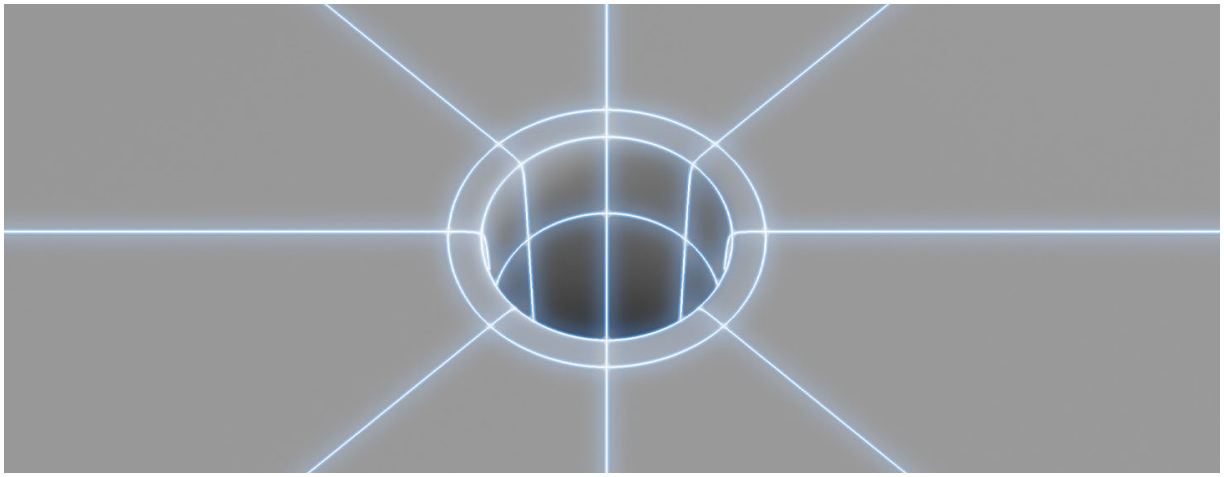
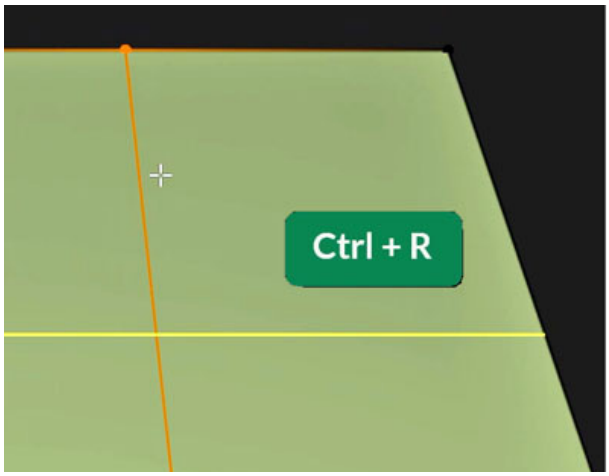
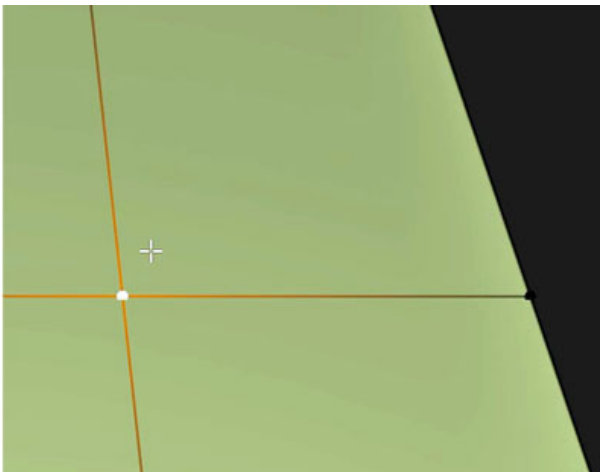
Create a hole from a Vertex

The easiest way to add a circular hole is by beveling a Vertex. Watch a longer video about this topic here.

