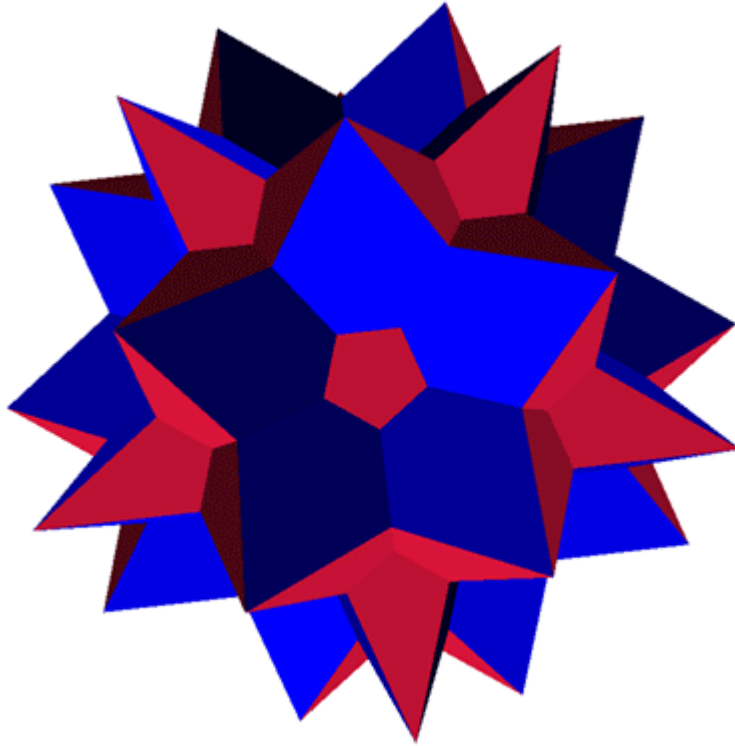


## Construction of Great Icosidodecahedron



This paper describes how to create the Great Icosidodecahedron analytically as a 3D object. This uniform polyhedron is particularly beautiful and can be constructed with 12 pentagrams and 20 equilateral triangles.

You start with a pentagon and create the net for a Icosidodecahedron without the triangles (fig 1). Extend the sides of the pentagons to create pentagrams and fold the sides into the same planes as the icosidodecahedron and you get the first half of the polyhedron (fig 2). Now for the equilateral triangles. Pick every combination of two pentagrams where a single vertex shares a common point (fig 3). Create two equilateral triangles connecting the common vertex and each of the legs of the two pentagrams. Do this to for all pentagrams and you will come up with 20 distinct intersecting triangles. The final result is in figure 4.

We can create the model using a second method. Based on the geometry of the existing model, create a single cup (fig 5). Add the adjoining pentagram star (fig 6). Now take this shape and rotate-duplicate for each plane of the pentagon icosidodecahedron and you get the model of figure 4.

## Construction of Great Icosidodecahedron

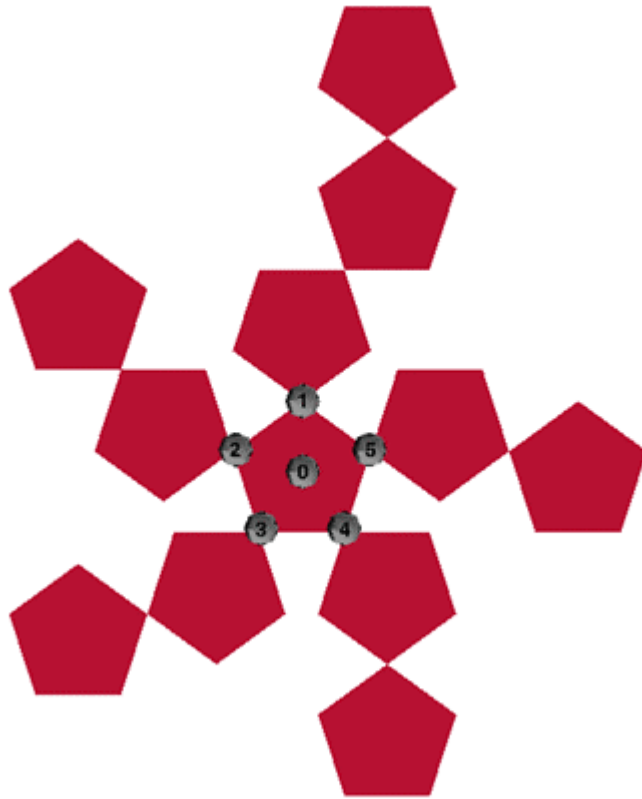


fig1

The net for the Icosidodecahedron without the triangle faces. I start with a pentagon, triangulate it with an extra point in the center.

