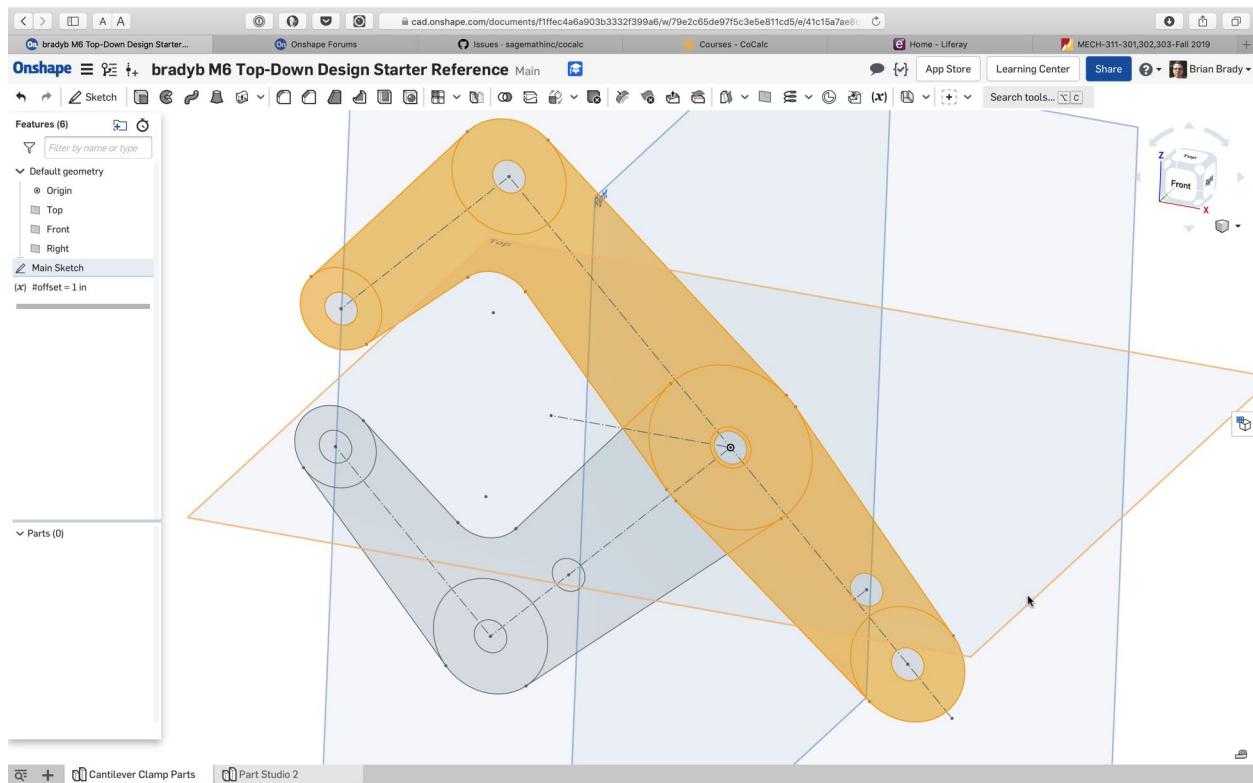
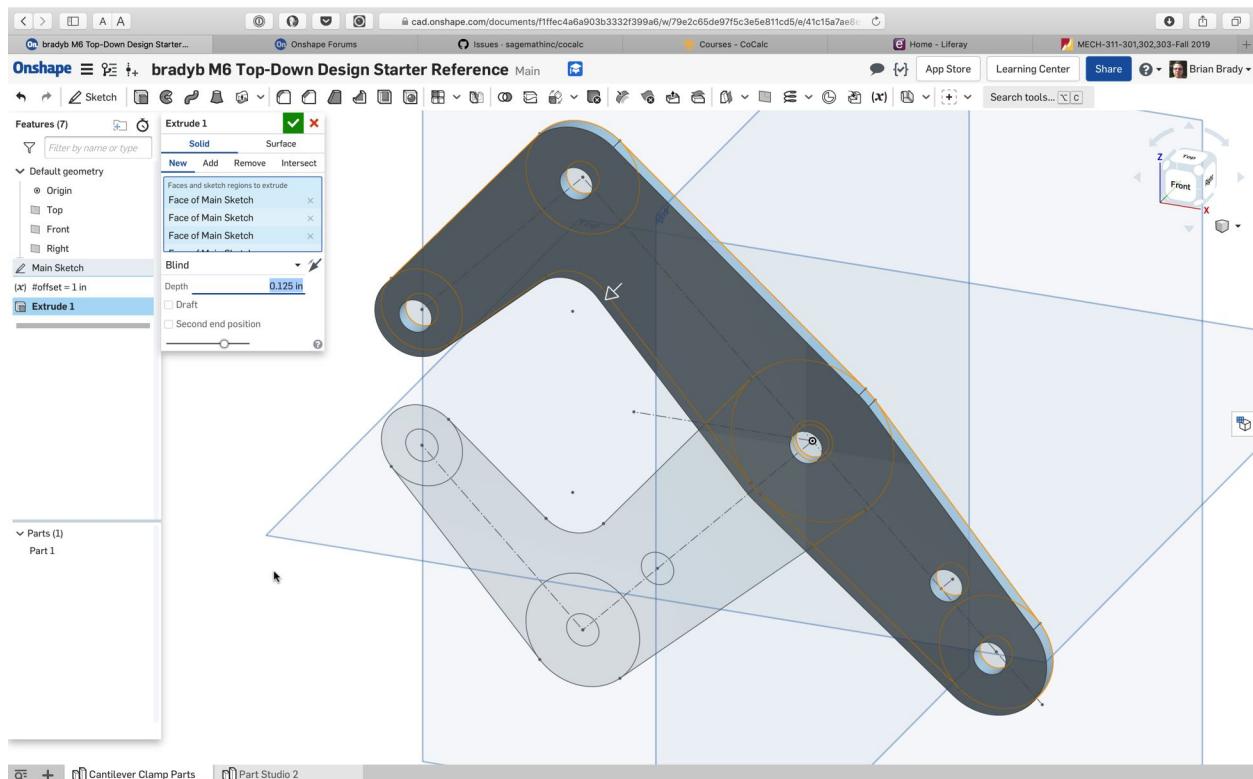