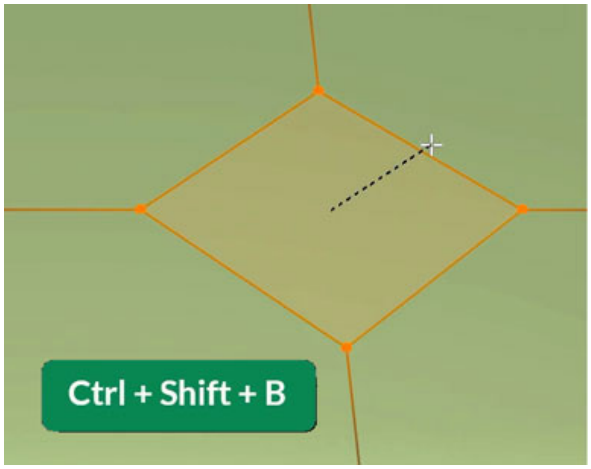


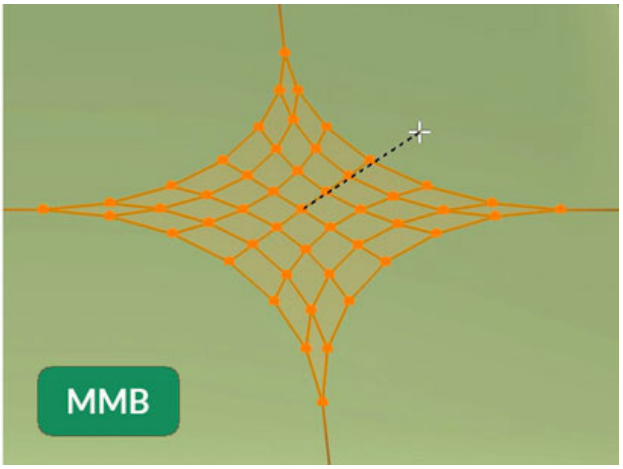
First add a couple of intersecting Edge Loops with **Ctrl+R**, so that you get a Vertex at the location where you want to place a hole. Of course, in case your geometry already has a Vertex in the location where you want the hole to be, you don't need to do this step.



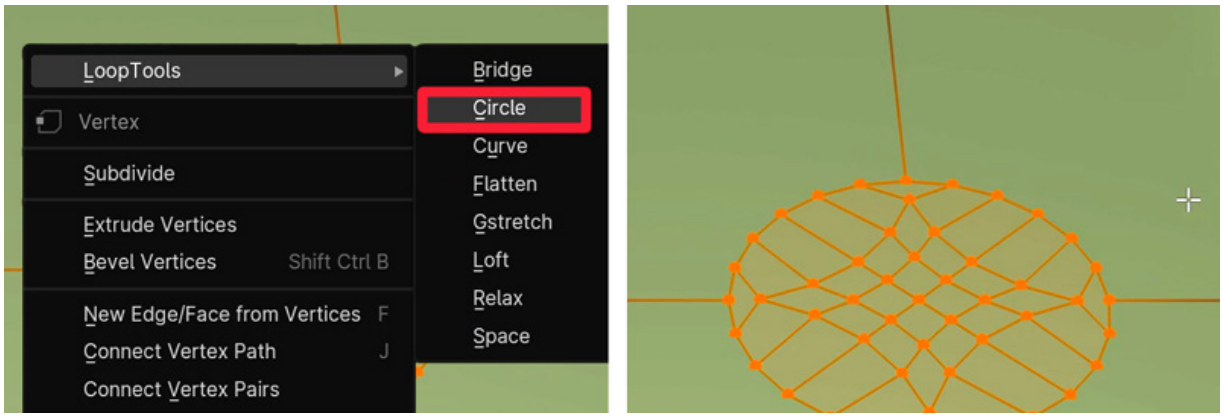


Then select the Vertex and **press Shift+Ctrl+B** to bevel it. Scroll the Middle Mouse Button up to add Segments.

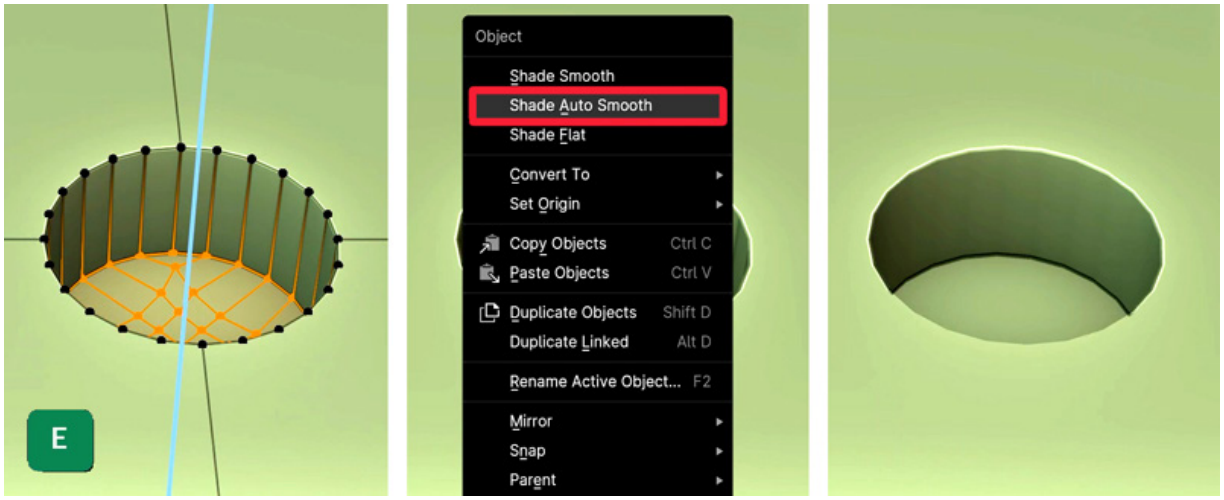




The easiest way to make it circular is by going to **LoopTools > Circle**. If you don't have these options, make sure LoopTools is enabled in Preferences > Add-ons.

