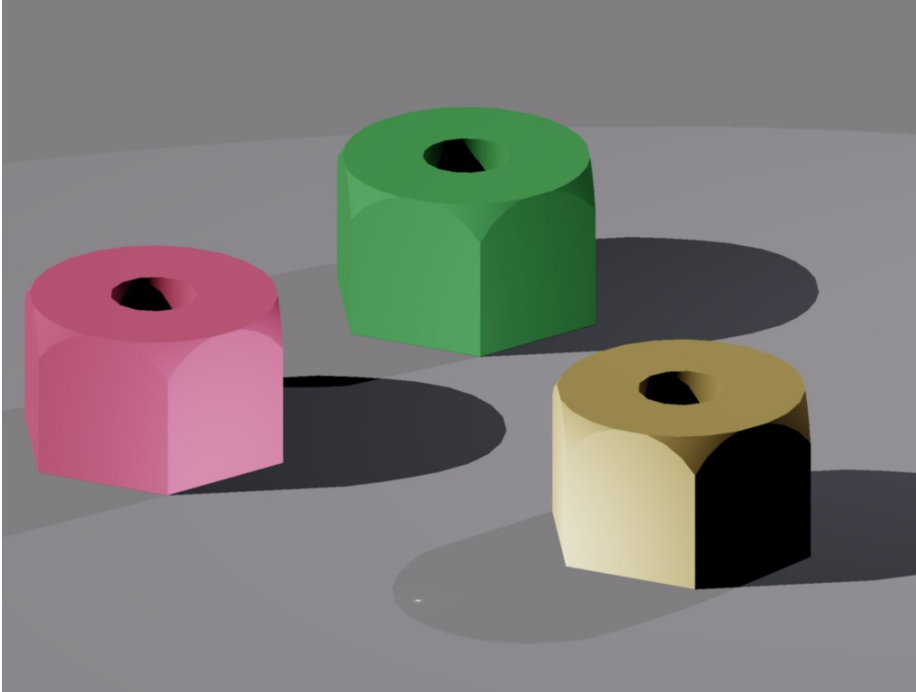


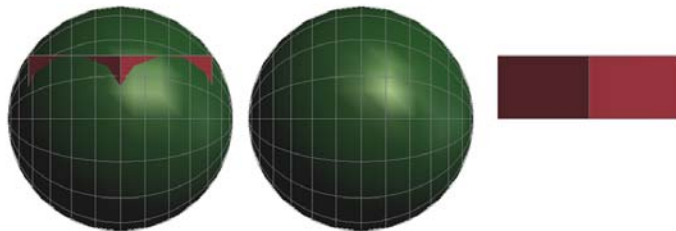
The Hex Nut: How do we make this in AutoCAD?