M6 Cantilever Clamp Parts - Top-Down Design

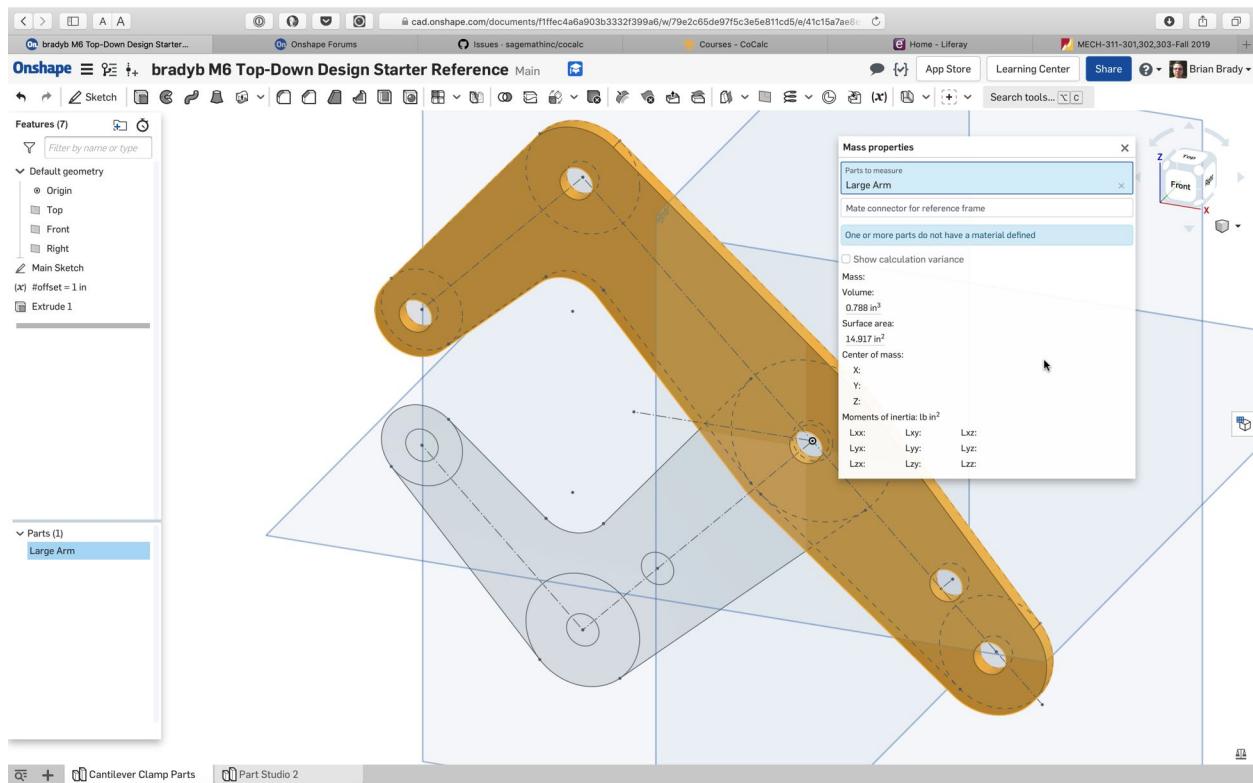


1. Select the regions shown to create the first extrude. Don't miss the small annular ring.

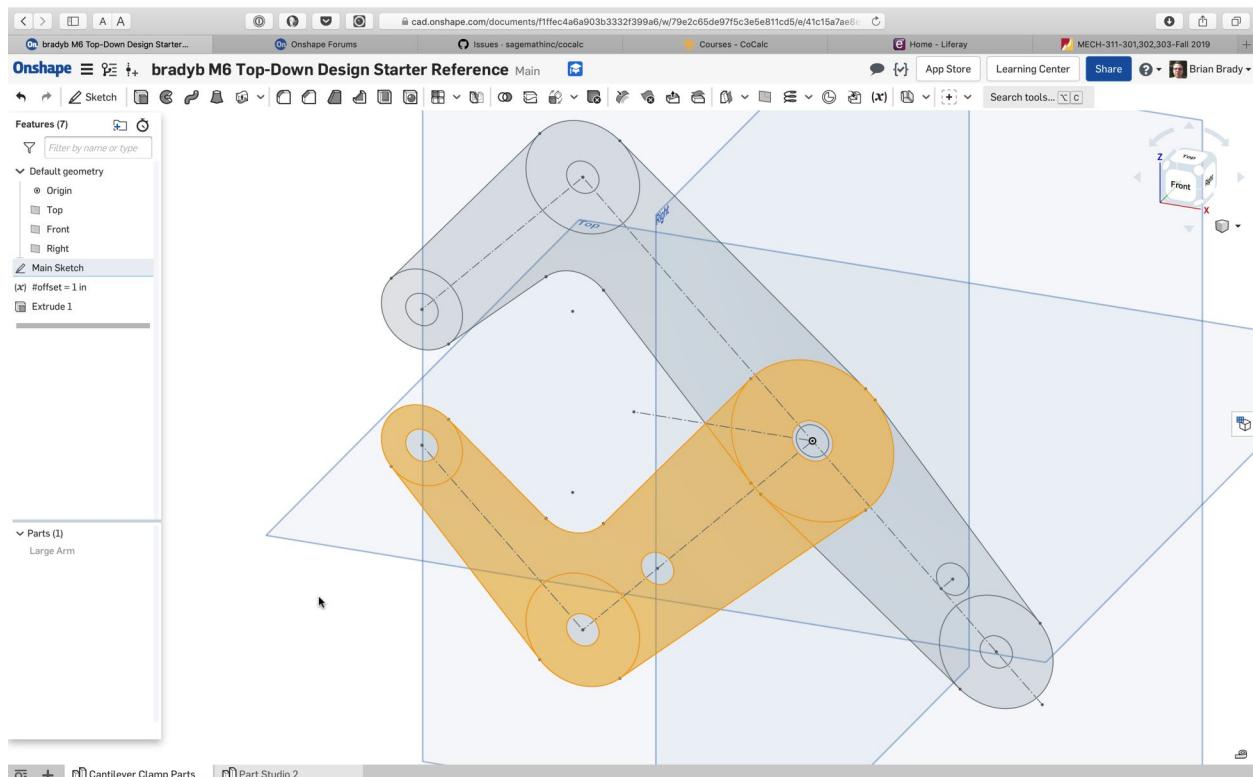


2. Extrude the selected regions in the direction shown by 0.125 inches.

M6 Cantilever Clamp Parts - Top-Down Design

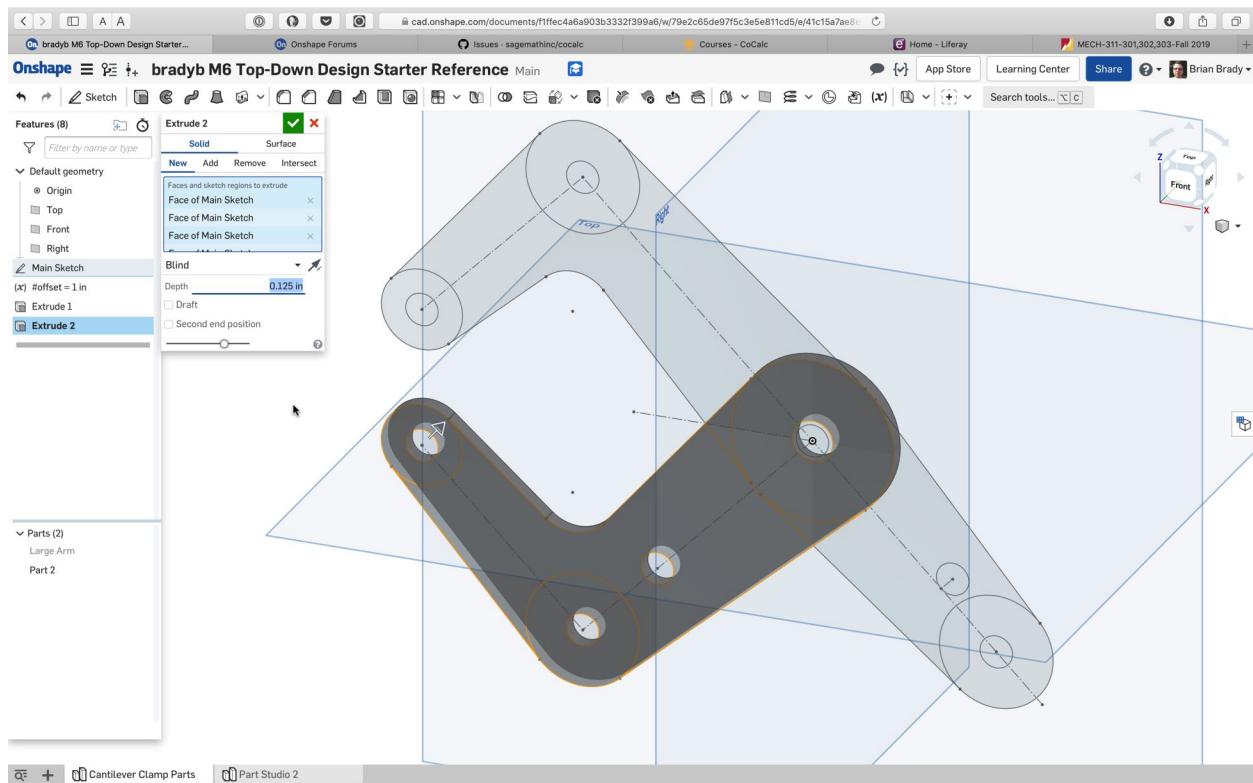


3. Rename the part “Large Arm” and check that its volume is 0.788 in³.

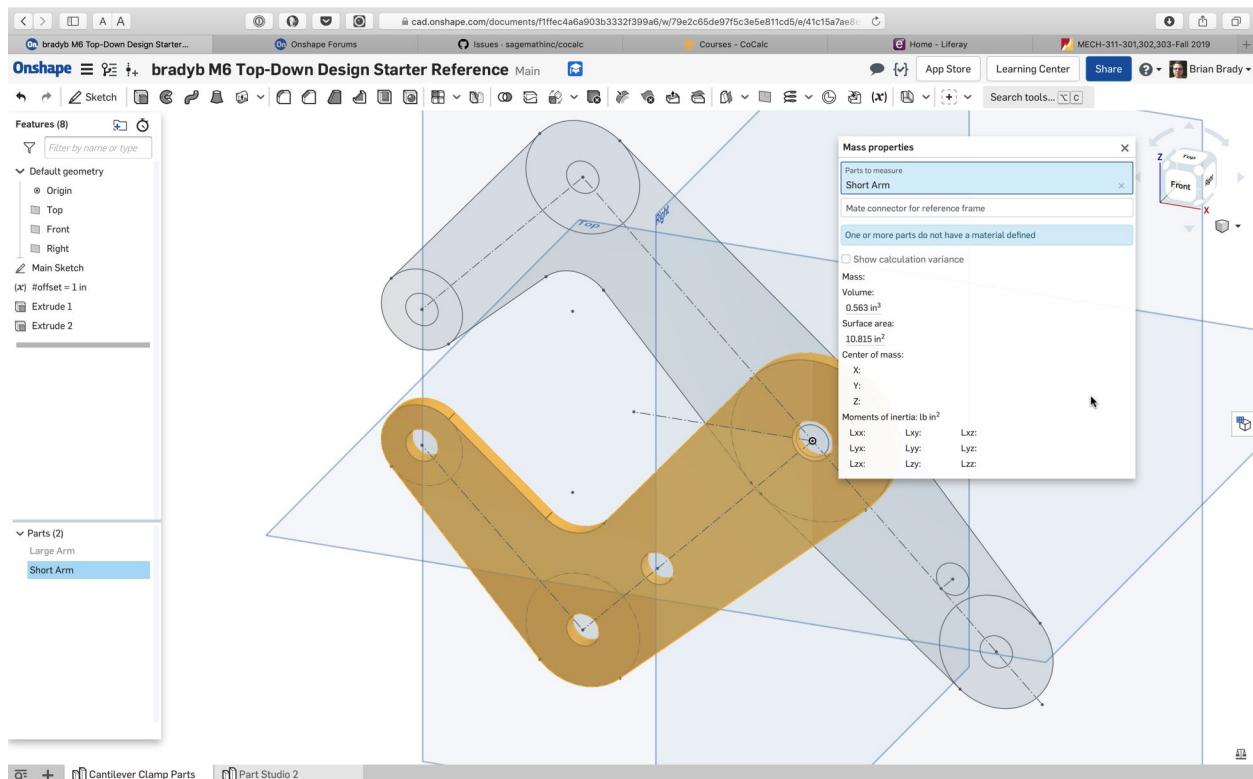


4. Hide the Large Arm and show the Main Sketch so you can select the regions shown. This time do not include the small annular ring.