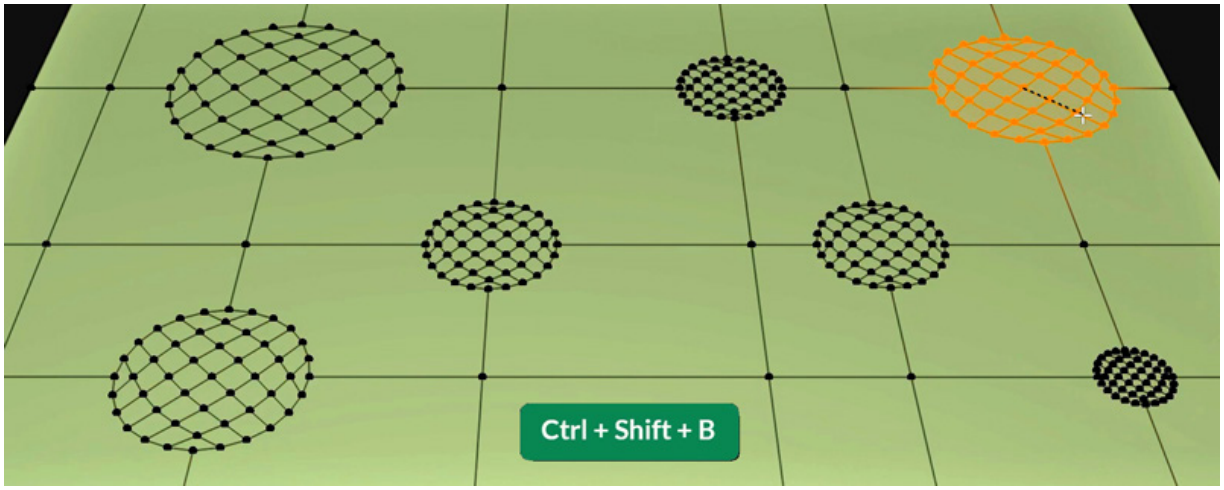


Then you can **press E** to extrude it inwards. Right-click and choose Shade Auto Smooth to make it look smooth.

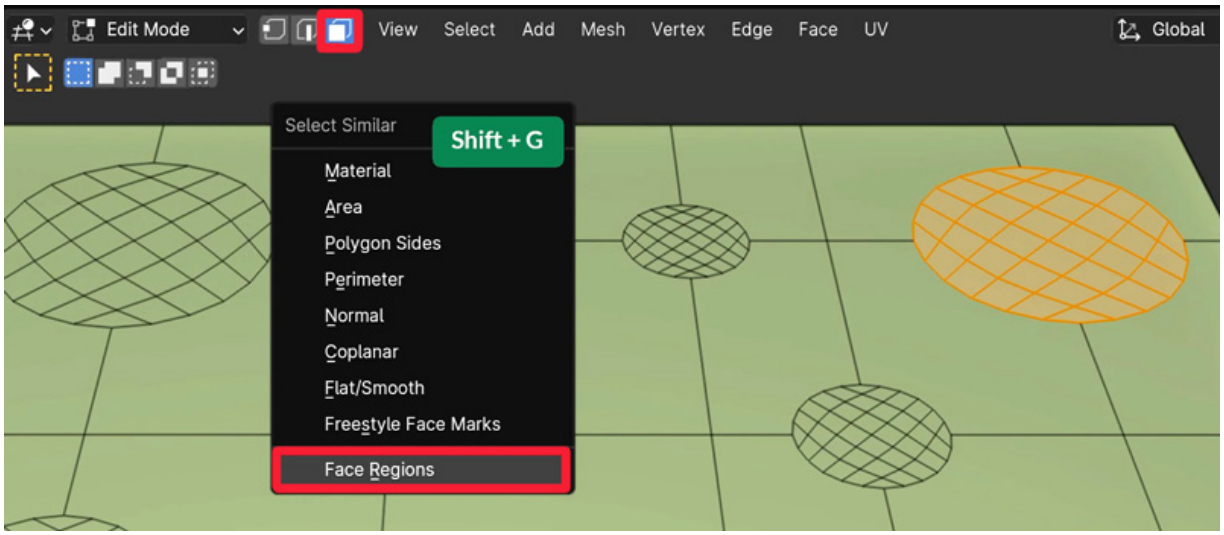


Instead of using LoopTools to make it circular, you can also adjust the **Shape** value in the last operator panel. A value of **0.085** seems to be the value closest to a circle, although it's not 100% perfectly circular. This panel appears in the lower left corner, but you can place it anywhere (and get it back if you accidentally close it) by pressing F9.

