex due September 20, 1996

1. Verify that
 - a) $\sin(x + iy) = \sin(x) \cosh(y) + i \cos(x) \sinh(y)$.
 - b) $|\sin(x + iy)|^2 = |\sin(x)|^2 + |\sinh(y)|^2$.

2. (Rules and nonrules for logarithms)
 - a) Show that the set of values of $\log(i^{\frac{1}{2}})$ is the same as the set of values of $\frac{1}{2} \log(i)$.
 - b) Show that the set of values of $\log(i^2)$ is not the same as the set of values of $2 \log(i)$.

3. The number(s) i^i .
 - a) Find all values of i^i .
 - b) Show that all values of i^i are real.
 - c) Show that the set of values of i^i is unbounded and has a limit point at $z = 0$.