
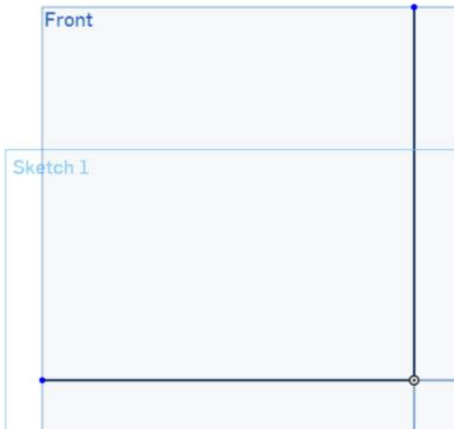


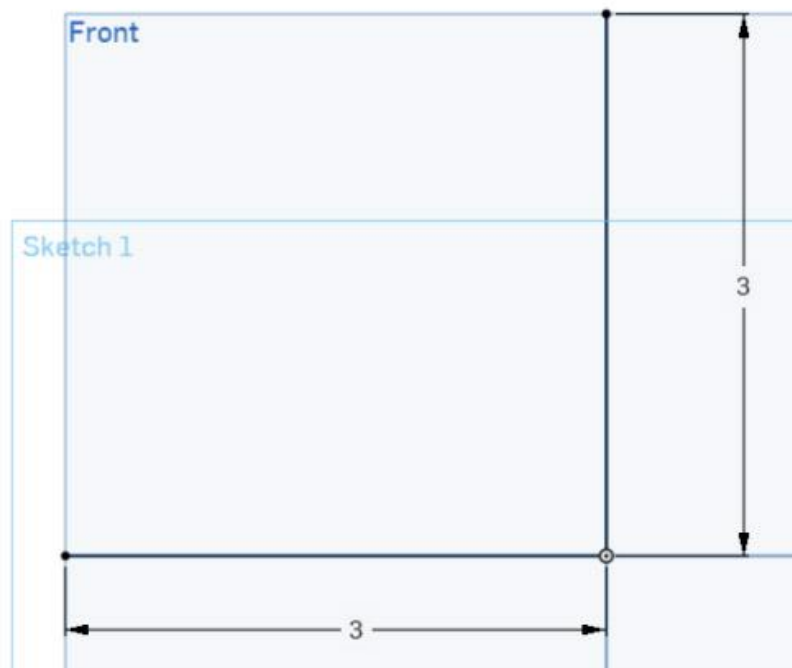
## Onshape Lesson 8

In this lesson you will create a bracket.

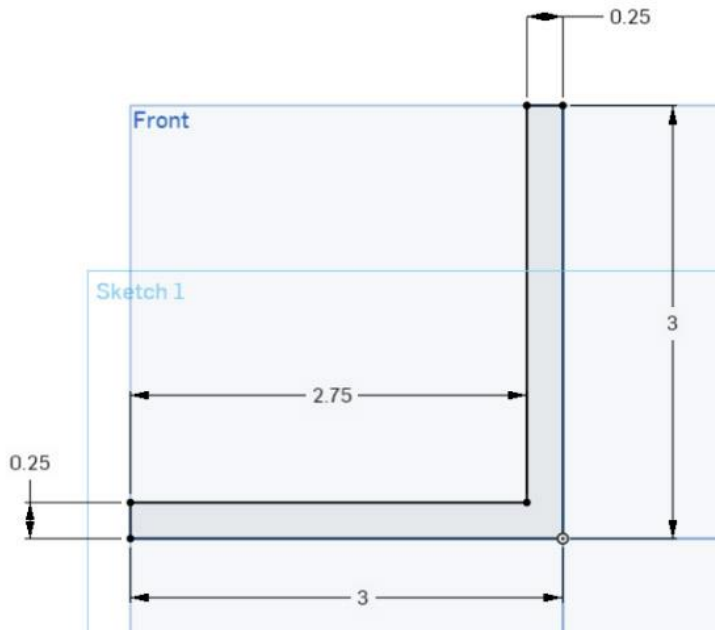
1. Create a new document and name it Lesson 8.
2. Make a new sketch on the front plane and make the view normal to the sketch plane.
3. Select the Line tool . Make a vertical line starting at the center point of the front plane and a horizontal line starting from the center point as well (see image below).