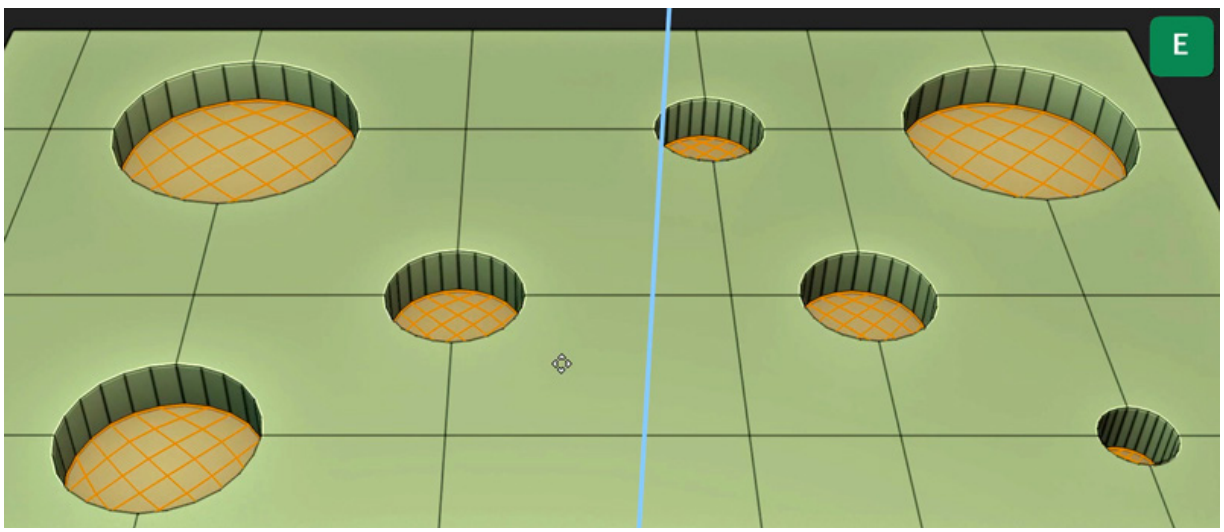
The advantage of this is that Blender remembers that value for each subsequent bevel, so that can save some time. The values are reset to default, the next time you start Blender.



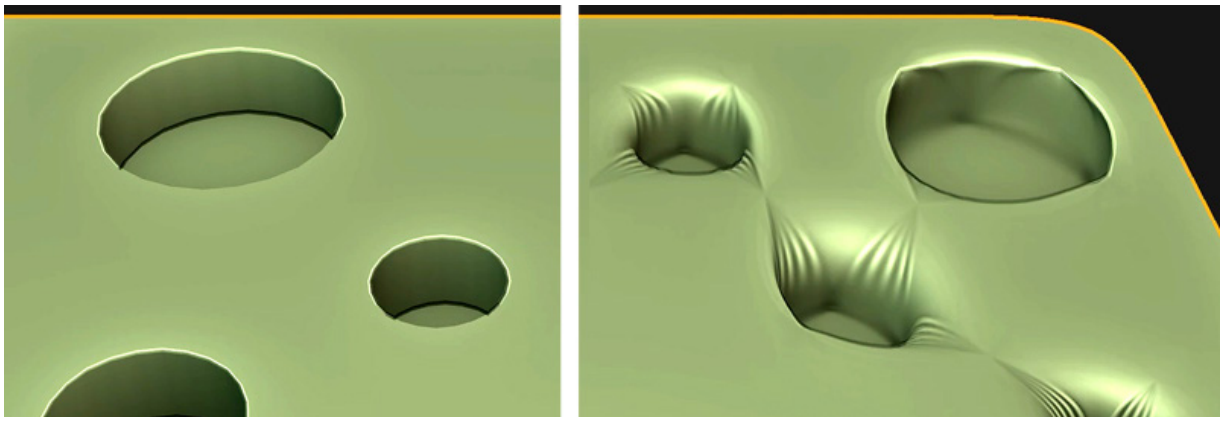
To select all the other circles, first go to **Face Selection** mode. Press **Shift+G** for the Select Similar menu and choose **Face Regions**.



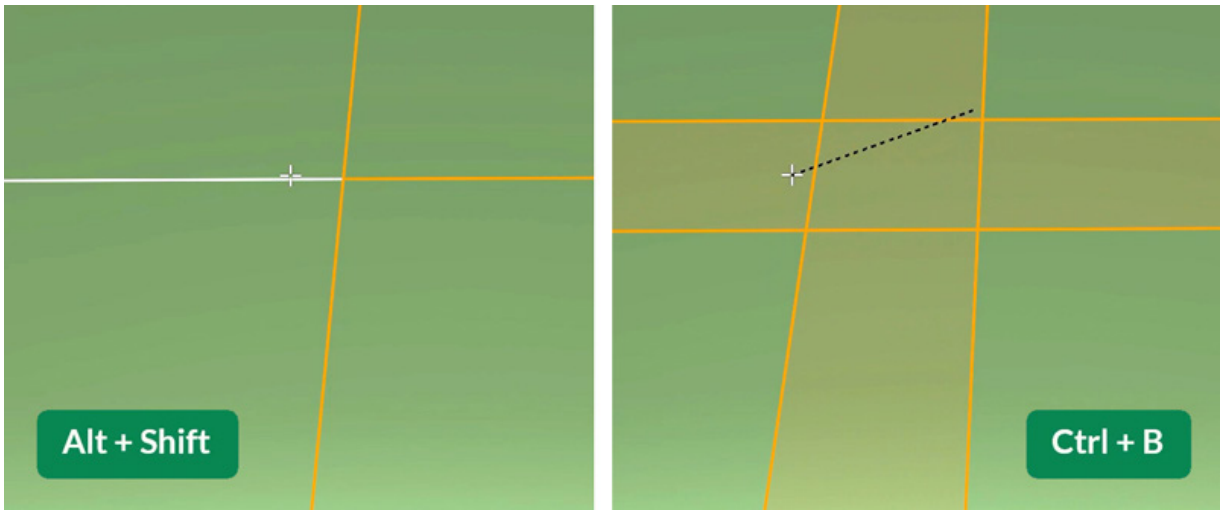
Then you can extrude them all at once by **pressing E**.



