

Math 120A  
August 8, 2023

**Question 1** A complex number is a

- A. point in the complex plane  $\mathbb{C}$ .
- B. number of the form  $x + iy$  with  $x, y \in \mathbb{R}$  and  $i^2 = -1$ .
- C. number of the form  $z = e^{\log(r)+i\theta}$  with  $r = |z|$ .
- D. **A** and **B**.
- \*E. **A**, **B**, and **C**.

**Question 2** Given a nonzero complex number  $z = x + iy$ . Which of the following is equal to  $\frac{1}{z}$ ?

A.  $\frac{1}{x} - i\frac{1}{y}$

B.  $\frac{\bar{z}}{|z|^2}$

C.  $\frac{x}{x^2 + y^2} - i\frac{y}{x^2 + y^2}$

D. **A and B**

\*E. **B and C**

**Question 3** How can you tell  $i$  and  $-i$  apart?

- \*A. You can't. They're both outside the real number system and satisfy the defining relationship  $i^2 = (-i)^2 = -1$ .
- B. It's easy. Just look for the minus sign.
- C.  $-i$  is the conjugate of  $i$ .
- D. **B** and **C**
- E. Why bother? They're both purely imaginary.