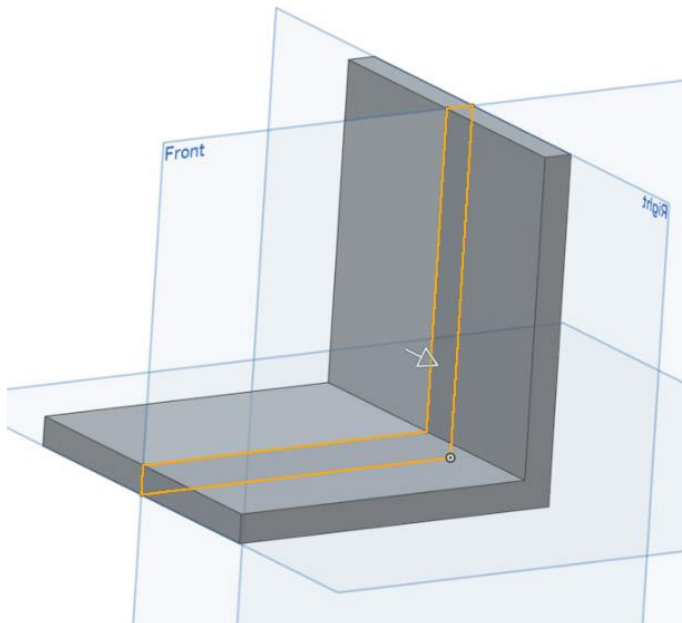
4. Select the Dimension tool . Make each line 3 inches long.




5. Use the Line and Dimension tools to finish making the profile of the L-shaped bracket as pictured below. Close the sketch.

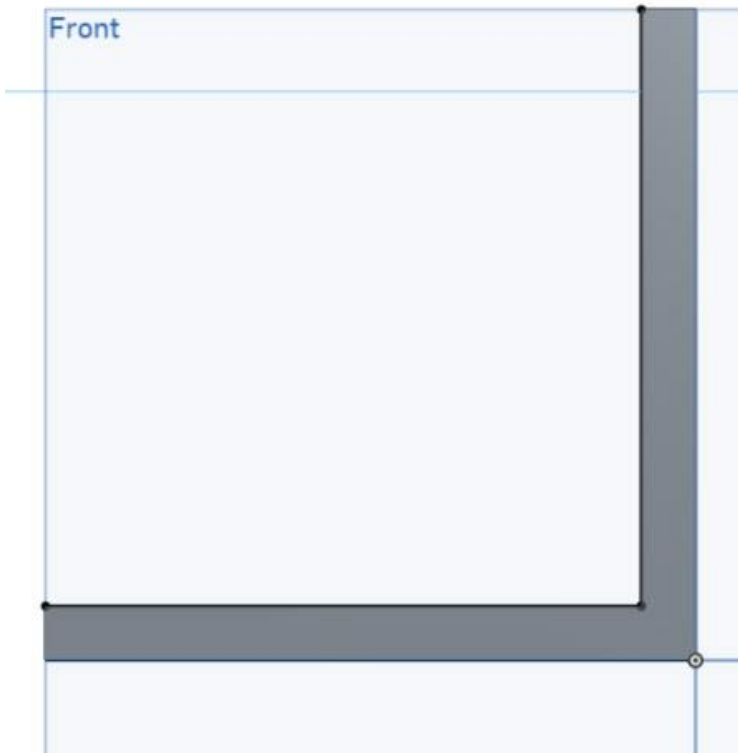



6. Select the Extrude tool . Click on the L-shaped profile to select it as the object to extrude. The extrude should be **symmetric** with a depth of **3 inches**. You now have the basic shape of the bracket. Close the extrude.

