Math 120A
August 2, 2022

**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 $\dfrac{1}{z}$?

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

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

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

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.