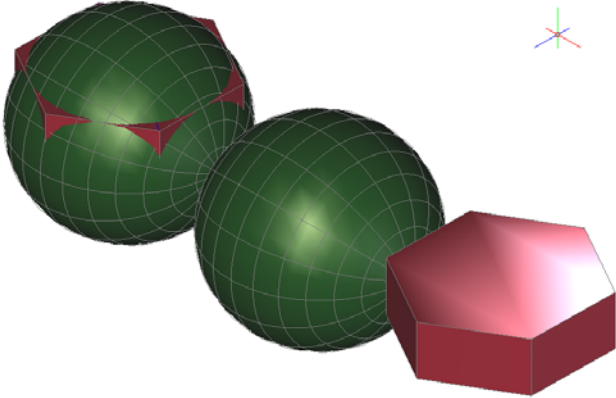
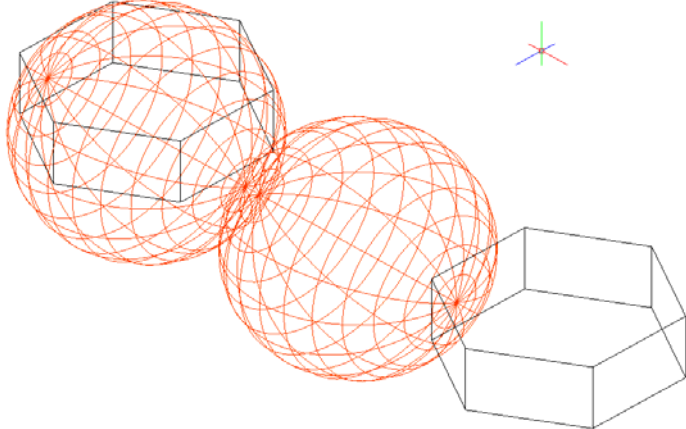
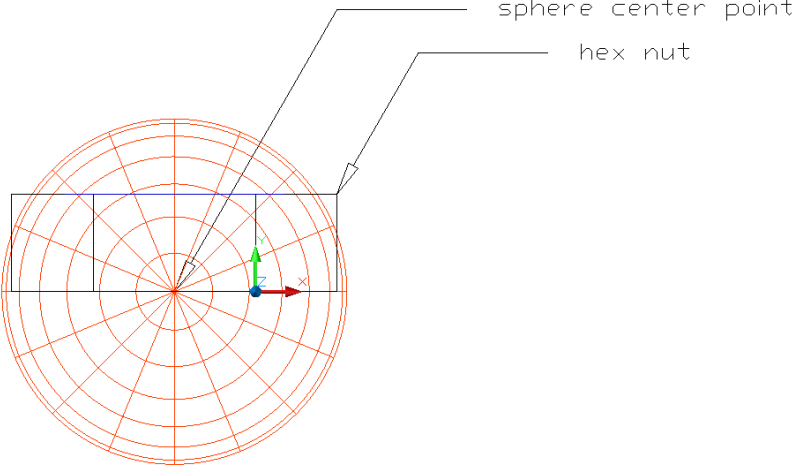
Hex shape is made using the 3D pyramid shape. Select the PYRAMID SHAPE, select SIDES, specify 6 sides, set radius and centre point, type T for TOP RADIUS, specify same radius as base of hex, set height.

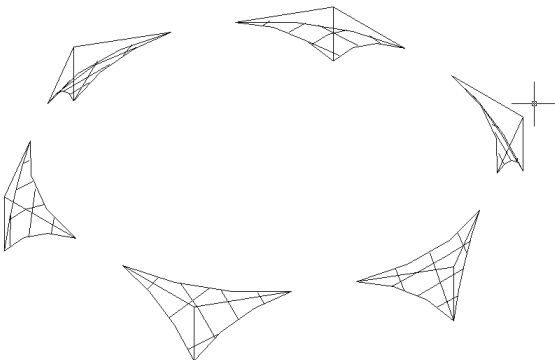

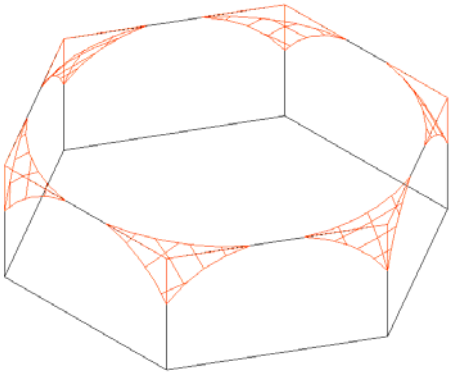
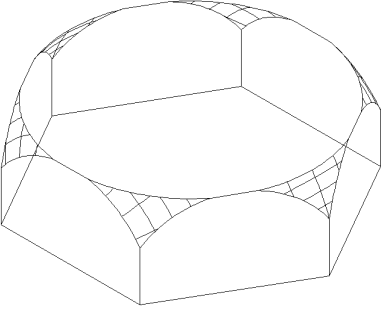
This info is for demonstrating the basics in CAD, and specific details for nuts, bolts, screws, machines screws, etc. will not be addressed in this autocad tutorial.

We're going to intersect a Sphere with an Hexagonal shaped solid.