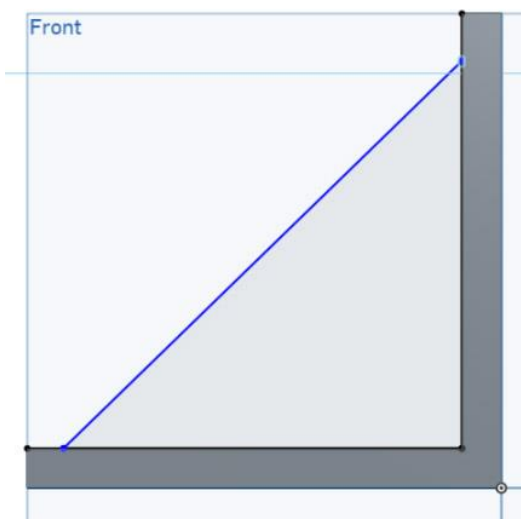


7. Make a new sketch on the front plane and make the view normal to the sketch plane. Select the

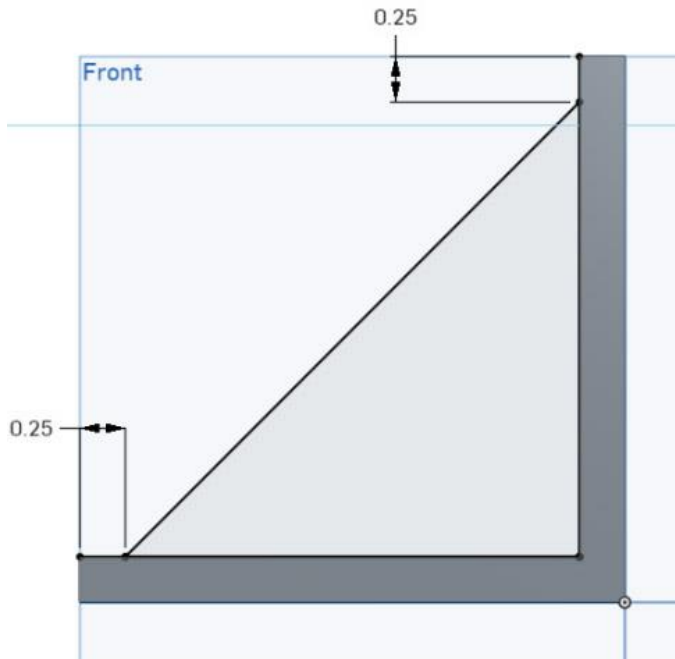
Use tool  . Click on the two lines on the inside part of the L to select them.




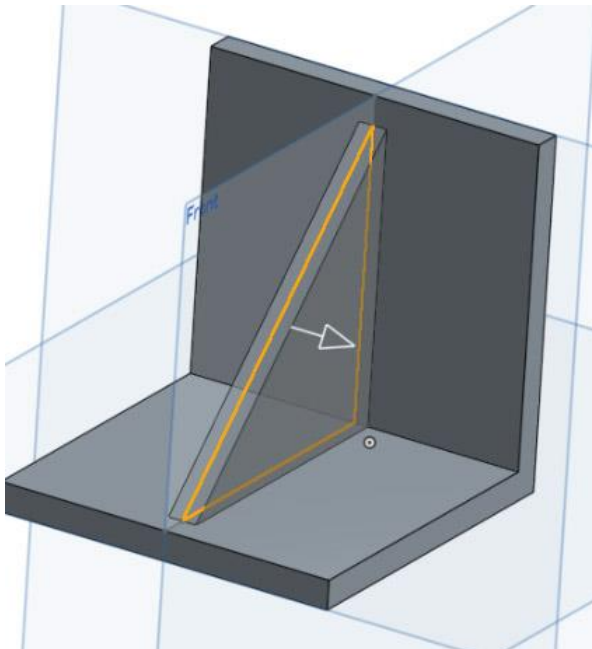
8. Use the Line tool  to draw a triangle like the one pictured below. Two of the triangle lines should be aligned on top of the bracket lines selected with the Use tool in step 7..