M6 Cantilever Clamp Parts - Top-Down Design

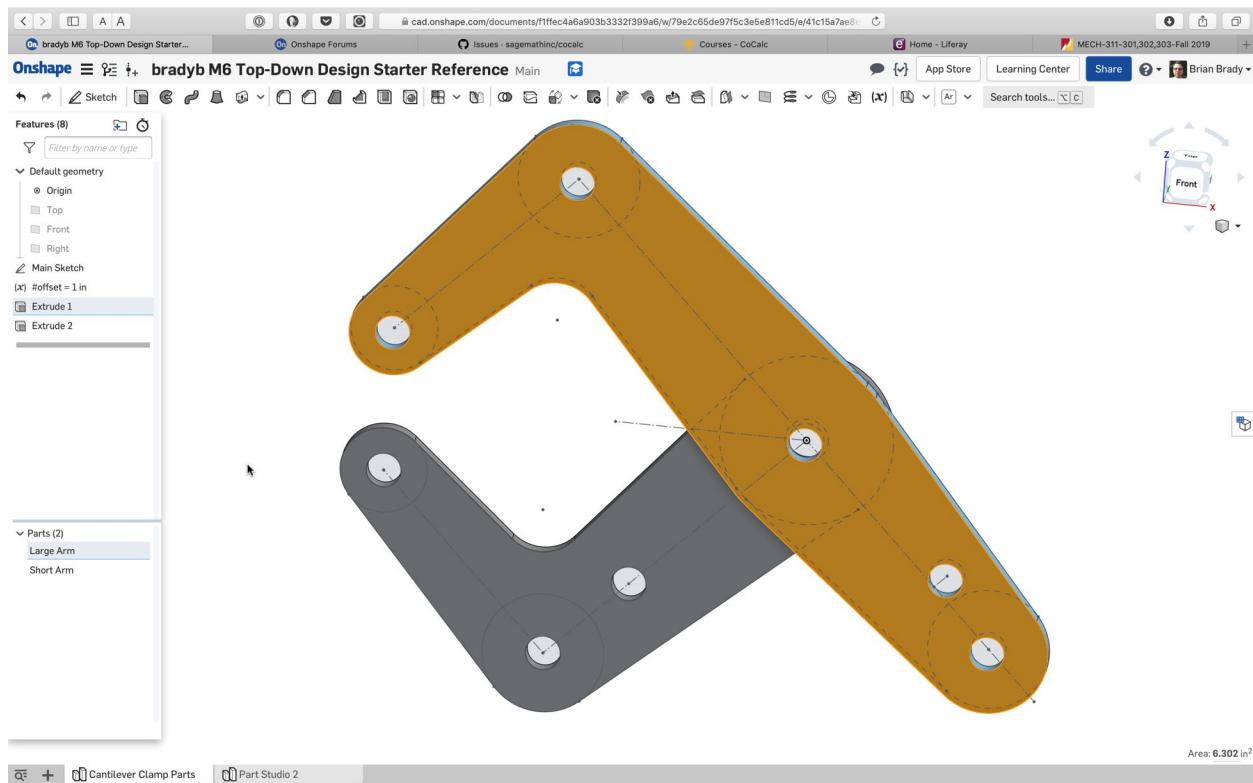


5. Extrude (New) the selected regions in the opposite direction as the Large Arm extrude by 0.125 inches.

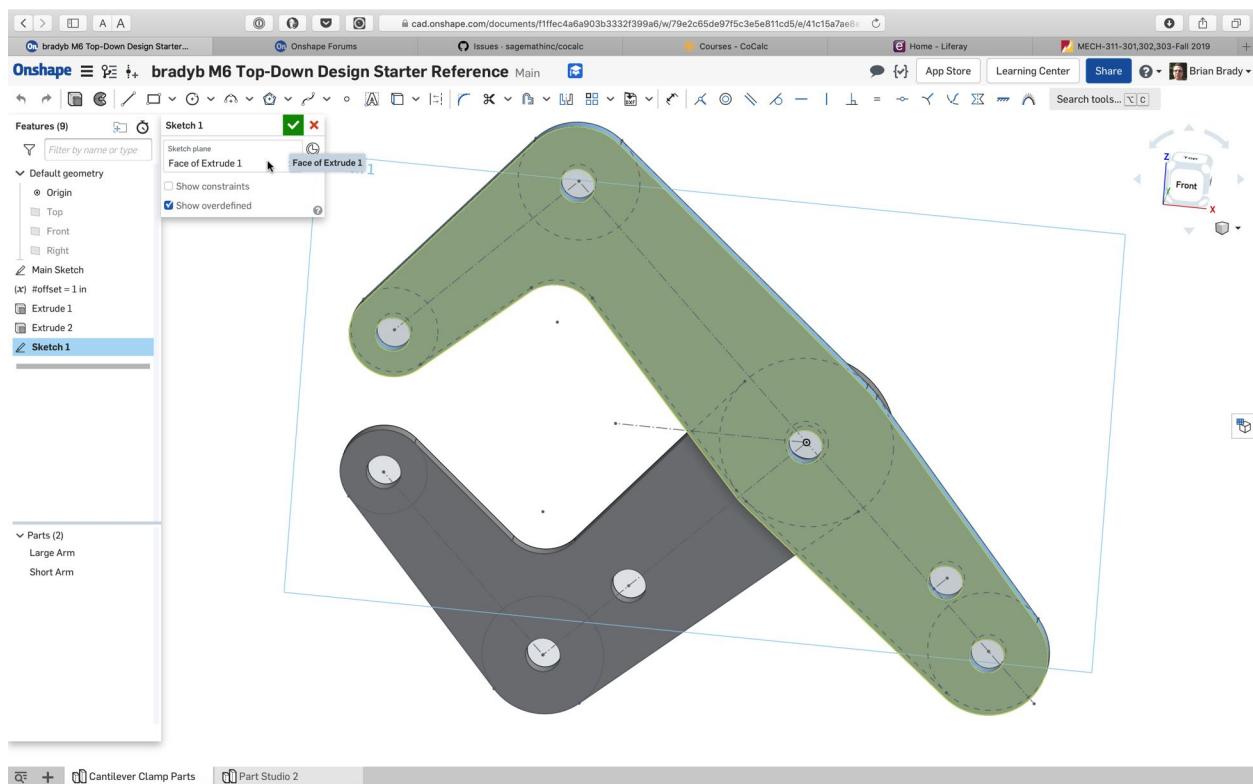


6. Rename the new part as “Short Arm” and check that its volume is 0.563 in³.

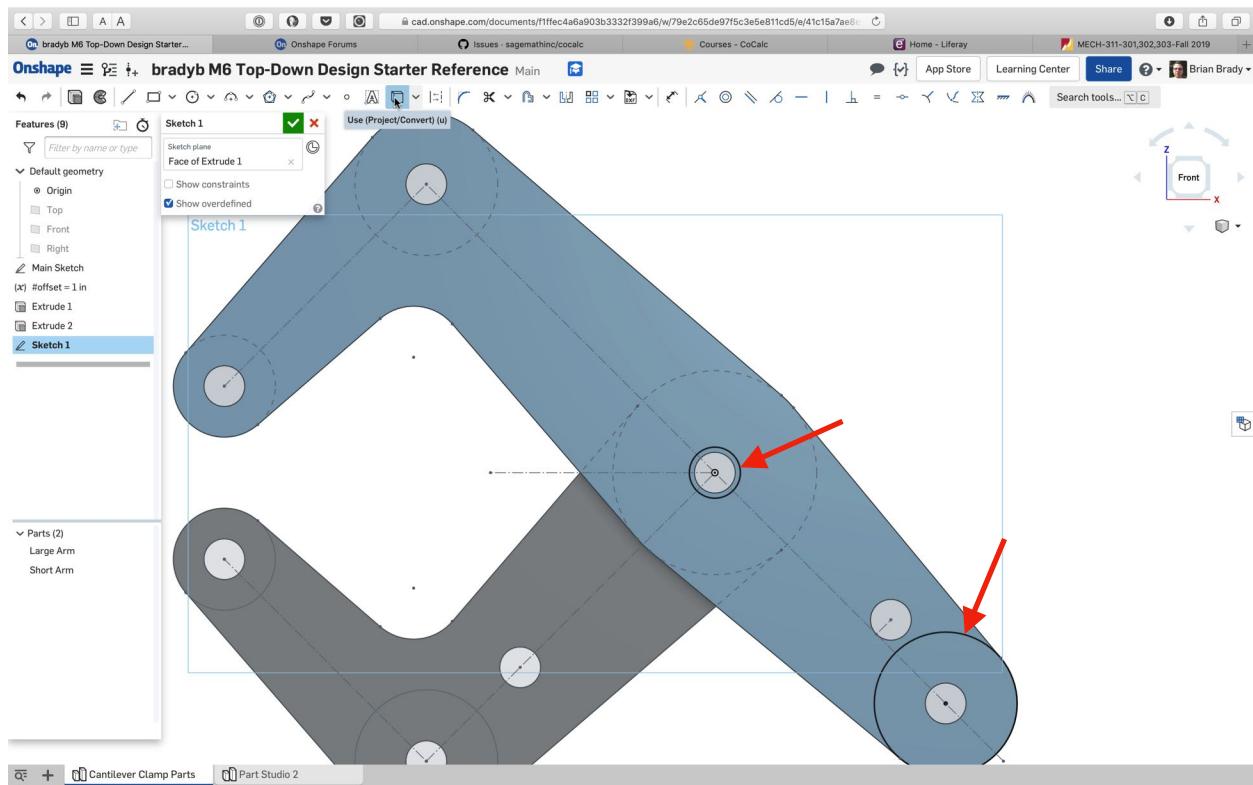
M6 Cantilever Clamp Parts - Top-Down Design



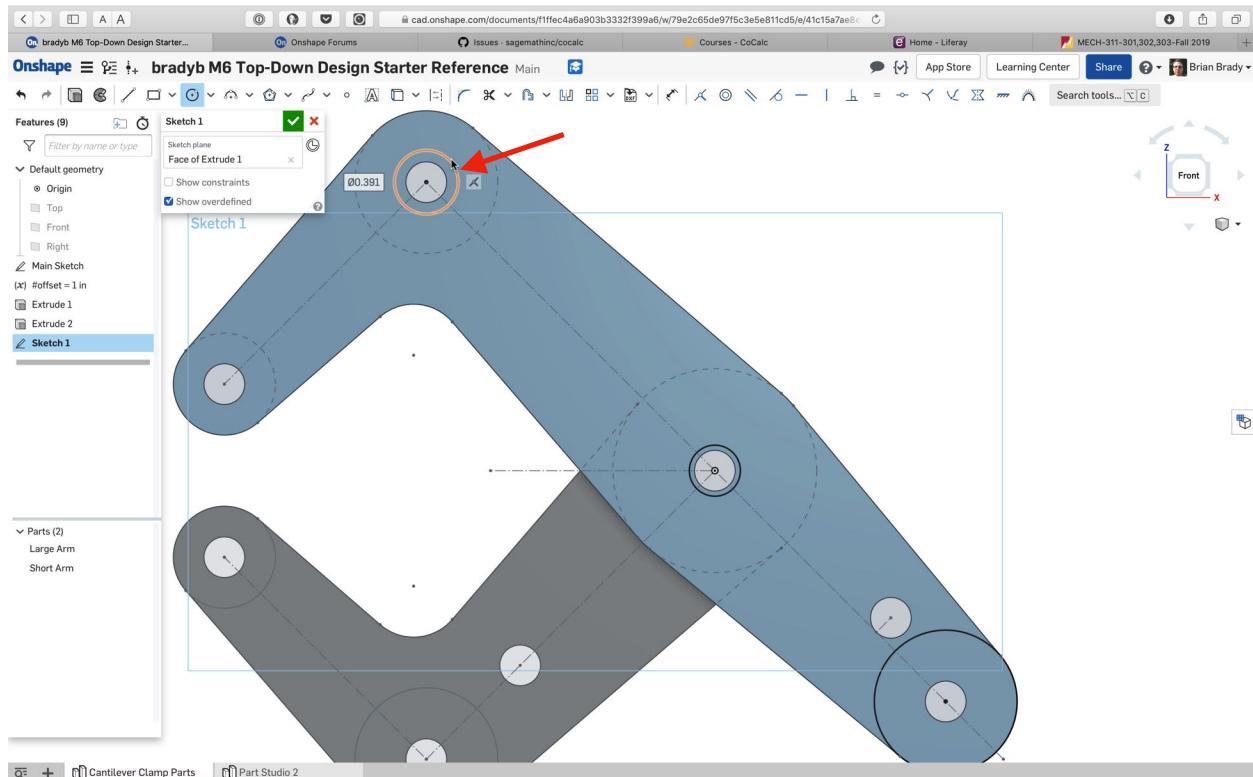
7. Unhide the Large Arm and select the face shown to create a sketch.



M6 Cantilever Clamp Parts - Top-Down Design

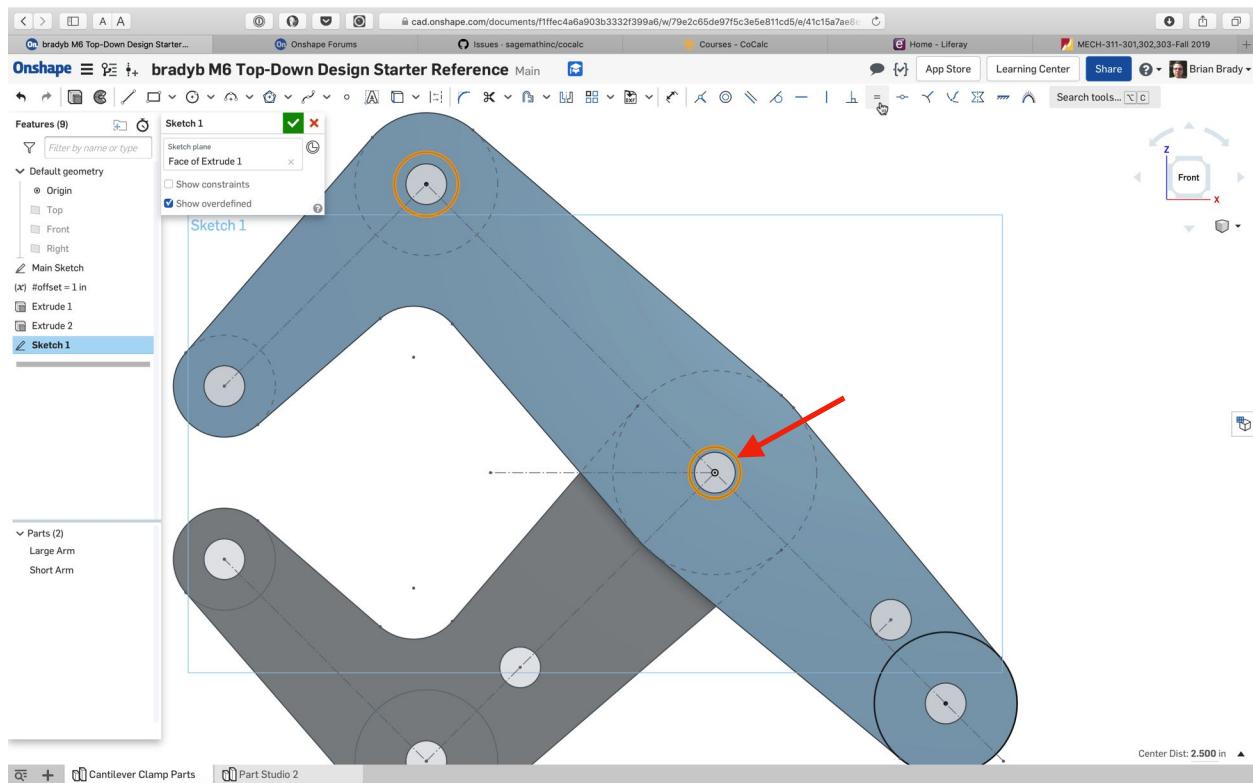


8. "Use" the two circles shown from the Main Sketch.

