Problem of the Month
Problem 4: January 2020

In this problem, we will call a rectangular prism an *appealing prism* if its three edge lengths are all integers and the length of the diagonal of each face is an integer.

(a) Show that at least two of the three edge lengths of an appealing prism must be multiples of 3.

(b) Show that the volume of an appealing prism must be a multiple of 1584.

(c) Find an appealing prism with shortest edge length equal to 44.

More to think about: It turns out that 44 is the smallest edge length that occurs in an appealing prism. Can you think of a way you might prove this? Do you think there are appealing prisms with integer-length *space diagonal*? A space diagonal of a rectangular prism is a line segment connecting any two vertices that are not on a common face. Note: there are three space diagonals and they all have the same length.