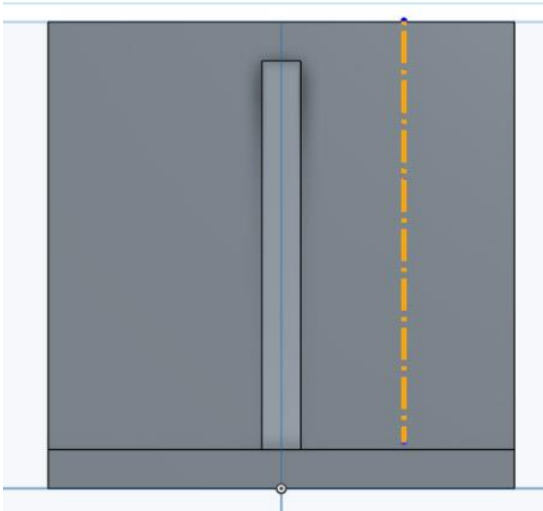
- Use the Dimension tool to set a distance of 0.25 inches from the ends of the L to the triangle intersections (see drawing below). You have completed drawing the rib for the bracket. Close the sketch.



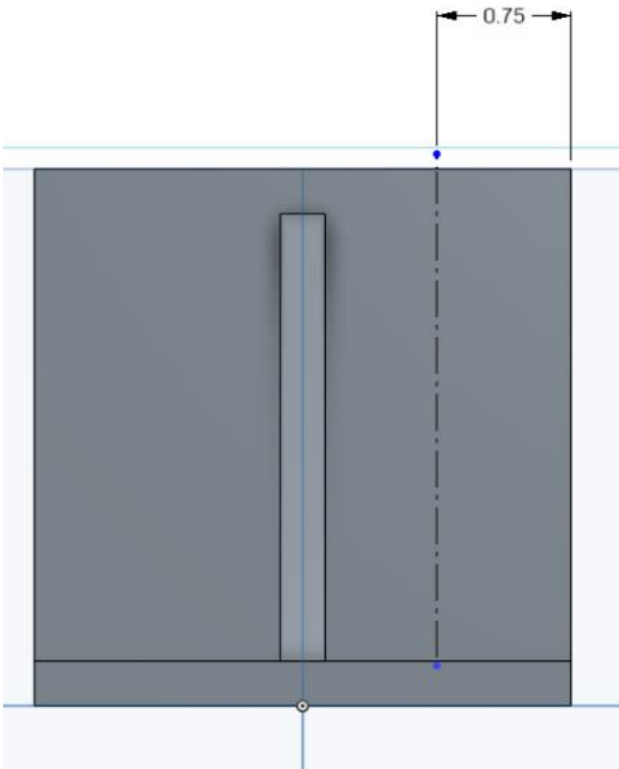
- Select the Extrude tool . Click on the triangle just completed in step 9. Extrude the triangle as a **symmetric** extrude, **0.25 inches** deep. Close the extrude.



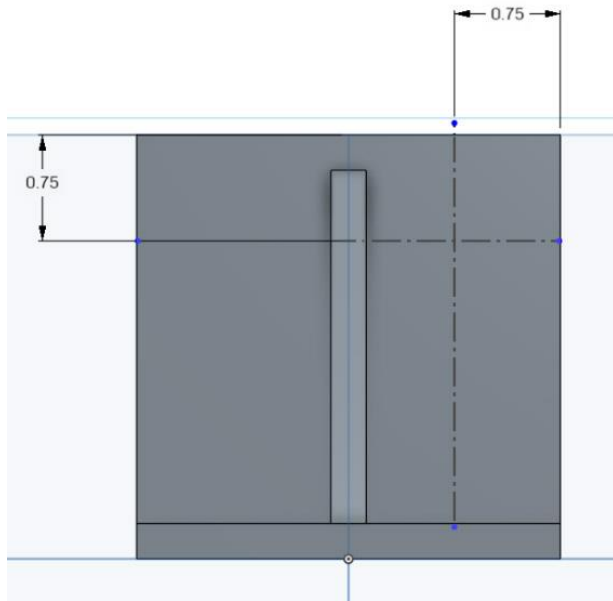
11. The bracket contains four holes for  $\frac{1}{4}$ -inch bolts. You will now work on creating the holes. Create a new sketch on the right plane and set the view normal to the sketch plane. Draw a vertical construction line as pictured below.