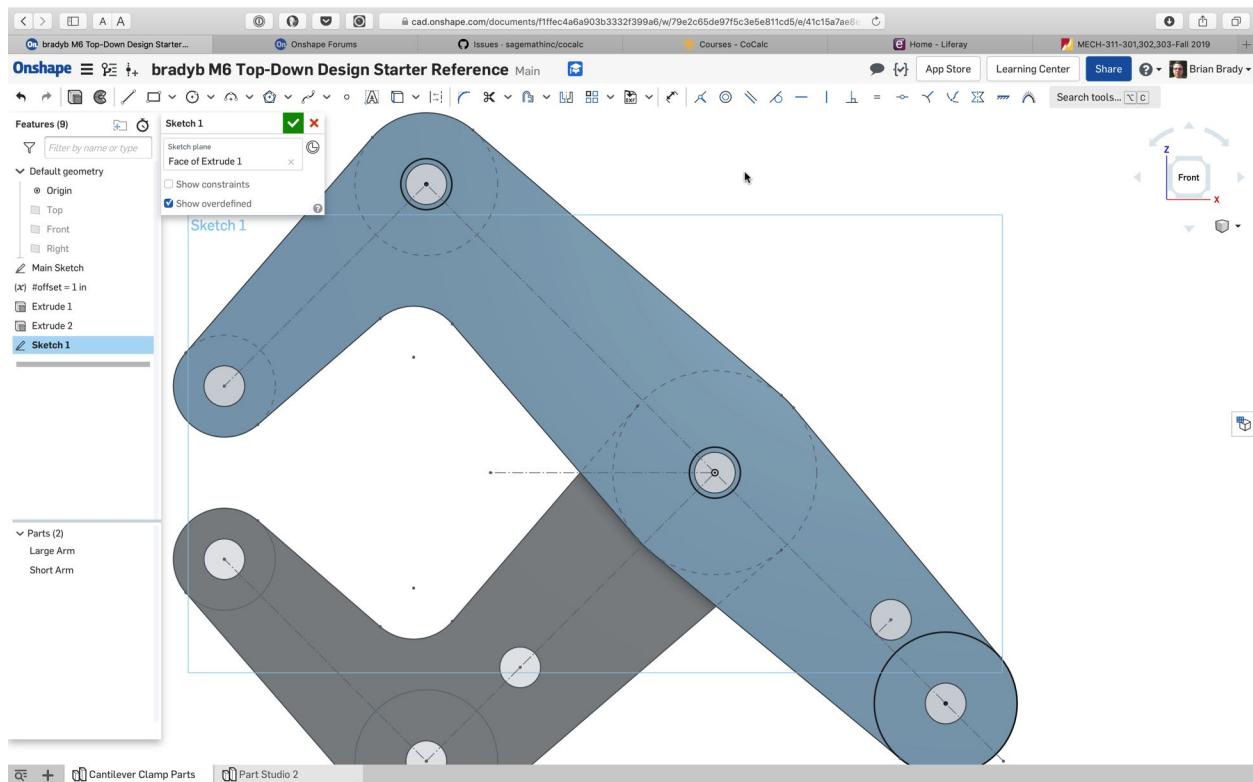


9. Draw a small circle at the location shown.

M6 Cantilever Clamp Parts - Top-Down Design

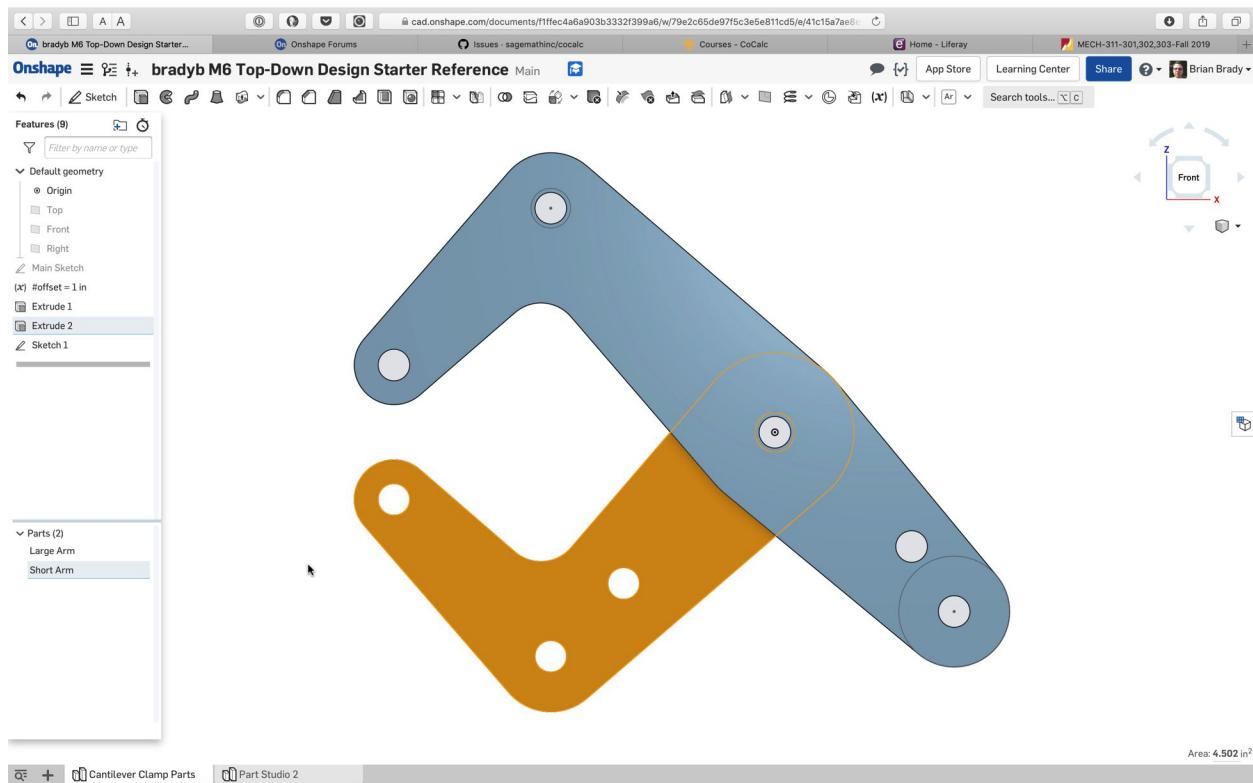


10. Use the Equal constraint to make the new circle the same size as the highlighted circle.

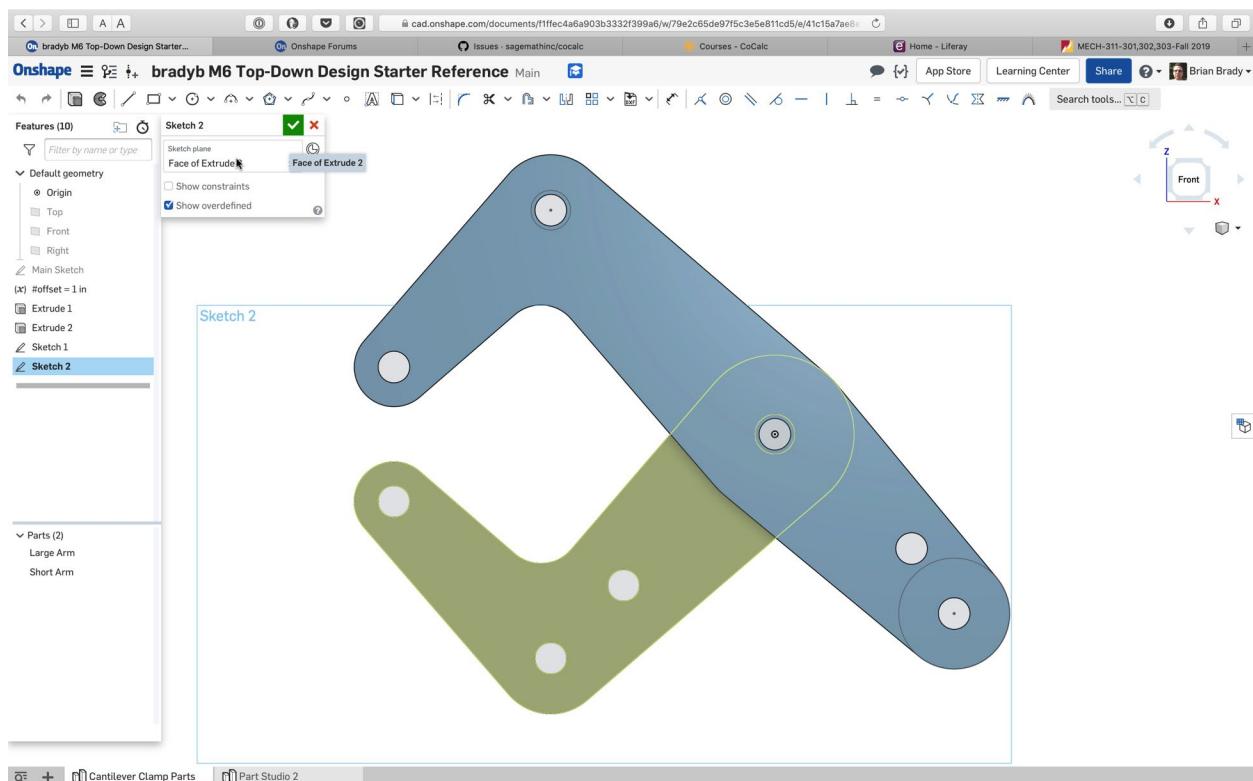


11. Accept the changes.

M6 Cantilever Clamp Parts - Top-Down Design

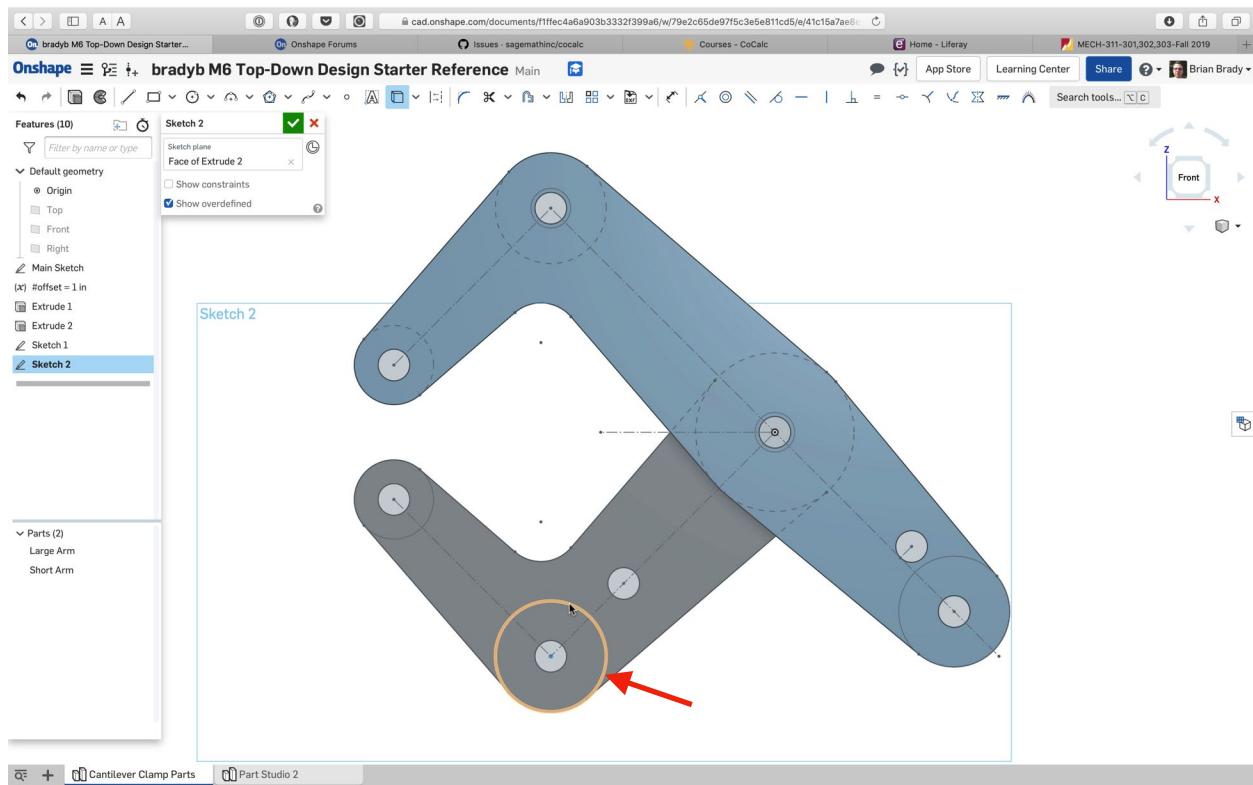


12. Hide the Main Sketch and select the face of the Short Arm as shown.

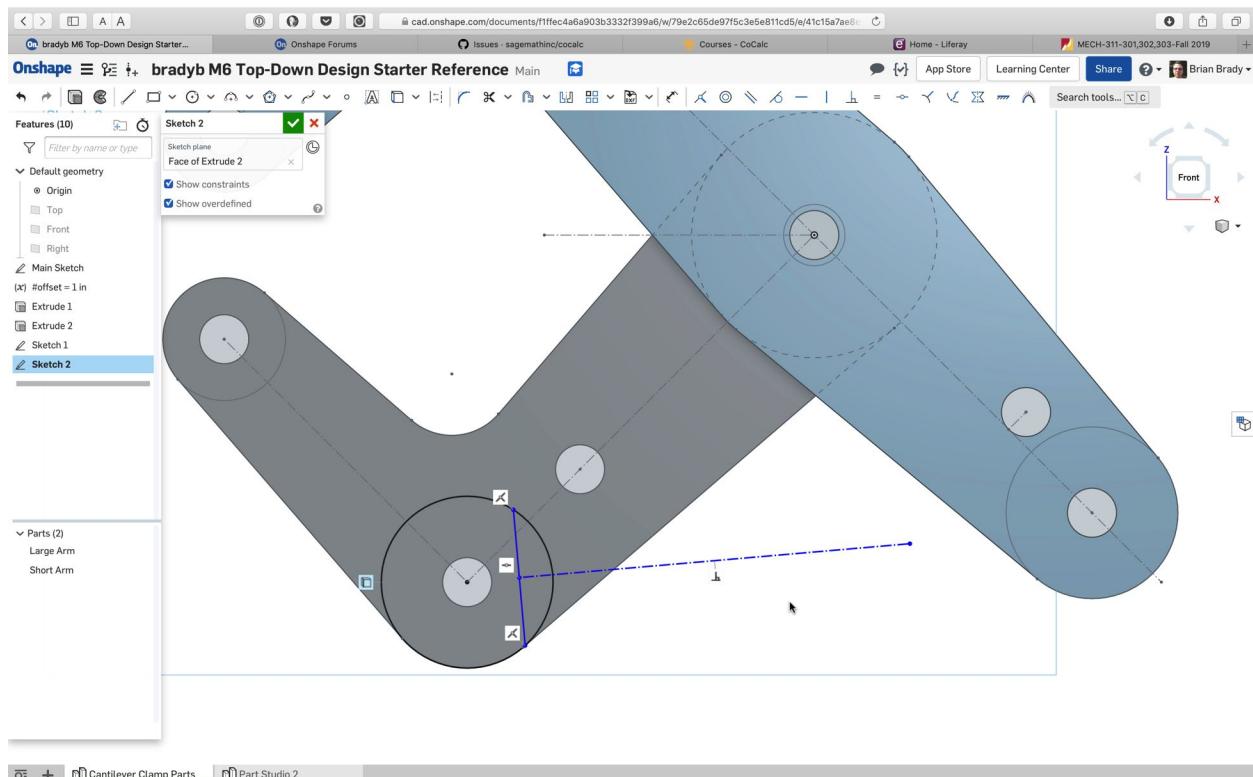


13. Create a new sketch on the selected face.

M6 Cantilever Clamp Parts - Top-Down Design

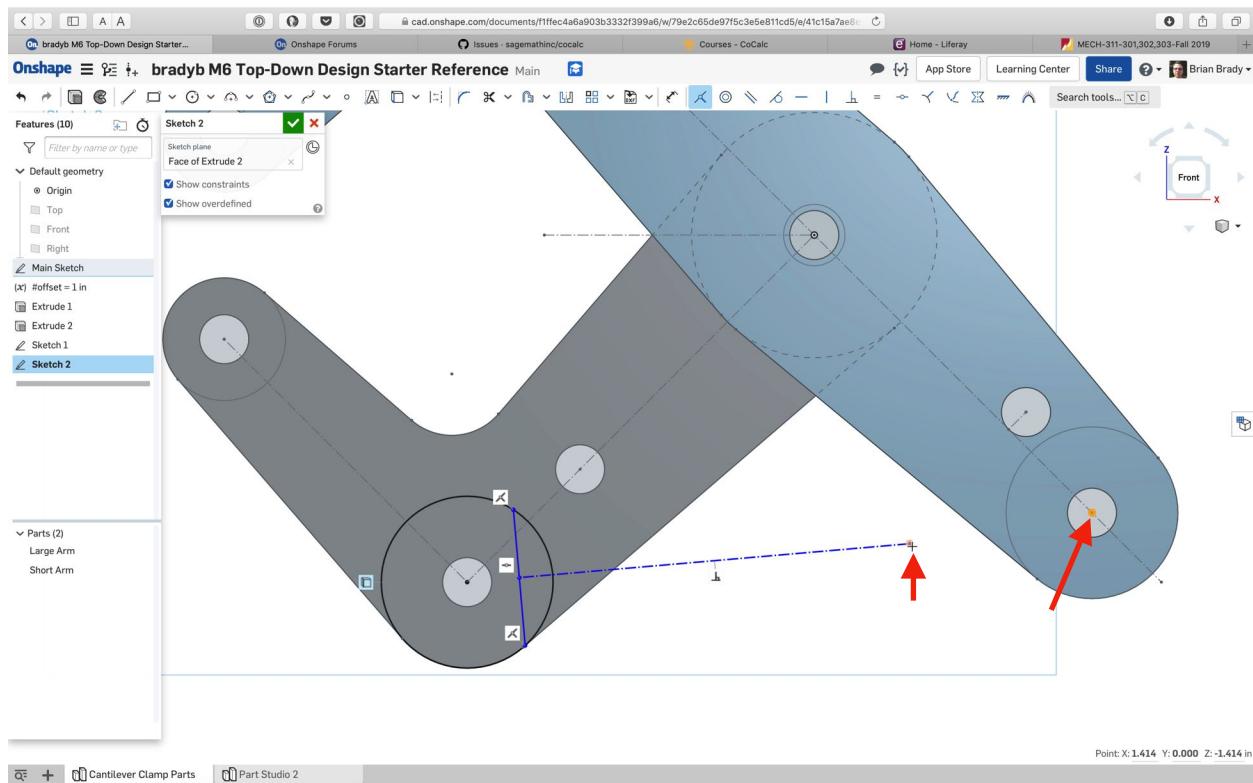


14. Unhide the Main Sketch and “Use” the indicated circle.

