Math 120A
August 7, 2019
Question 1  Given \( z \in \mathbb{C} \), it’s argument \( \text{arg}(z) \) is

A. the angle it makes with the positive real axis, with counterclockwise the positive orientation.

B. the set of real numbers \( t \) for which \( z = |z|e^{it} \).

C. the imaginary part of \( \log(z) \), the logarithm of \( z \).

D. A and B.

E. A, B, and C.
Question 2  Log(z) is

A. the principal branch of log(z).

B. equal to log |z| + iArg(z), where Arg(z) is the principal branch of arg(z).

C. a set-valued (multivalued) function because Arg(z) is a set-valued (multivalued) function.

* D. A and B

E. A, B, and C.
Question 3  Why does $\log(z)$ have branches?

A. $e^z$ is periodic.

B. You have to restrict the domain of $e^z$ to obtain an invertible function.

C. There are many choices for a restricted domain on which $e^z$ is invertible.

D. None of the above.

*E. A, B, and C.
Question 4  Given $z \in \mathbb{C}$ with $|z| = 1$. Then,

A. $z = e^{i\phi}$ for some real number $\phi$.
B. $|\text{Re}(z) + \text{Im}(z)| \leq 1$.
C. $\frac{1}{z} = \bar{z}$
* D. A and C.
E. B and C.