Name: _____

Sums of squares.

The Problem.

A **square number** is a whole number multiplied by itself. For instance, nine is square because $9 = 3 \times 3$. Here is a list of some squares:

$$0, \quad 1, \quad 4, \quad 9, \quad 16, \quad 25, \quad 36, \quad 49, \quad \ldots$$

It is a surprising fact that **every whole number is the sum of four squares.** For example:

$$
\begin{aligned}
10 &= 4 + 4 + 1 + 1 \\
11 &= 9 + 1 + 1 + 0 \\
12 &= 9 + 1 + 1 + 1 \\
13 &= 9 + 4 + 0 + 0 \\
14 &= 9 + 4 + 1 + 0
\end{aligned}
$$

Write the numbers 15, 16, 17, 18, 19, 20, 21, and 22 as the sum of four squares. Can every number be written as the sum of **three** squares?

Your solution.