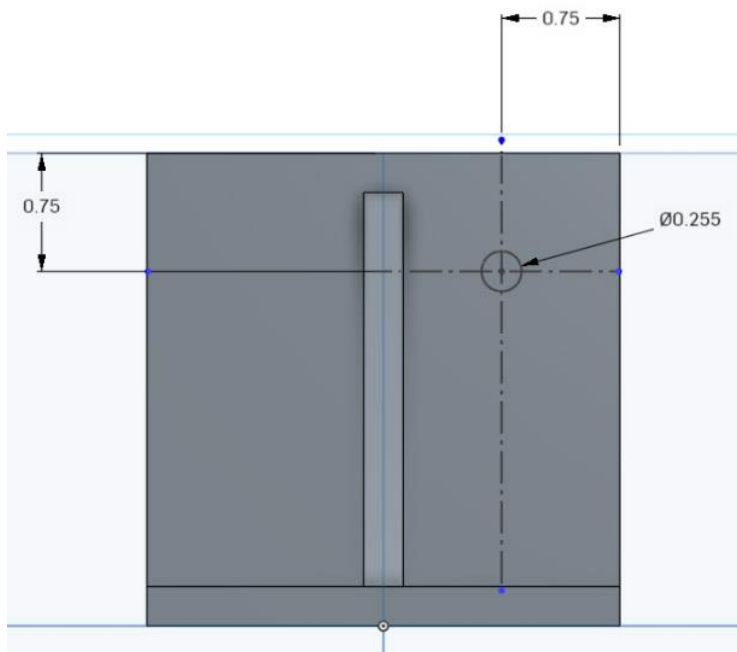
12. Use the Dimension tool to set the position of the construction line 0.75 inches from the end of the bracket.



13. Draw a horizontal construction line and dimension it as shown below (0.75 inches from top of bracket).

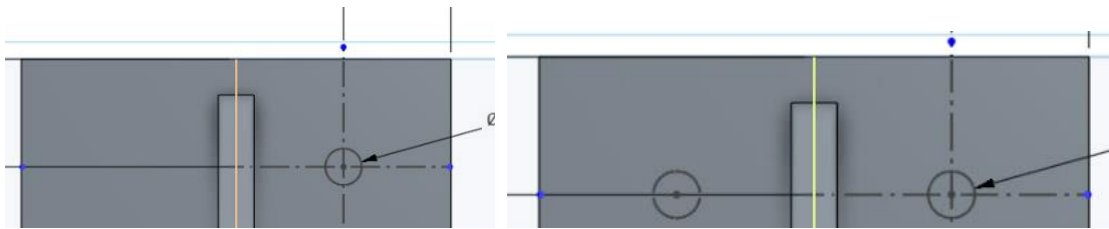


14. Use the Circle tool  to draw a circle with its center at the intersection of the construction lines. Use the Dimension tool to set the diameter of the circle to 0.255 inches. This diameter is 0.005 inches greater than the nominal size of a 1/4-inch bolt, to allow the bolt to slip easily through the hole.





