Problem of the Week
Problem E
CUBES

Certain numbers have interesting properties. For example, \(1^3 + 5^3 + 3^3 = 153\). That is, the sum of the cubes of the individual digits of the positive integer 153 is the number itself. This may lead you to ask a question like, “Are there other such numbers?” (Yes there are, but that is not our concern today.)

The number 512 stands alone as a three-digit positive integer with three different digits such that the cube of the sum of the digits equals the number itself. That is, \((5 + 1 + 2)^3 = 512\). This is the only three-digit positive integer with three distinct digits that has this property.

Find all five-digit positive integers with distinct digits such that the cube of the sum of the digits equals the original number.
That is, find all five-digit positive integers of the form \(CUBES\) with distinct digits such that

\[
(C + U + B + E + S)^3 = CUBES
\]