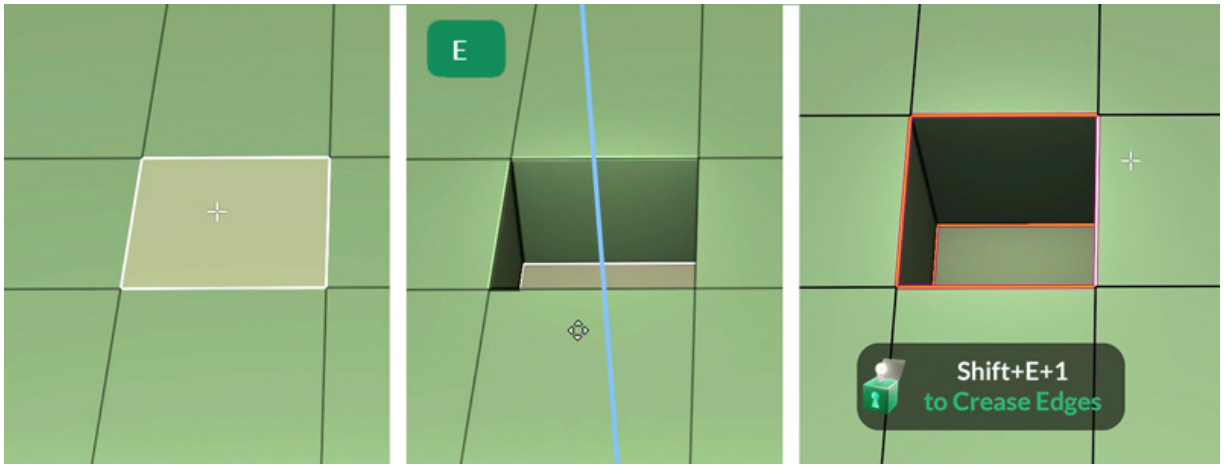
Shade Auto Smooth to make it look better. This is fine for a model that doesn't get deformed or subdivided, in a workflow where you use Shade **Auto Smooth** *(below left)*. But once you **subdivide** it, you get this kind of mess *(below right)*. It could be interesting for some kind of cloth object, but in this case it's not what we're after.



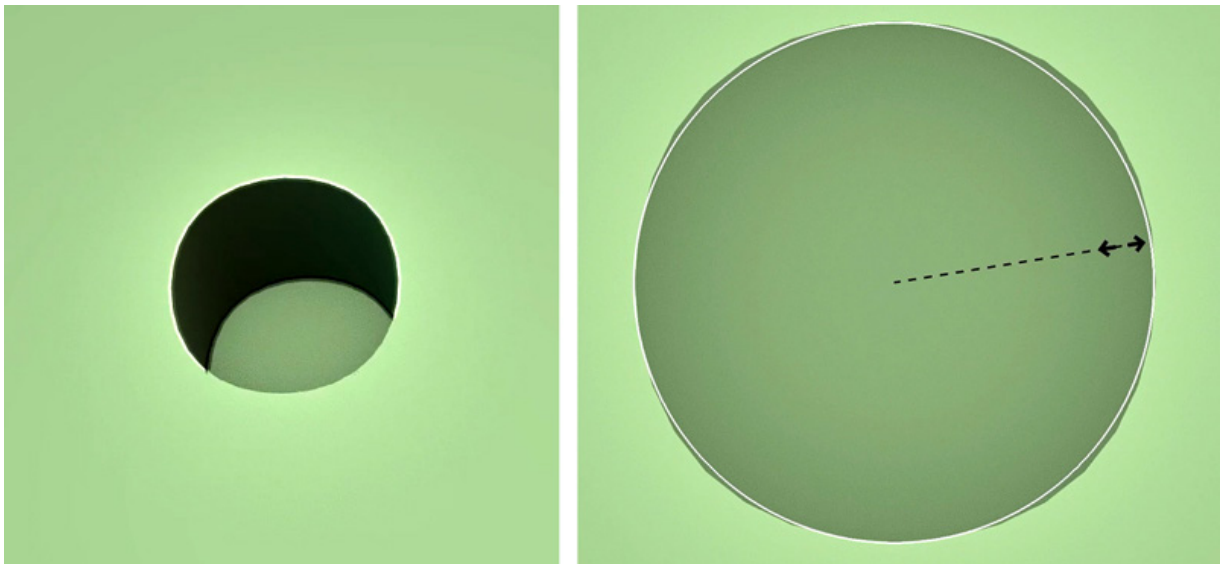
To get a hole you can use in a subdivision workflow, you'll need more Edge Loops. First, select both Edge Loops by **holding Alt and Shift** and clicking on them. Bevel the selected Edges by **pressing Ctrl+B**.