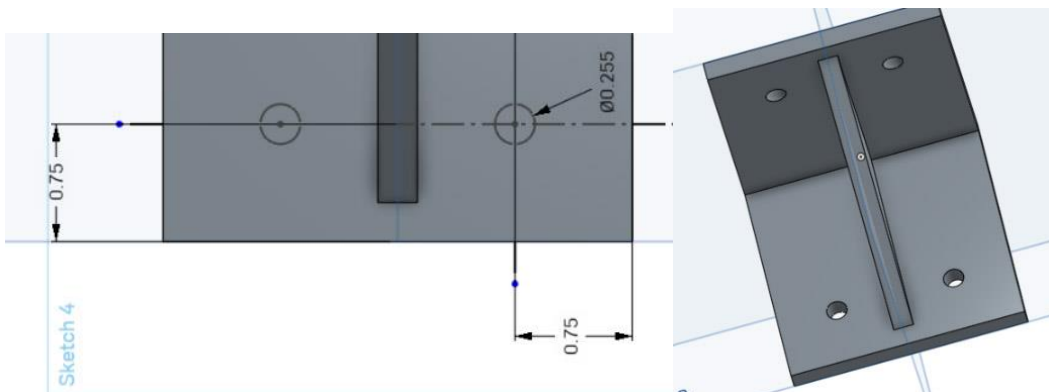
15. Select the Mirror tool . Place the mouse cursor over the vertical axis line and click it to select the axis for the mirror procedure (the yellow line in the center of images below). Then click on the circle to make a mirror copy of it. Close the sketch.




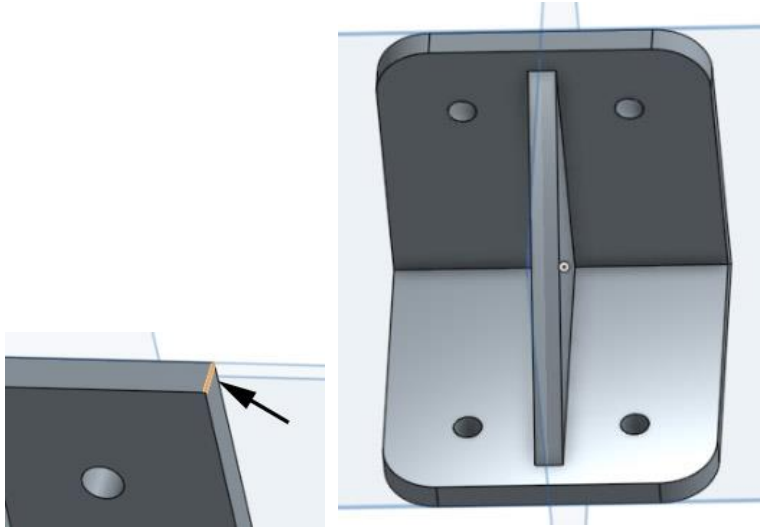
16. Select the Extrude tool . Then click on Sketch 3 in the list on the left. The two circles become highlighted as pictured below (on left). The extrude should be set to **Remove**, **“Through all”** to create the holes. Close the extrude.



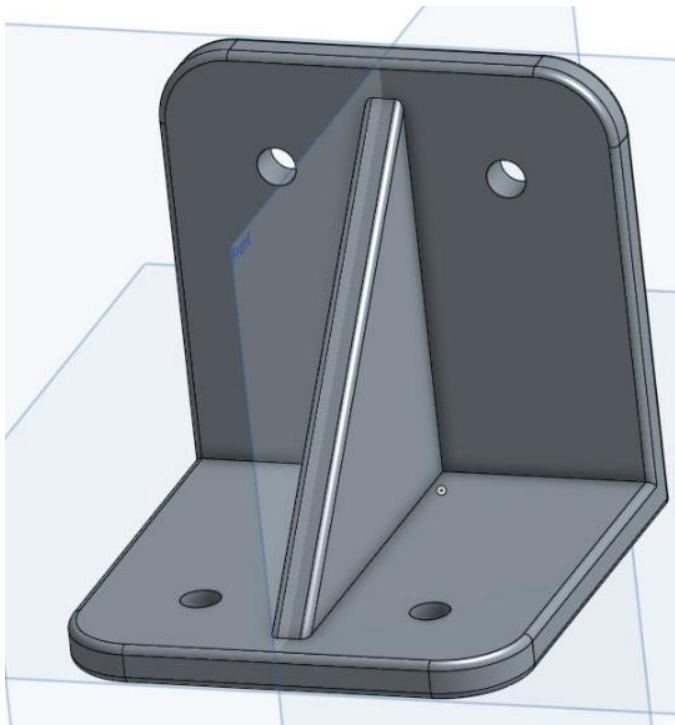
17. Create a new sketch on the top plane and set the view normal to the sketch plane. Draw two circles and extrude those circles as you did previously in steps 11 through 16.