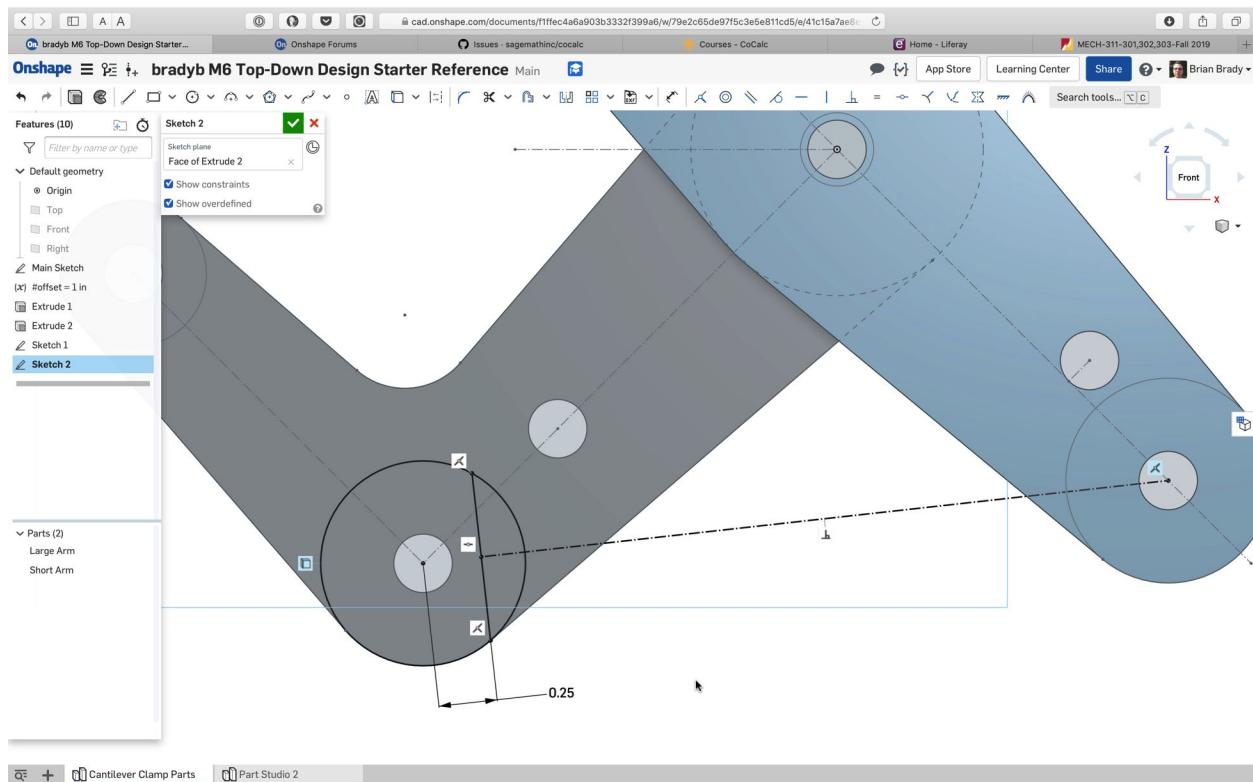


15. Draw the two lines shown, making sure both ends of the small line are coincident to the circle but not vertical and the long construction line is perpendicular to the short line.

M6 Cantilever Clamp Parts - Top-Down Design

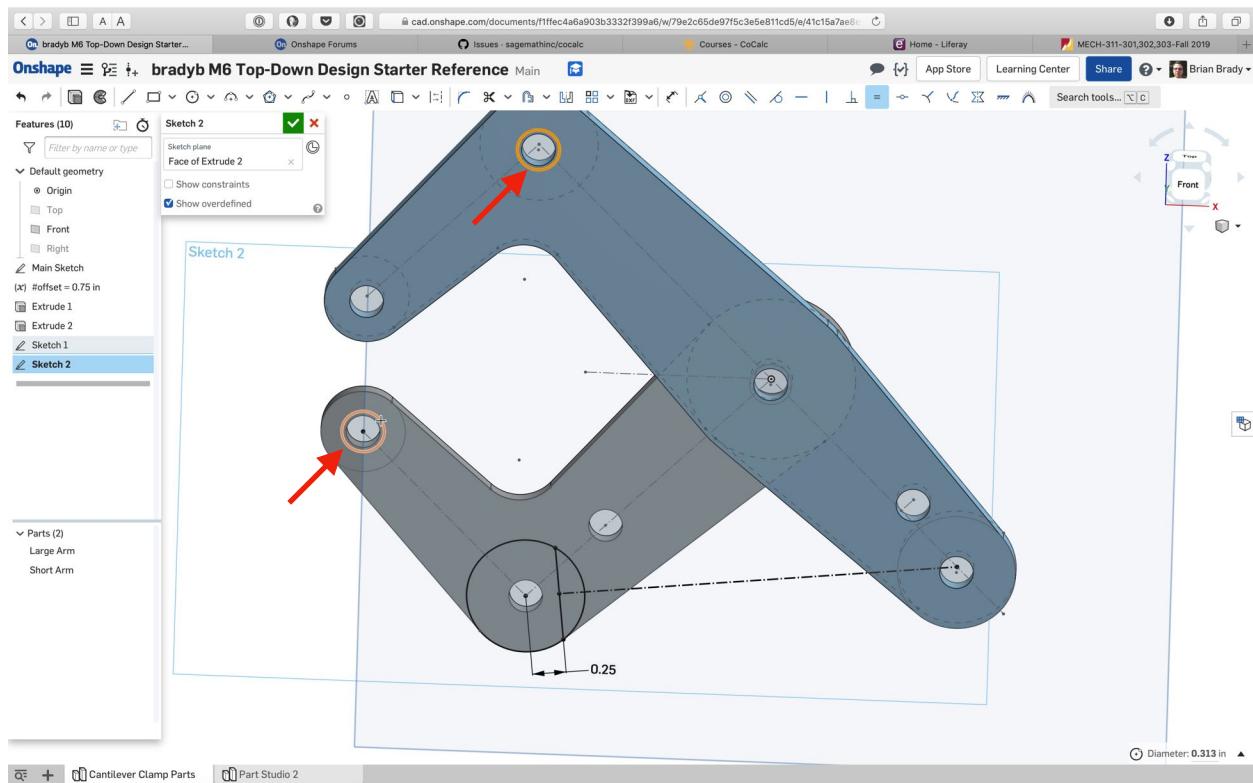


16. Select the end of the long line and the center of the circle shown and add a coincident constraint.

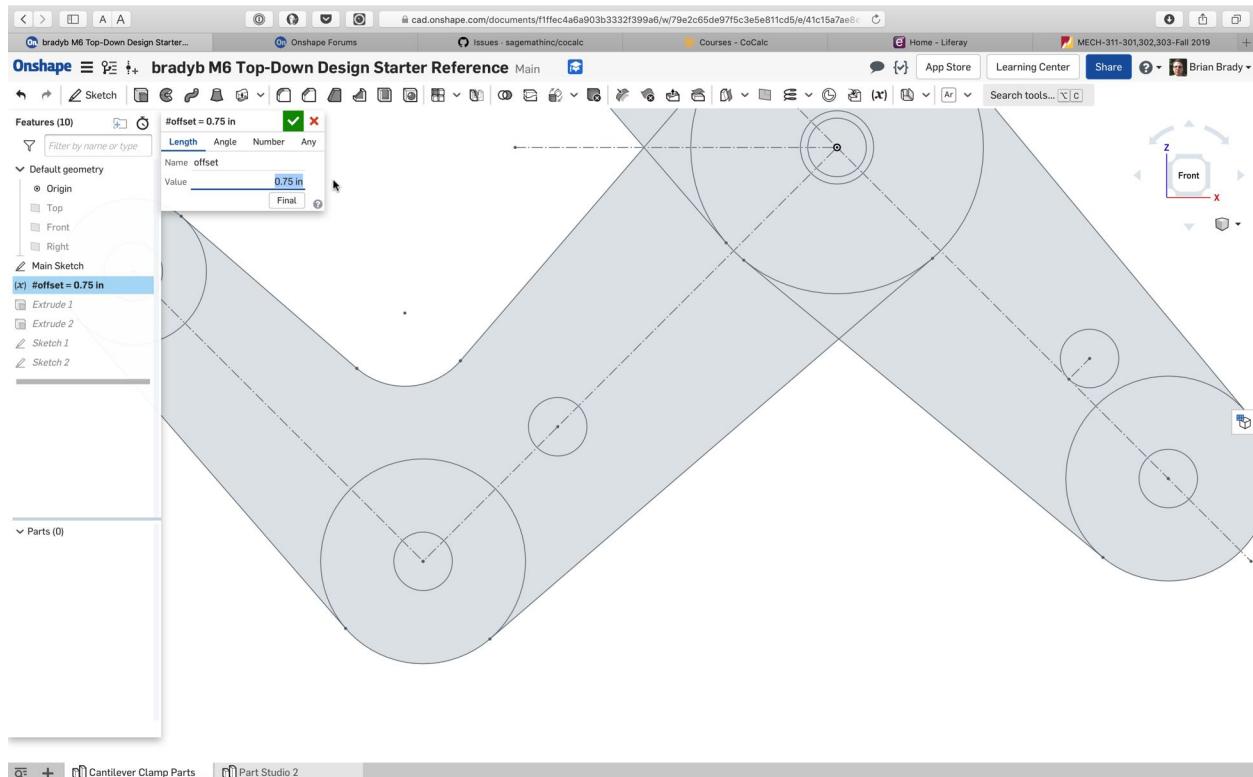


17. Add a 0.25 dimension from the center of the circle shown to the short line.

M6 Cantilever Clamp Parts - Top-Down Design

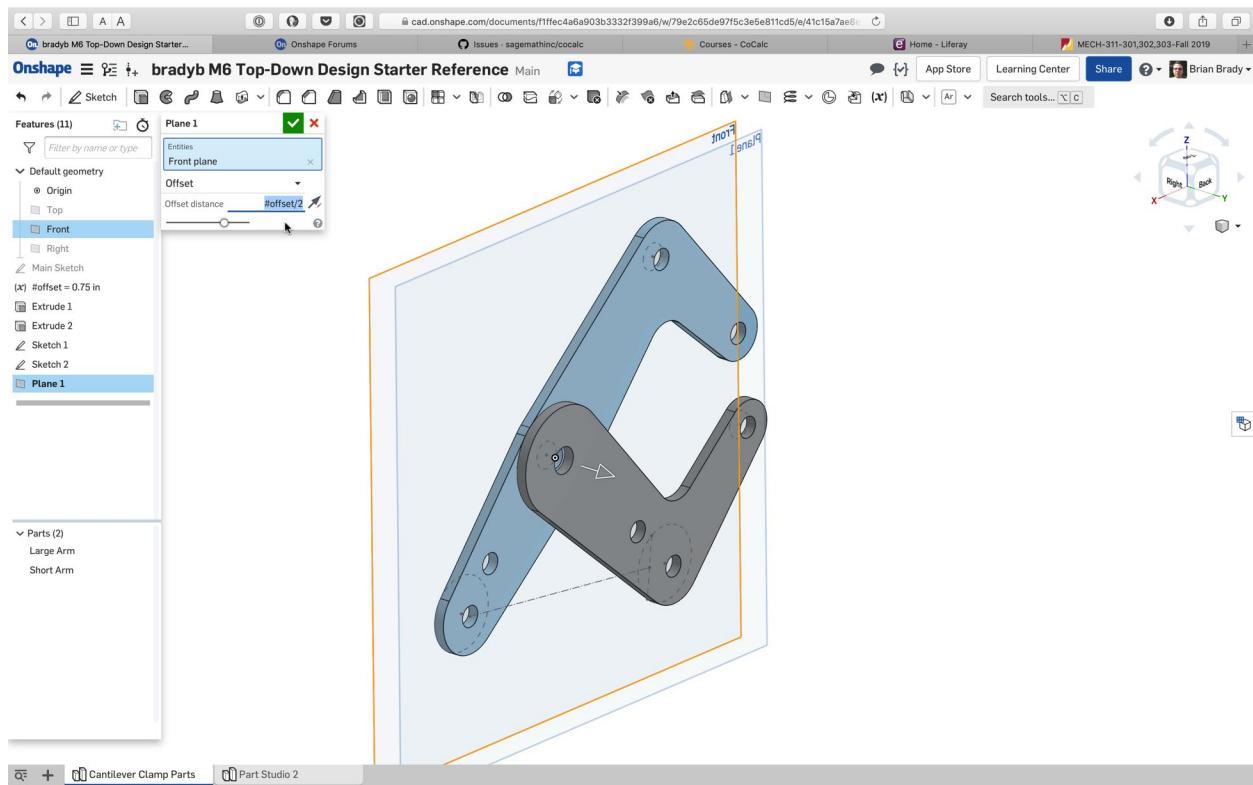


18. Create a circle at the location shown towards the end of the Short Arm and set it equal to the circle shown on the Large Arm. Accept the sketch.

