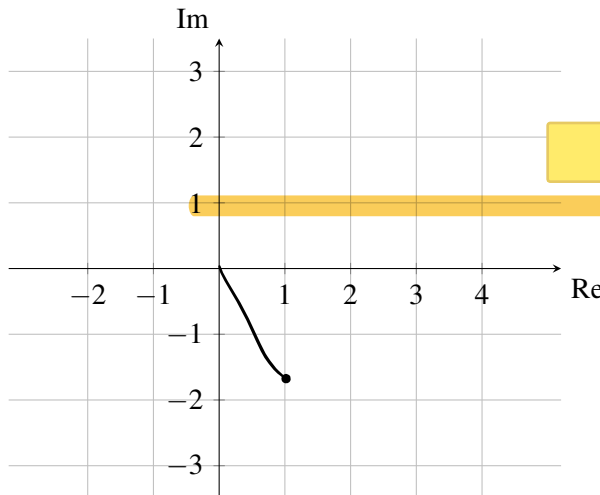# EECS 16A   Designing Information Devices and Systems I
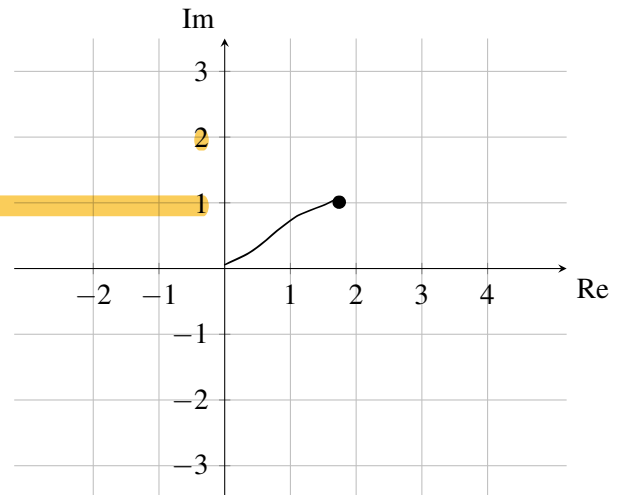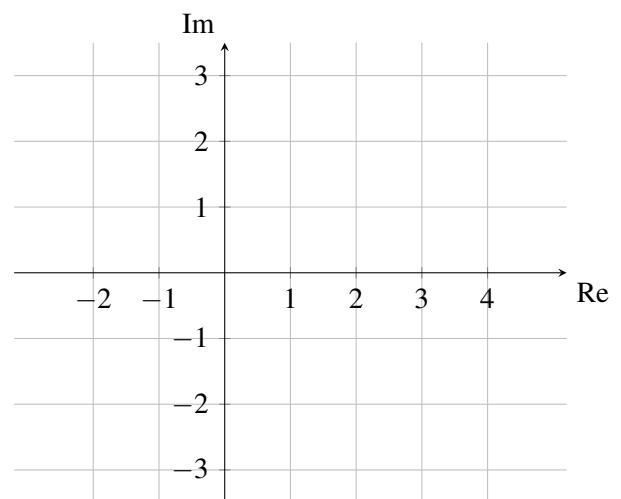# Fall 2024   Discussion 0B

1. **Complex Algebra (Review)** Let $a = 1 - i\sqrt{3}$ and $b = \sqrt{3} + i$.

   (a) Show the numbers a and b in the complex plane below, marking the distance from the origin and angle with the real axis.

   Figure 1: Complex Plane for a Figure 2: Complex Plane for b

   (b) Multiply a with i, and plot the resulting expression a' below. Show that a' is equivalent to a rotated *counterclockwise* by $\frac{\pi}{2}$ or $90°$ in the complex plane. Multiply b with $-i$, and plot the resulting expression b' below. Show that b' is equivalent to b rotated *clockwise* by $\frac{\pi}{2}$ or $90°$ in the complex plane.
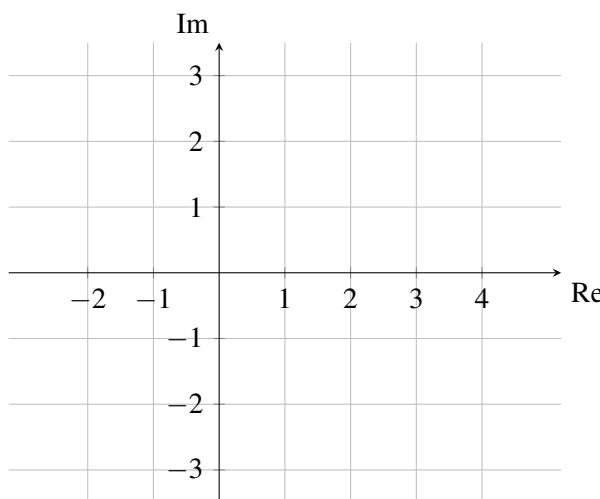
   Figure 3: Complex Plane for a' Figure 4: Complex Plane for b'

(c) For complex number $z = x + yi$ show that $|z| = \sqrt{z\bar{z}}$, where $\bar{z}$ is the complex conjugate of z.

(d) Find ab, $a\bar{b}$, $a + \bar{a}$, $a - \bar{a}$, $\overline{ab}$, and $\bar{a}\bar{b}$.