18. The bracket is now complete, but has many sharp edges. A more refined bracket would have rounded corners and edges, which can be done with the Fillet tool . Select the Fillet tool and click on one of the corners of the bracket. In the Fillet properties box enter a radius of 0.5 inches. Then click on the remaining 3 corners to add fillets to them as well. Close the Fillet box.

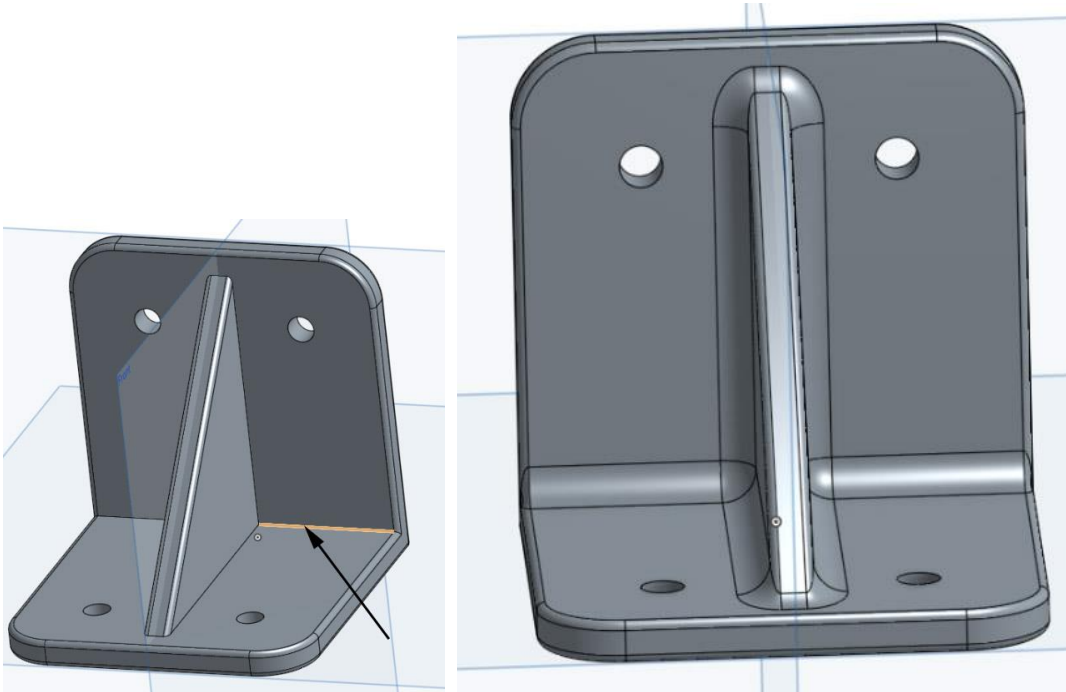



19. Select the Fillet tool again. Click on one of the outside edges of the bracket. Set the radius to 0.05 inches. Click on remaining outside edges to round them as well, to produce a bracket like the one below. Close the fillet.





20. Select the Fillet tool. Click on one of the inside edges to select it. Set the radius of the fillet to 0.20 inches. Select the remaining five inside edges to apply fillets to them as well. Close the fillet box.



21. You are finished with the fillet tool now. Select the Chamfer tool . Click the mouse on one edge of a hole to chamfer it. Set the chamfer to 0.02 inches. Then chamfer the remaining seven edges of the holes. The chamfer removes the sharp edge of the hole and makes it easier to insert a bolt into the hole. Close the chamfer. You have now completed the lesson.

