THREE PUZZLES

Alan H. Schoen
schoenah@gmail.com

1) Design a set ***S1*** of 24 dissimilar [non-convex] polyhedra with plane faces, such that
(a) **three** concurrent edges of each polyhedron have integer lengths;
(b) the volume of each polyhedron is proportional to the sum of the lengths of the ***three*** concurrent edges described in 1(a);
(c) the set S1 can be partitioned into **six** subsets, each of which packs a ***regular tetrahedron***.

2) Design a set ***S2*** of 24 dissimilar [non-convex] polyhedra with plane faces, such that
a) ***four*** concurrent edges of each polyhedron have integer lengths;
b) the volume of each polyhedron is proportional to the sum of the lengths of the ***four*** concurrent edges described in 2(a);
c) the set S2 can be partitioned into ***four*** subsets, each of which packs a ***regular octahedron***.

3) Design a set ***S3*** of 24 dissimilar [non-convex] polyhedra with plane faces, such that
a) ***three*** concurrent edges of each polyhedron have integer lengths;
b) the volume of each polyhedron is proportional to the sum of the lengths of the ***three*** concurrent edges described in 3(a);
c) the set S3 can be partitioned into ***three*** subsets, each of which packs a ***cube***.

The solutions will be posted on May 1, 2014 at schoengeometry.com.