Front View

Isometric	
Wireframe	
<p>Alignment:</p> <p>I've approximated the radius of the sphere, as the specific information can be referenced in the bill of materials.</p>	 <p>sphere center point</p> <p>hex nut</p>

<p>We need to subtract:</p> <p>Hex – Sphere = Profile</p>	
	
<p>Move this profile onto another hex, and subtract:</p> <p>Hex – Profile = Hex Nut</p>	
<p>The result</p> <p>A circle can be drawn on the surface, and the Presspull tool can be used to create the hole to make a nut. Various other shapes can be used to modify the object, depending on the application.</p>	



The Thread: How do we make this in AutoCAD?



Using the Helix command, assign the major diameter as the bottom radius, and top radius. Set the height to the length of the thread.

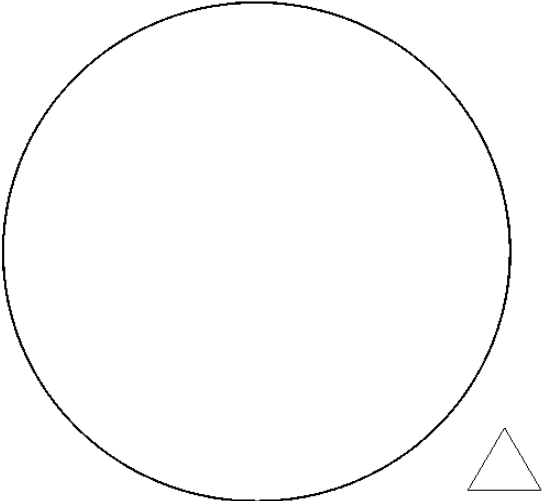
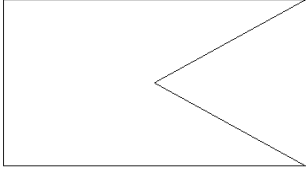
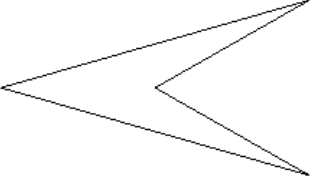
Double click on the helix to open the properties tab, set the number of revolutions. If the pitch is one, set the revolutions to equal the length of the thread.