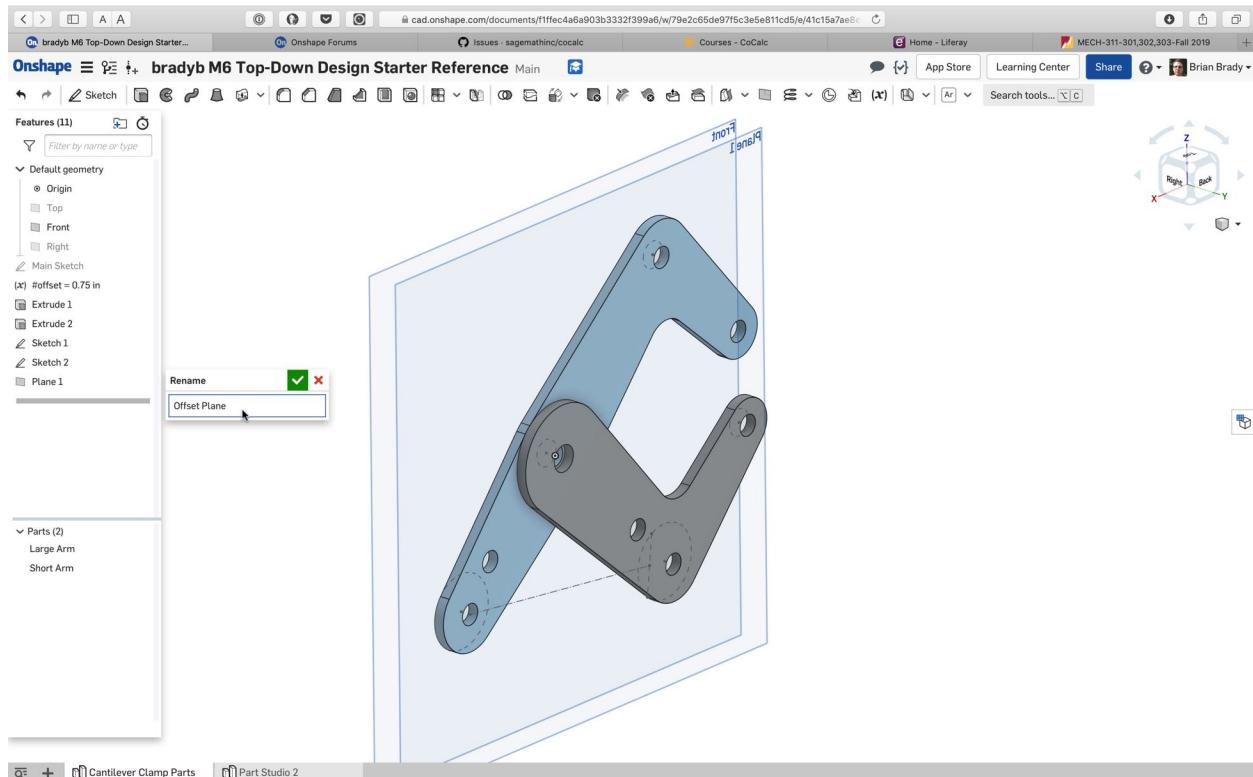


18. Use the Variable tool to create a variable named "offset" with a value of 0.75 inches and drag it up the feature list to a position just below the Main Sketch.

