MA30056: Complex Analysis

SELF-ASSESSMENT SHEET 7: MULTIFUNCTIONS

1.) What is wrong with the following argument?
Since $z \mapsto \sin z$ is entire and $|\sin z| \leq 1$ for all z, $\sin z = \sin 0 = 0$ by Liouville's Theorem.
For the solution, click on the following space:

2.) Calculate the following logarithms (i.e., all possible values of the multifunction log).
For the solution, click on the appropriate lines.

a) $\log 4 =$ _____

b) $\log(-1) =$ _____

c) $\log(3-4i) =$ _____

3.) Show by a calculation that the multifunction $f(z) = z^n$ where $n \in \mathbb{N}$ has just one value.
For the solution, click on the following space:

4.) Find all values of the following expressions. Which one is the principal value?
For the solution, click on the appropriate lines.

a) $4^i =$ _____

b) $(3-4i)^{\frac{1}{3}} =$

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c) $\left(\frac{1+i}{\sqrt{2}}\right)^{\pi} =$

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