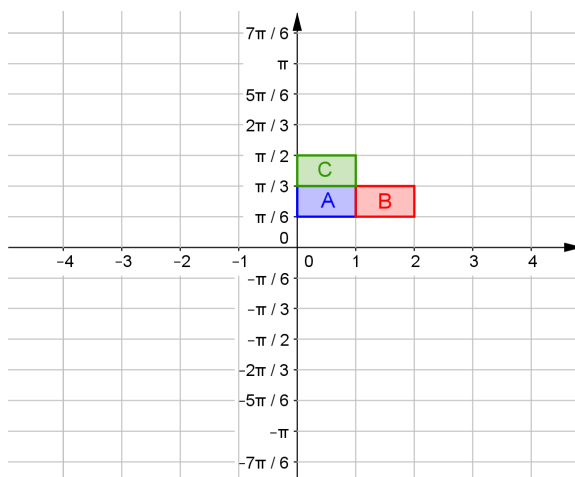


MATH 300.202
Assignment 7

Due: Wednesday, March 1

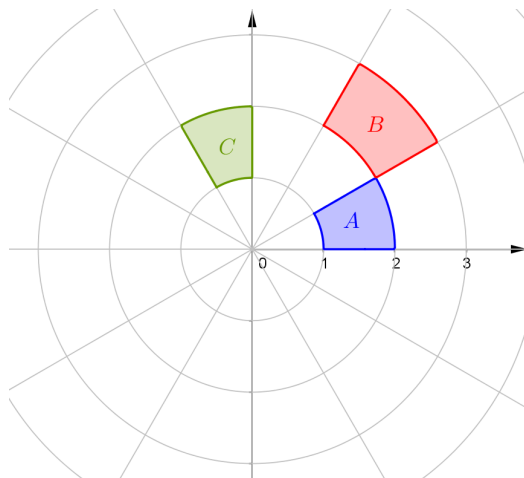
Note: *You do not need to hand in your solutions to the starred problems.*

- I. Section 3.3: 1, 3, 6
- II. Sketch of the image of the following grid under the map $f(z) := e^z$. Identify the image of horizontal and vertical lines in your sketch. Where is each of the designated regions A, B, C mapped to?



- III. Sketch of the image of the following grid under the map $f(z) := \text{Log } z$. Identify the image of circles and rays in your sketch. Where is each of the designated regions A, B, C mapped to?

Last update: February 17, 2017



IV. Section 3.3: 8*, 9, 12*, 13(c)

V. Find a branch of $f(z) := \log(z^2 - 1)$ that is analytic at $z = 0$. Determine where this branch is analytic, and find $f(0)$ and $f'(0)$.

VI. *Complex powers:* We know the meaning of z^5 and $z^{1/7}$. How can we make sense of z^e or z^π or z^i ? For an arbitrary complex number α and $z \neq 0$, we can define z^α by $z^\alpha := e^{\alpha \log z}$. Note that each value of $\log z$ leads to a value of z^α .

Find all the values of the following.

(a) 2^i

(b) $2^{1/3}$

(c) i^i

(d) i^3

(e) 2^e

VII. Section 3.5: 2, 4

VIII. 9 (follow example 3.5.3)