M6 Cantilever Clamp Parts - Top-Down Design

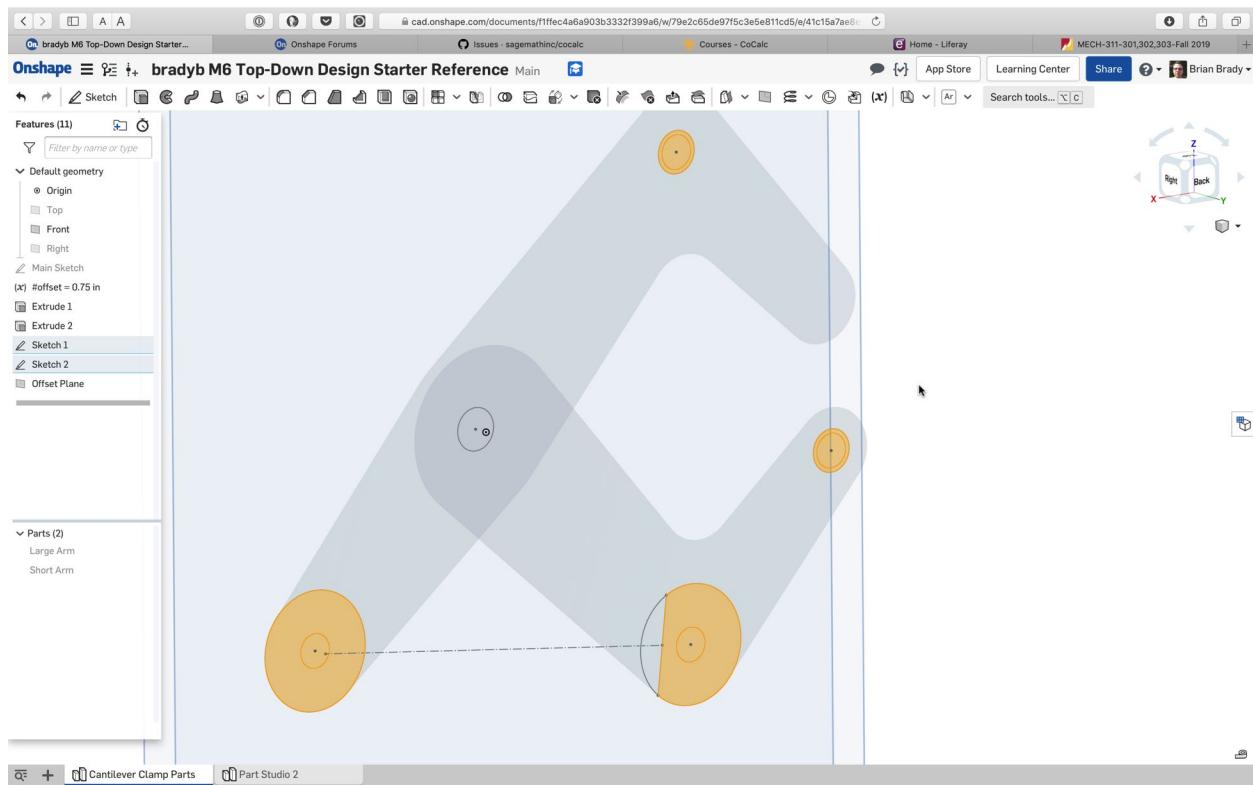


19. Create a new offset plane in which the offset distance is #offset/2

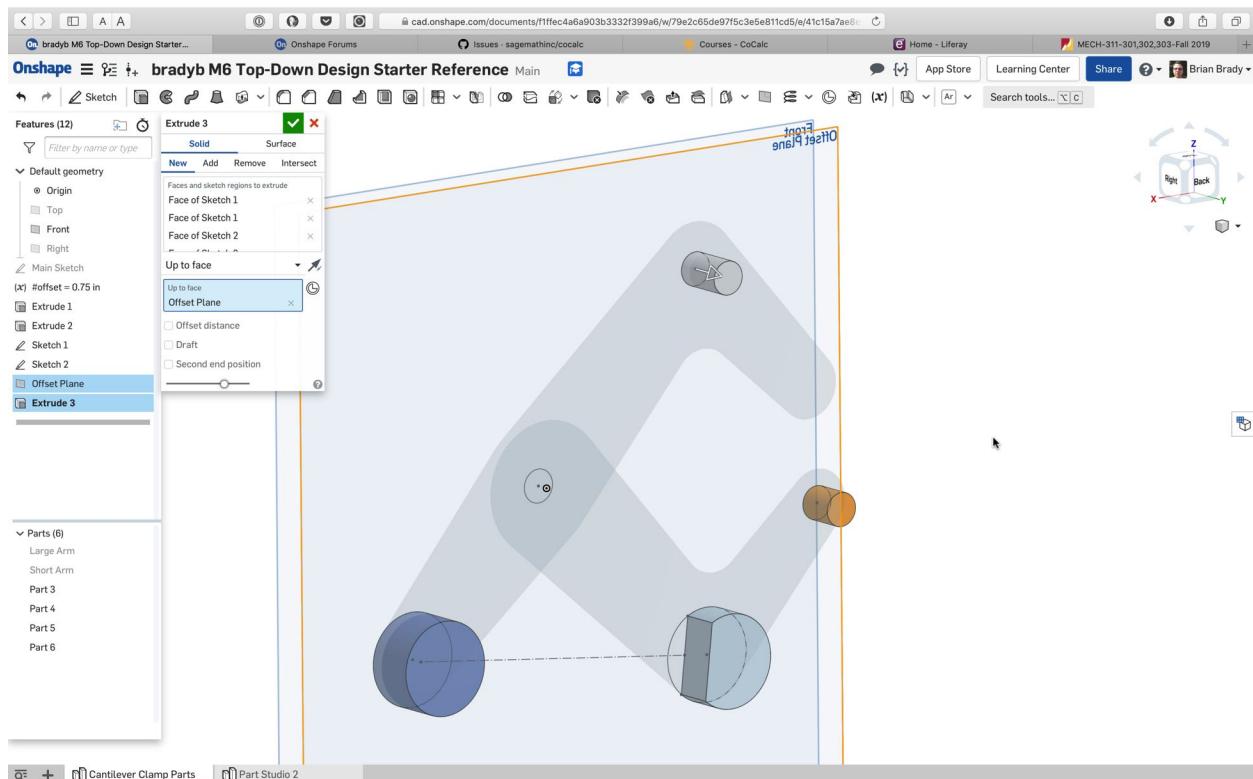


20. Rename the new plane "Offset Plane"

M6 Cantilever Clamp Parts - Top-Down Design

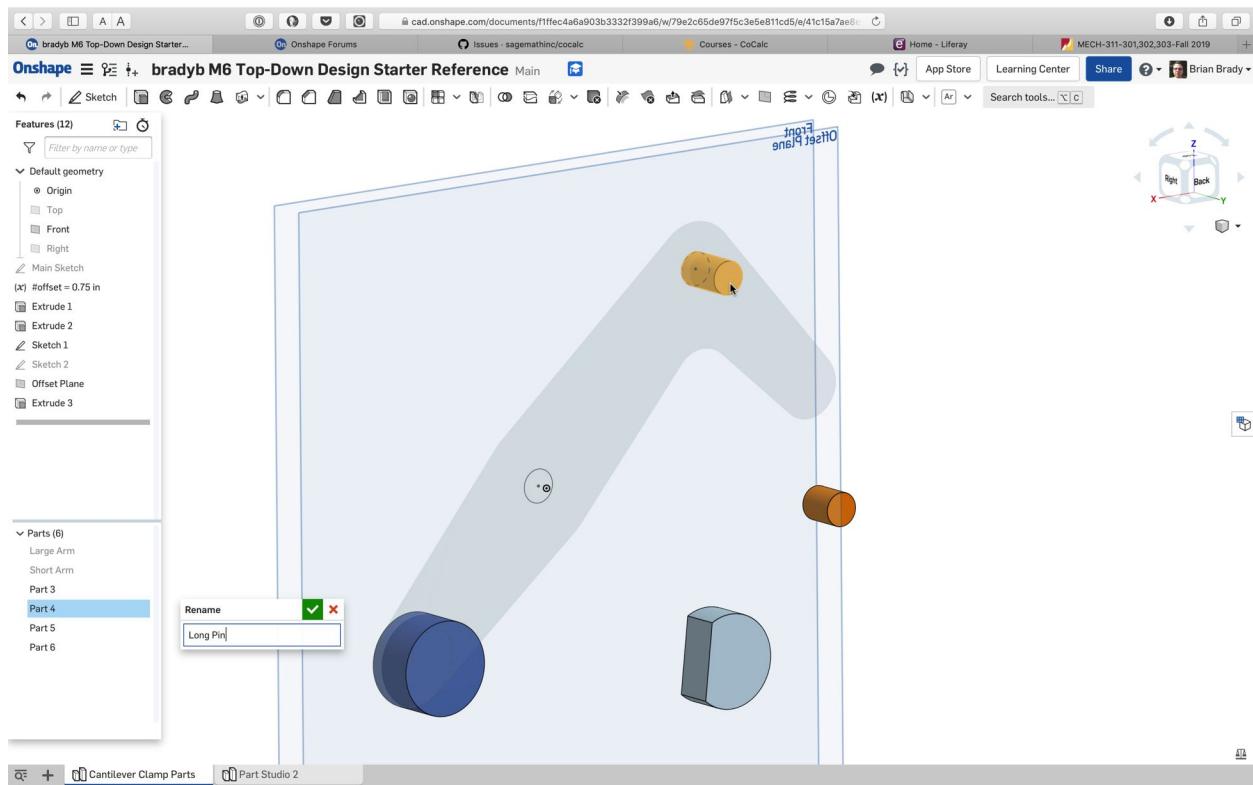


21. Hide all parts and select the regions shown. Don't forget the two small annular rings.

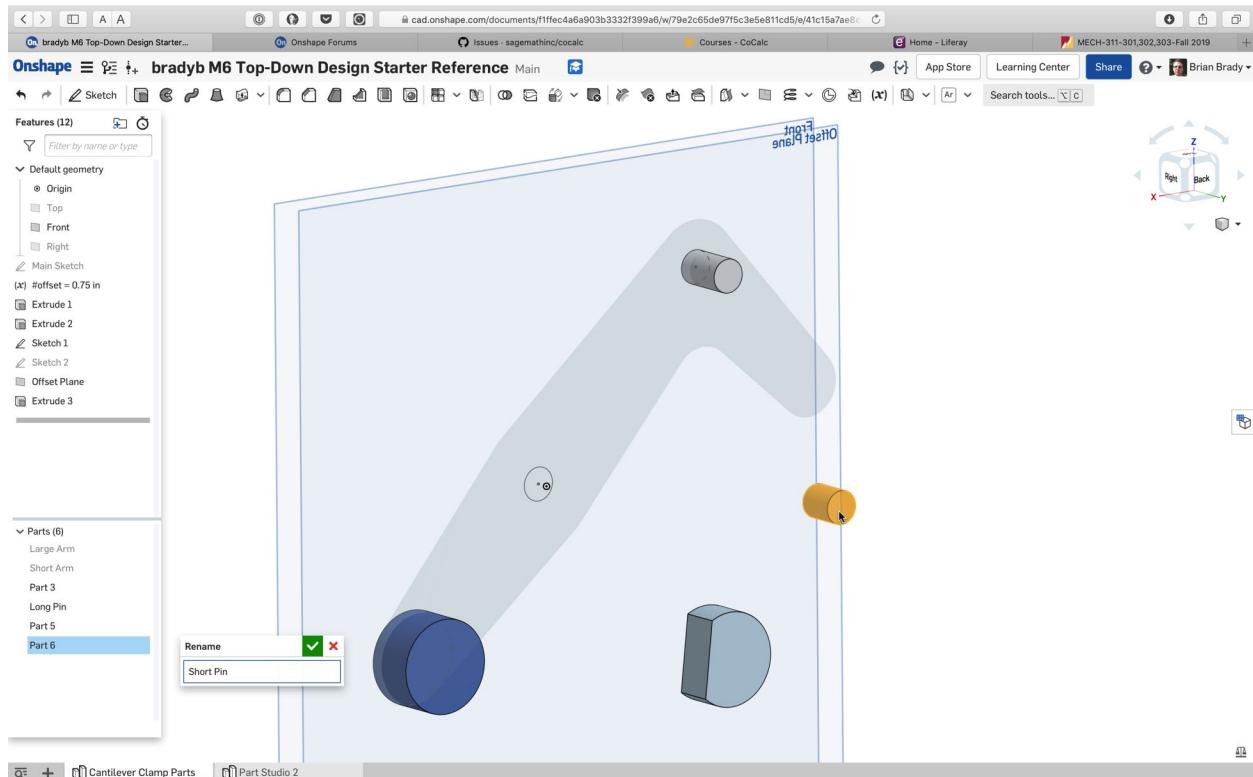


22. Extrude the selected regions in the direction shown (as New parts) up to the Offset Plane.

M6 Cantilever Clamp Parts - Top-Down Design

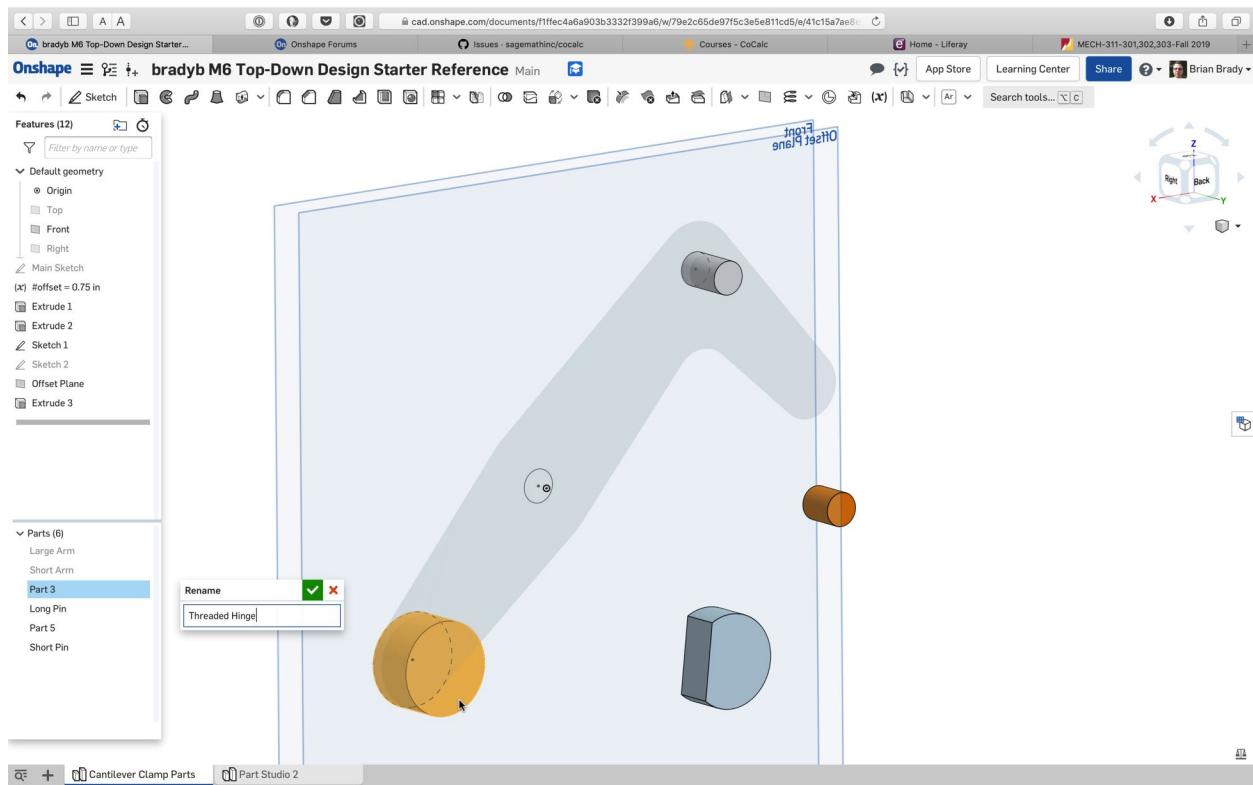


23. Rename the new parts as “Long Pin”...

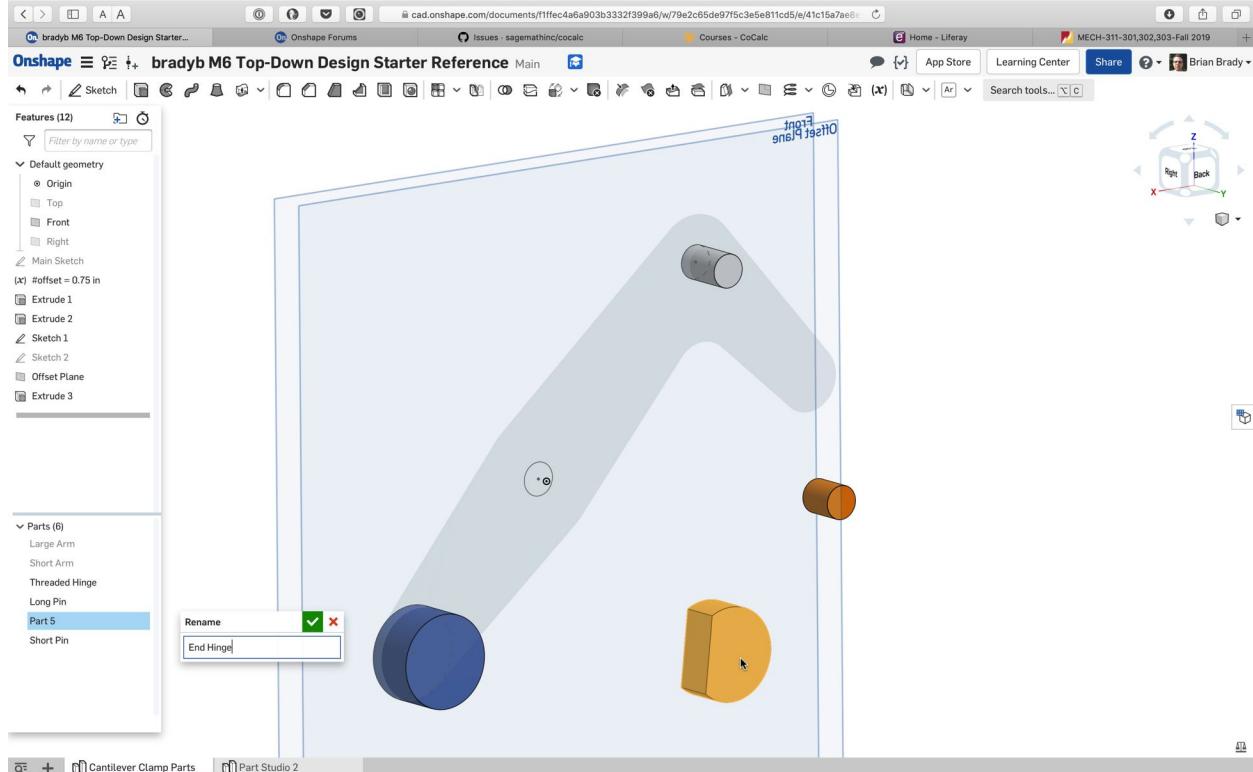


“Short Pin”...

M6 Cantilever Clamp Parts - Top-Down Design

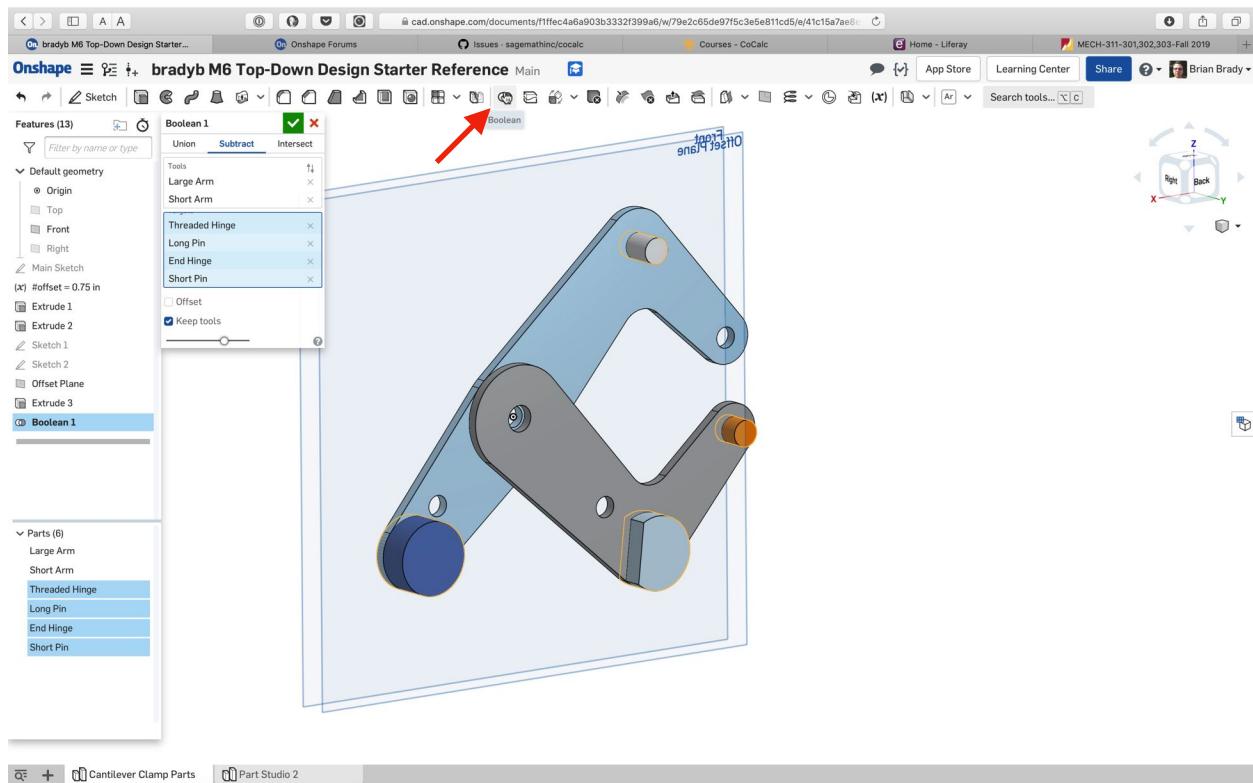


"Threaded Hinge"...