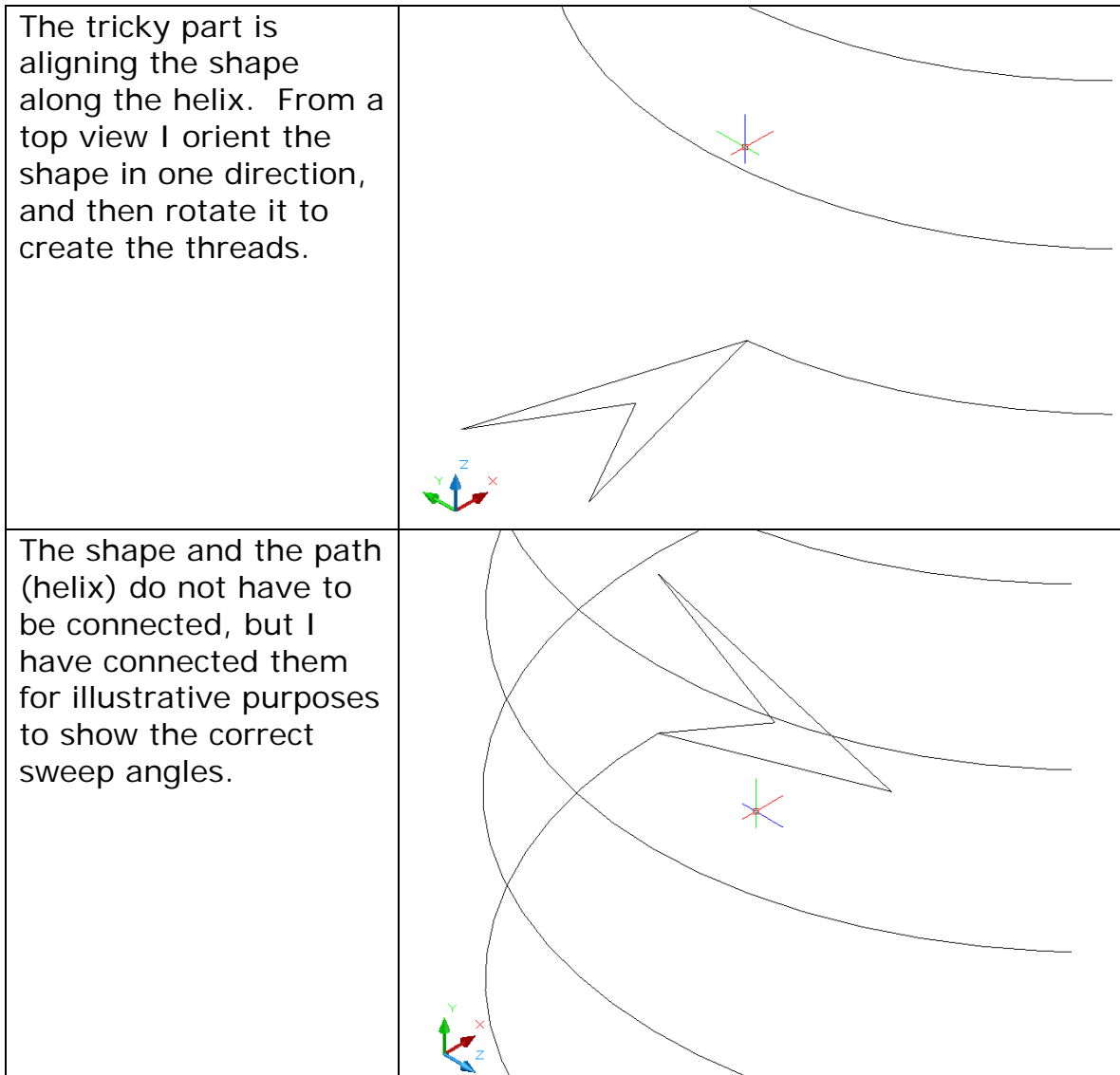
Turn Height = 1

General	
Color	<input type="checkbox"/> ByLayer
Layer	0
Linetype	ByLayer
Linetype scale	1
Plot style	ByColor
Lineweight	ByLayer
Hyperlink	

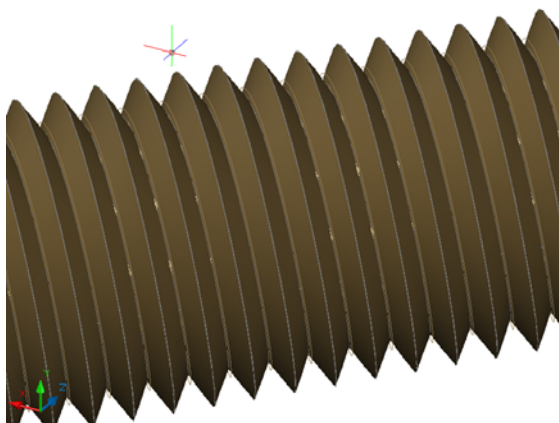
Geometry	
Position X	12.2075
Position Y	-4.1522
Position Z	288.9184
Constrain	Turns
Height	20
Turns	20
Turn Height	1
Base Radius	3
Top Radius	3
Twist	CCW
Turn Slope	0
Total length	376.6091

Next, we need to create a shape with 60 degree angles. We will use this shape to illustrate the threads by sweeping the shape along the helix.

<p>Using the polygon draw tool, set the number of sides to 3, set the radius to .5 (if the minor diameter is 2).</p>	 A large circle is centered in the upper half of the cell. To its right and slightly below is a small, upright equilateral triangle.
<p>There are several possibilities for this sweep shape. I exploded the triangle, added some lines.</p>	 A shape consisting of a vertical line on the left, a horizontal line on the top, and a horizontal line on the bottom. The right side is a V-shaped notch pointing to the right.
<p>Using the pedit command, I converted the shape to a closed polyline, and moved the grips for make the following shape.</p> <p>The V is set to 60 degrees.</p>	 A closed shape with a V-shaped notch on the right side. The V is wider than the previous one, with a 60-degree angle at its tip. The left side is a vertical line, and the top and bottom are horizontal lines.



It may take a couple of tries to get the threads working correctly, but the file can be saved and modified for all future thread use.



To fill the interior of the thread, I have added a cylinder that is the same length as the helix. This can be easily modified to illustrate the preferred shape.

