Complex Variables, MATH 4337/5337, Fall 2020

Homework 3, 1.8. Arguments of Products and Quotients, 1.9. Roots of Complex Numbers, 1.10. Examples, 1.11. Regions in the Complex Plane; Solutions

Due Tuesday, February 11 at 12:45

Write in complete sentences!!! *Explain* what you are doing and convince me that you understand what you are doing and why. Justify all steps by quoting relevant results from the textbook or hypotheses. The exercise numbers are based on the 9th edition of the textbook.

1.9.5. By writing the individual factors on the left in exponential form, performing the needed operations, and finally changing back to rectangular coordinates, show that:

(b) $5i/(2+i) = 1+2i$.

1.11.1. (b) Find the square roots of $1-\sqrt{3}i$. Express them in rectangular coordinates.

1.11.8. (a) Prove that the usual formula solves the quadratic equation $az^2+bz+c=0$ (where $a \neq 0$) when the coefficients a, b, and c are complex numbers. Specifically, by completing the square on the left-hand side, derive the *quadratic formula* $z = \dfrac{-b+(b^2-4ac)^{1/2}}{2a}$ where both square roots are to be considered when $b^2-4ac \neq 0$.

1.12.8. Prove that if a set contains each of its accumulation points, then it must be a closed set. NOTE: This is the converse of Lemma 1.11.B.

1.12.9. (Graduate) Prove that any point z_0 of a domain is an accumulation point of that domain.