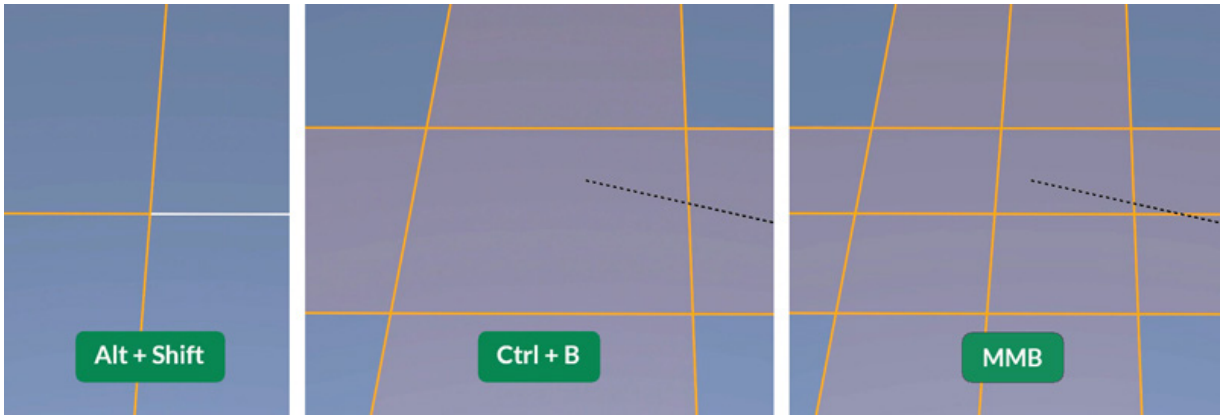
At the very least you'll need two Edge loops intersecting so that you get one Face. This Face can then be extruded to create a simple hole. We can hold Shift and select the edges that we want to keep sharp and Crease them with **Shift+E+1** on the Numpad.



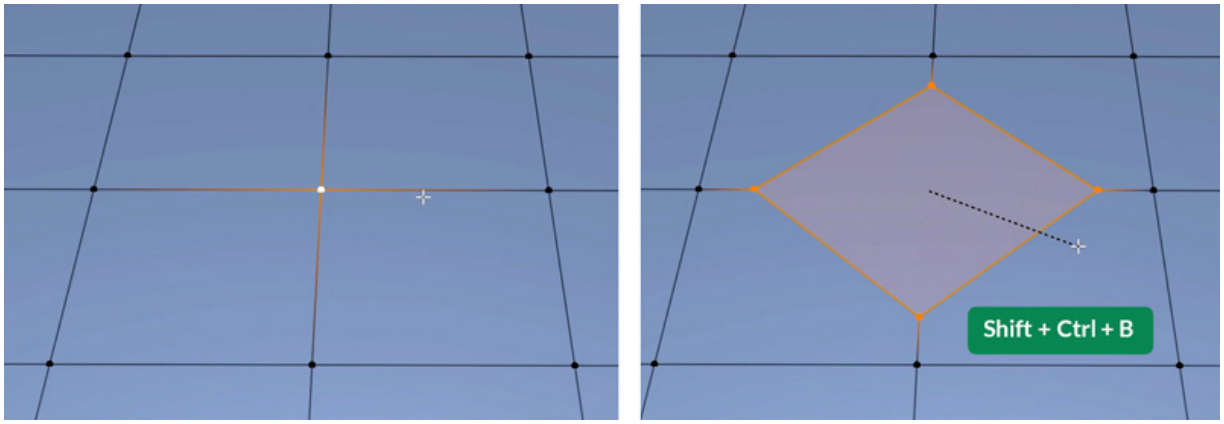
If you add a Subdivision modifier now, it will look circular enough. However if we compare this to a Circle (Shift+A > Mesh > Circle), we can see that it's not 100% circular. If you want it to be perfect, you'll need more geometry than this.



