1. Let \(a, b \in \mathbb{C}\). Define a sequence \(<z_n>\) via
\[z_0 = a,\quad z_1 = b\quad \text{and}\quad z_n = \frac{z_{n-1} + z_{n-2}}{2}\quad \text{for}\quad n \geq 2.\]
Show that 
\[z_n = \frac{2}{3}(a - b)\left(-\frac{1}{2}\right)^n + \frac{1}{3}a + \frac{2}{3}b\quad \text{for}\quad n \geq 0.\]

2. Find the points of discontinuity for the functions

(a) \(f(z) = \log(z^3 + 1)\)
(b) \(g(z) = \sqrt{1 - z^2}\)

3. Evaluate the following limits (you may not use l’Hopital’s rule for complex functions):

(a) \(\lim_{z \to i}[2z^2 - iz^3 + z\text{Arg}\, z]\)
(b) \(\lim_{z \to -i} \frac{z^4 + 1}{z + i}\)
(c) \(\lim_{z \to 2i} \frac{z^2 - iz + 2}{z^2 + 4}\)
(d) \(\lim_{z \to 0} \frac{e^z + z\text{Log}\, z}{1 - z^2\text{Arg}\, z}\)