Math 231 — Hw 1

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1. **Floating-point** numbers are a way to represent real numbers in computers using a *finite* number of bits, expressed in scientific notation as a combination of a sign, a significand, and an exponent. This format allows representation of a wide range of values but introduces rounding errors and precision limits, leading to potential inaccuracies in arithmetic operations. As was stated in class, this space of numbers are not associative.

   Within your python terminal, demonstrate that floating point numbers are not associative using the following values: $a = 1.0, b = 10^8, c = -10^8$.

   Note: Exponentials are written using "E". For example, 10^3 can be written as `1E3`.

2. The example given in class used $\{1, 2, 3\}$ with $a \circ b = \max\{a, b\}$ and $a * b = \min\{a, b\}$. Demonstrate why 2 has no inverse under both operations (you can do this exhaustively).

3. Consider the space with $\{0, 1, 2\}$ with operation $a \circ b = (a + b) \mod 3$. What axioms are satisfied? (You can skip the distributive property since there is only one operation.)