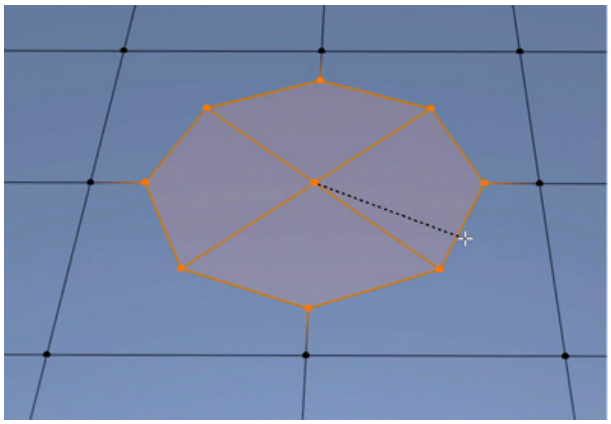
Let's look at a method with slightly more geometry. As before, starting with a Plane **press Ctrl+R** to add some Edge Loops. **Hold Alt and Shift** to be able to select multiple Edge Loops. For a perfectly circular hole we'll need to add one more Edge Loop when beveling these loops. So bevel with **Ctrl+B** and then scroll the mouse wheel up to add an additional loop.

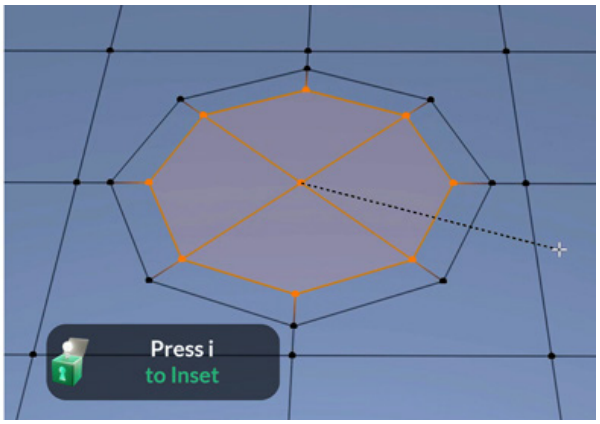


Switch to **Vertex selection mode**. Then we can select and bevel this Vertex in the center with **Shift+Ctrl+B.**

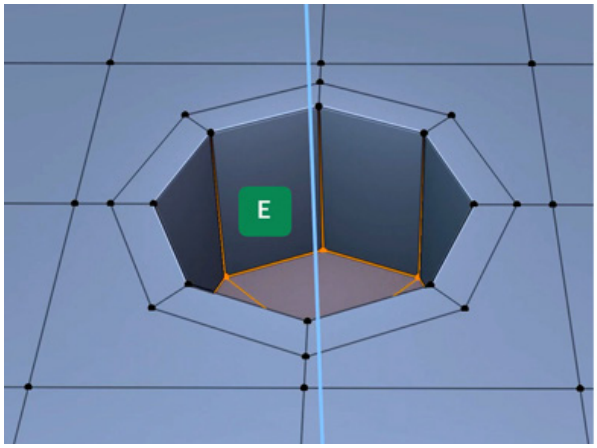


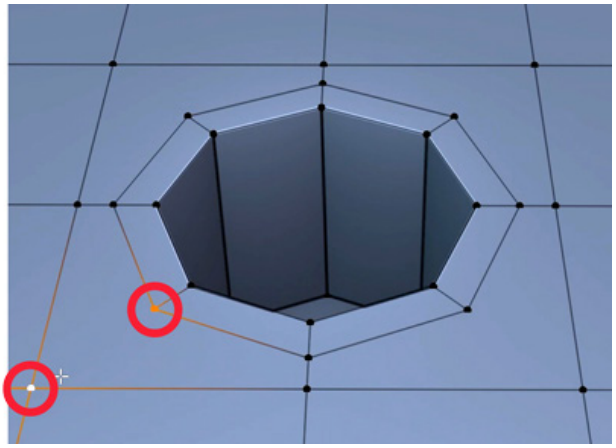
Scroll the mouse wheel up to add one more segment. Blender remembered my **Shape** value from the previous time I beveled a Vertex. Otherwise you can use **LoopTools > Circle** to get the circular shape. I'll inset this with **i** to add a loop of Faces to support the geometry around the hole.



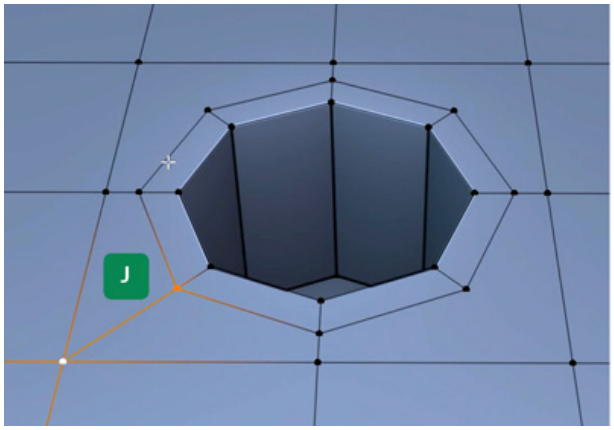


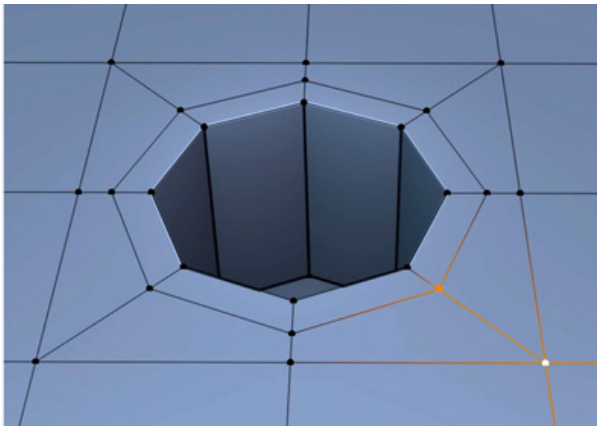
And now we can extrude that down. To get all quads, we can connect these Vertices by selecting them and **pressing J**.



