

Math 218D

Quiz 10

1. a) Compute the polar form of the complex number: $(1 + i)^{-1}$.
- b) Compute the real and imaginary part of $e^{2 + \frac{i\pi}{4}}$.
- c) Compute the complex conjugate of $2ie^{1+i}$. You don't need to simplify your answer.

2. Let A be a 5×5 matrix with the characteristic polynomial:

$$p(\lambda) = (\lambda - 1)(\lambda - 3)^2(\lambda^2 + \lambda + 1).$$

- a) What is the algebraic multiplicity of the eigenvalue 3?
- b) What is the geometric multiplicity of the eigenvalue 1?
- c) Is the statement $\dim \text{Nul}(A - 3I) \geq 3$ true or false?
- d) Can A be diagonalized over the real number?