## Construction of Great Icosidodecahedron



fig 2

Extend the sides of the pentagons to make pentagrams then fold the net into the same planes as the Icosidodecahedron. This makes 12 intersecting stars (pentagrams).

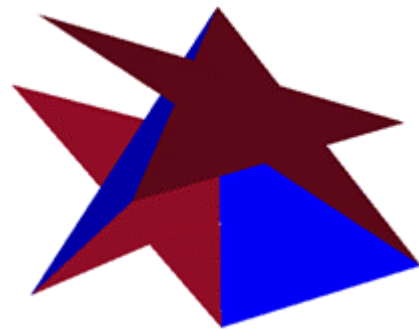


fig 3

Now add equilateral triangles to each pair of pentagrams, which touch in only one vertex. Getting all the distinct triangles will yield 20 intersecting triangles.

## Construction of Great IcosiDodecahedron

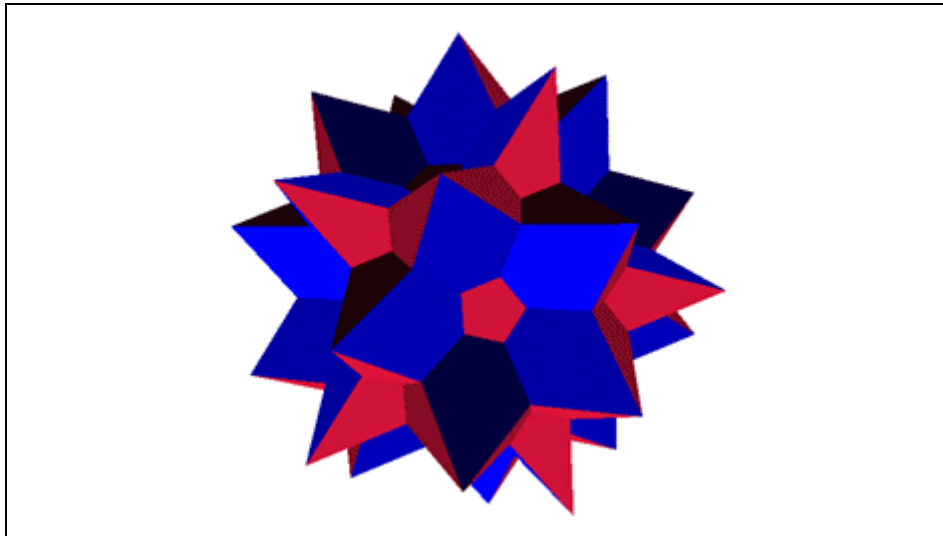


fig 4

Finished model with pentagrams colored red and triangles colored blue.



fig 5

Based on the geometry of our previous model we can determine the shape of the pentagonal cup.

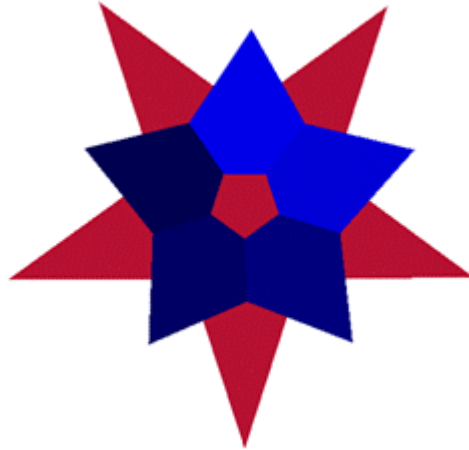


fig 6

Add the cup to the attached pentagram which is coplanar to the center pentagon.