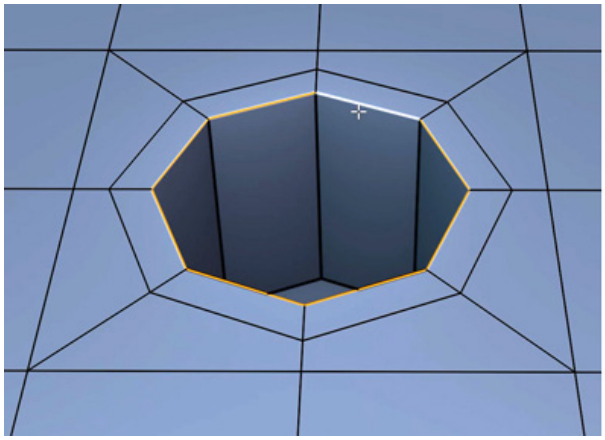


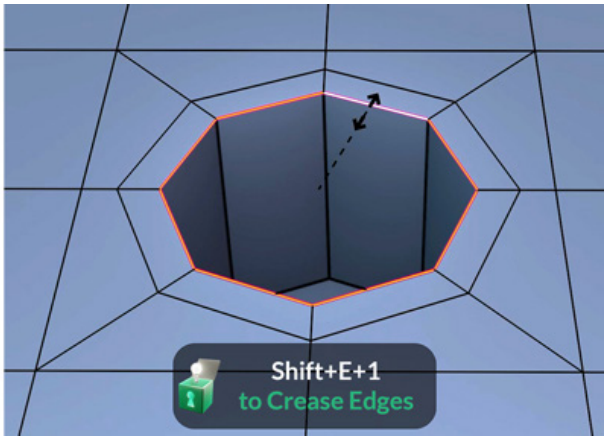
Repeat for the other Vertices until they are all connected and there are no N-gons, only Faces with 4 Edges ("Quads").



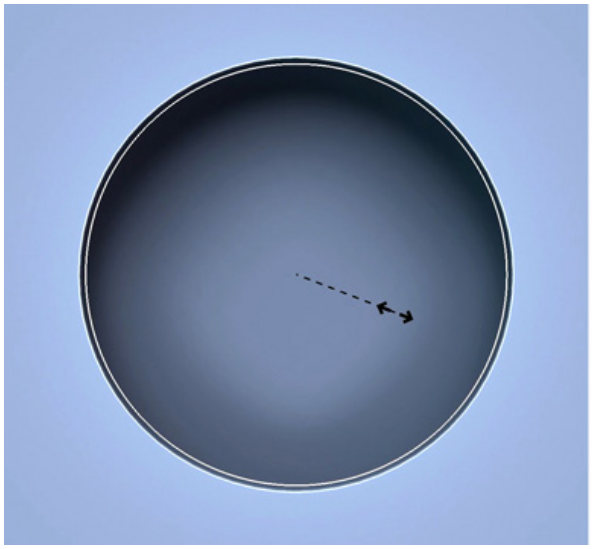


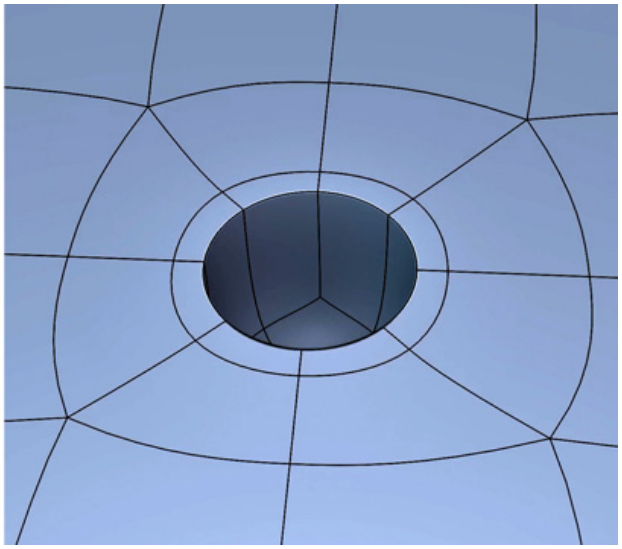
And we can **crease** these edges to keep them sharp.





Press Ctrl and 2 (or 3, depending on how much geometry you want) to give it a Subdivision modifier. After subdividing, the hole is perfectly circular. We can verify the shape by comparing it to a Circle (Shift+A > Mesh > Circle).





And that's how you make a perfect quad-topology hole from a Vertex.