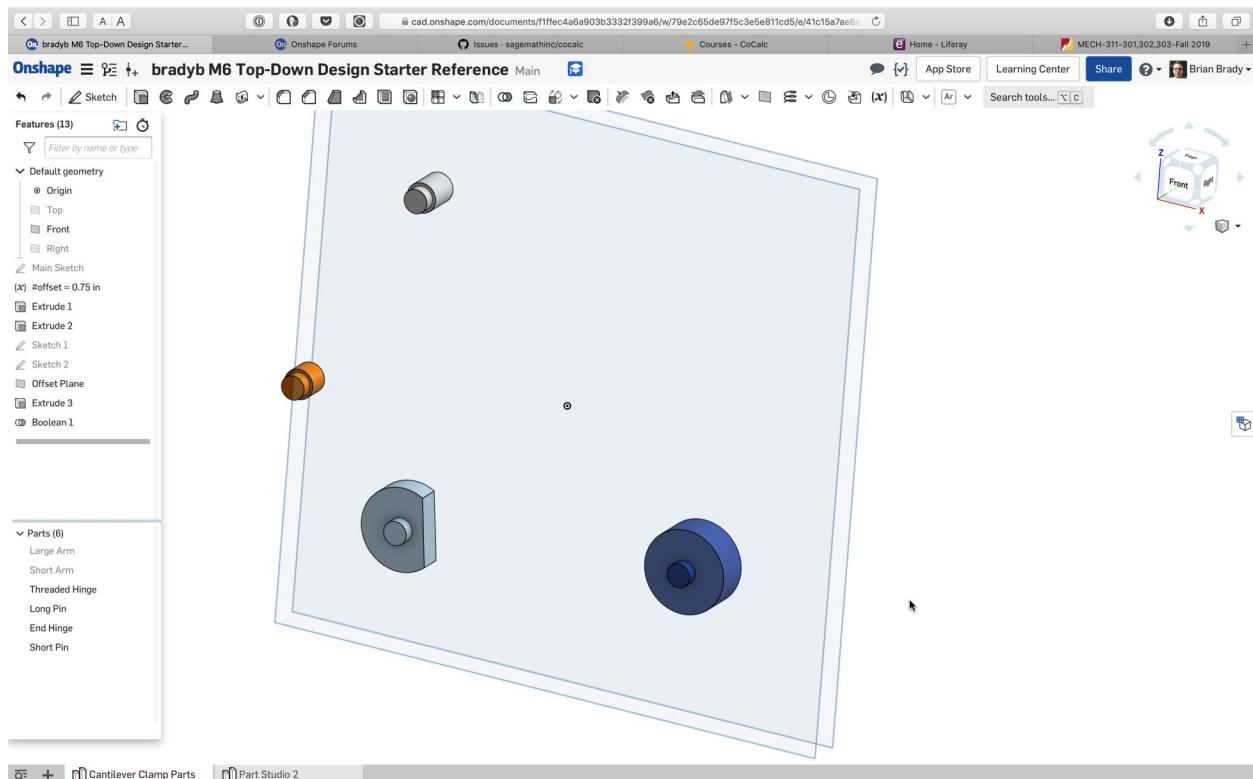


and "End Hinge"

M6 Cantilever Clamp Parts - Top-Down Design

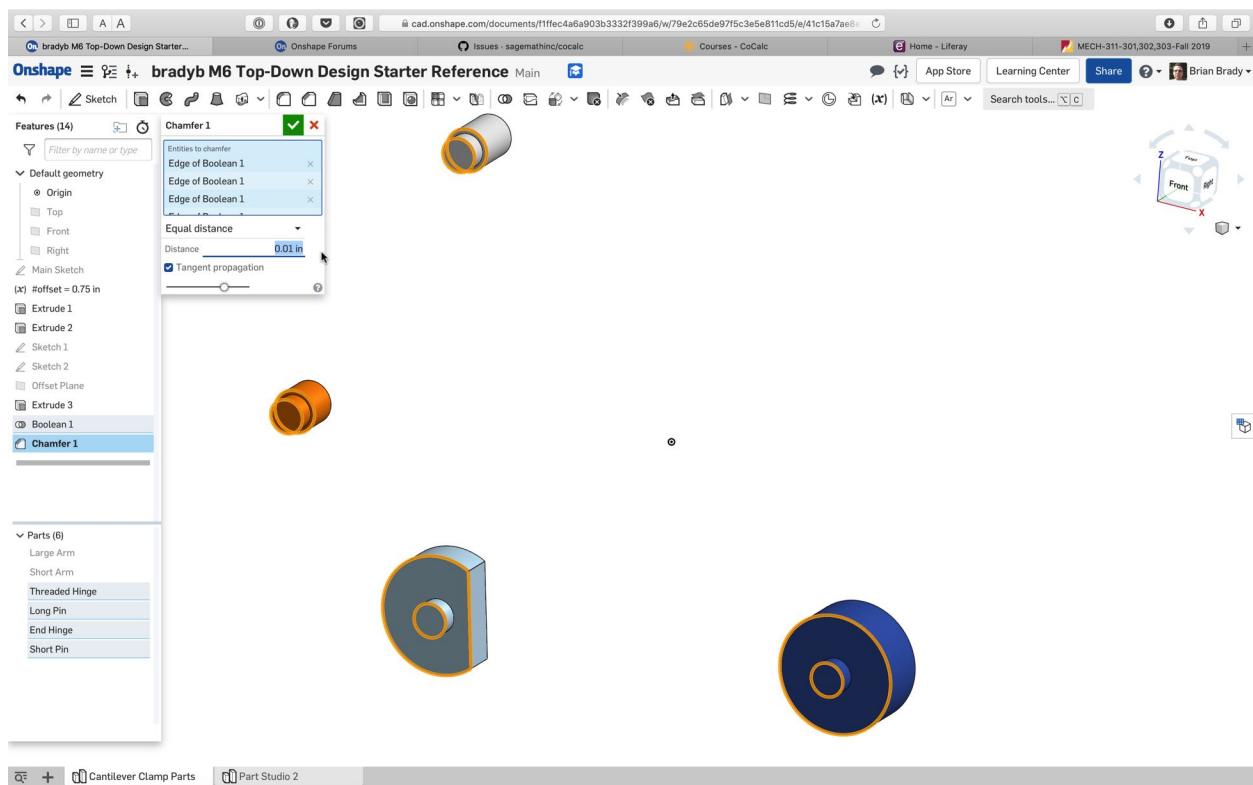


24. Use the Boolean tool to Subtract the Long Arm and Short Arm (the tools) from the Long Pin, Short Pin, Threaded Hinge, and End Hinge (the targets); keeping the tools.

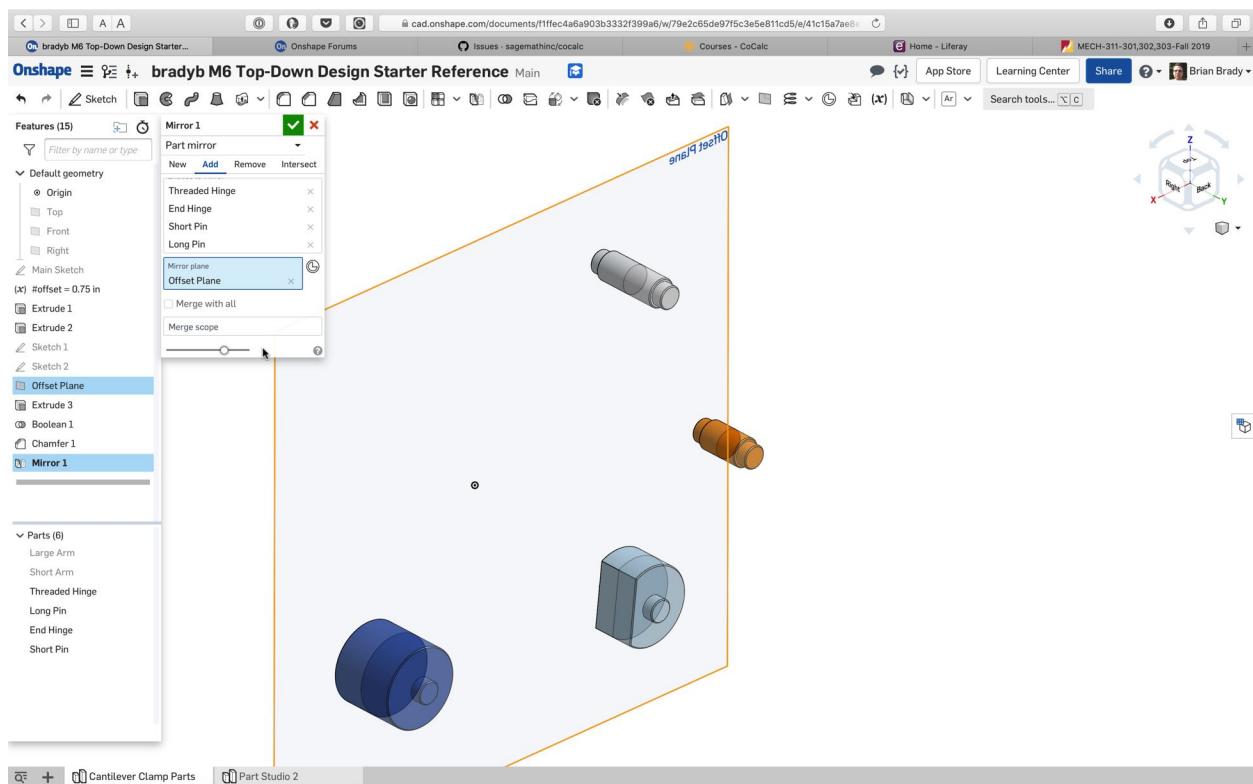


25. Hide the arms and verify that the Subtract worked as desired; creating a short step on the ends of the parts.

M6 Cantilever Clamp Parts - Top-Down Design

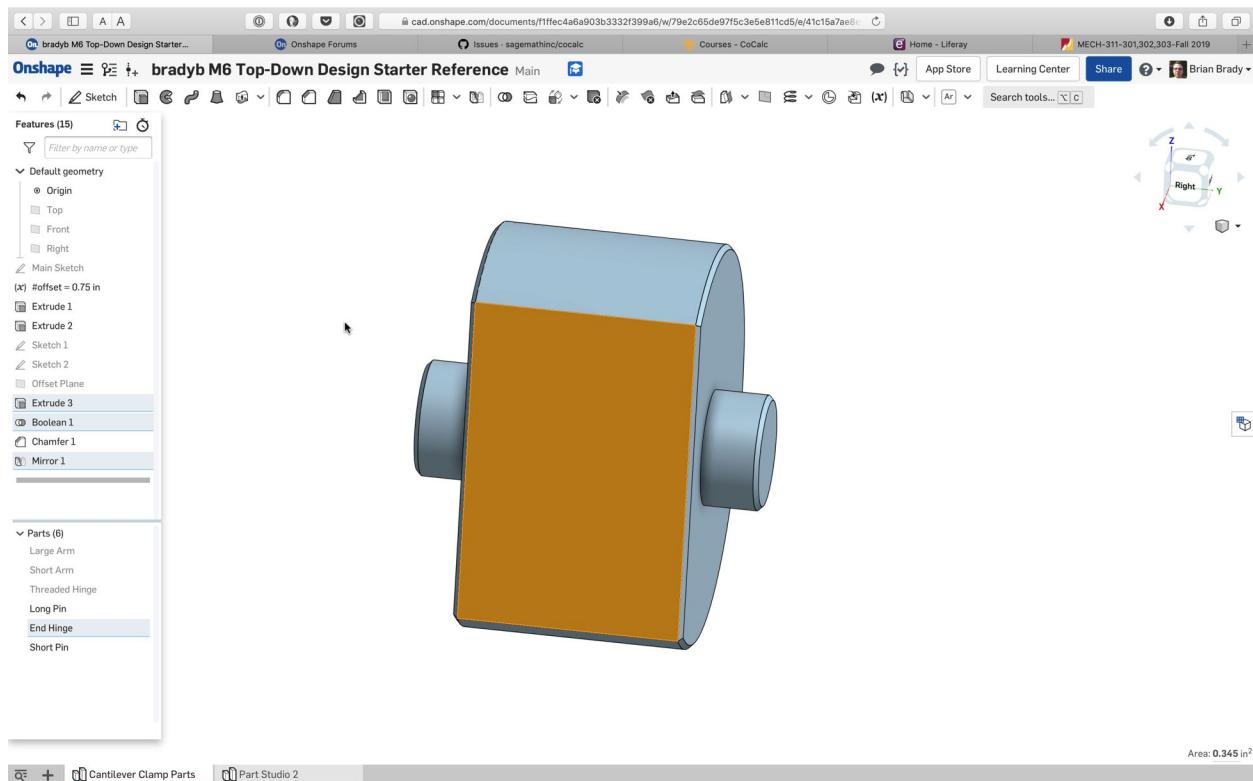


26. Select the edges shown and create 0.01 inch chamfers.

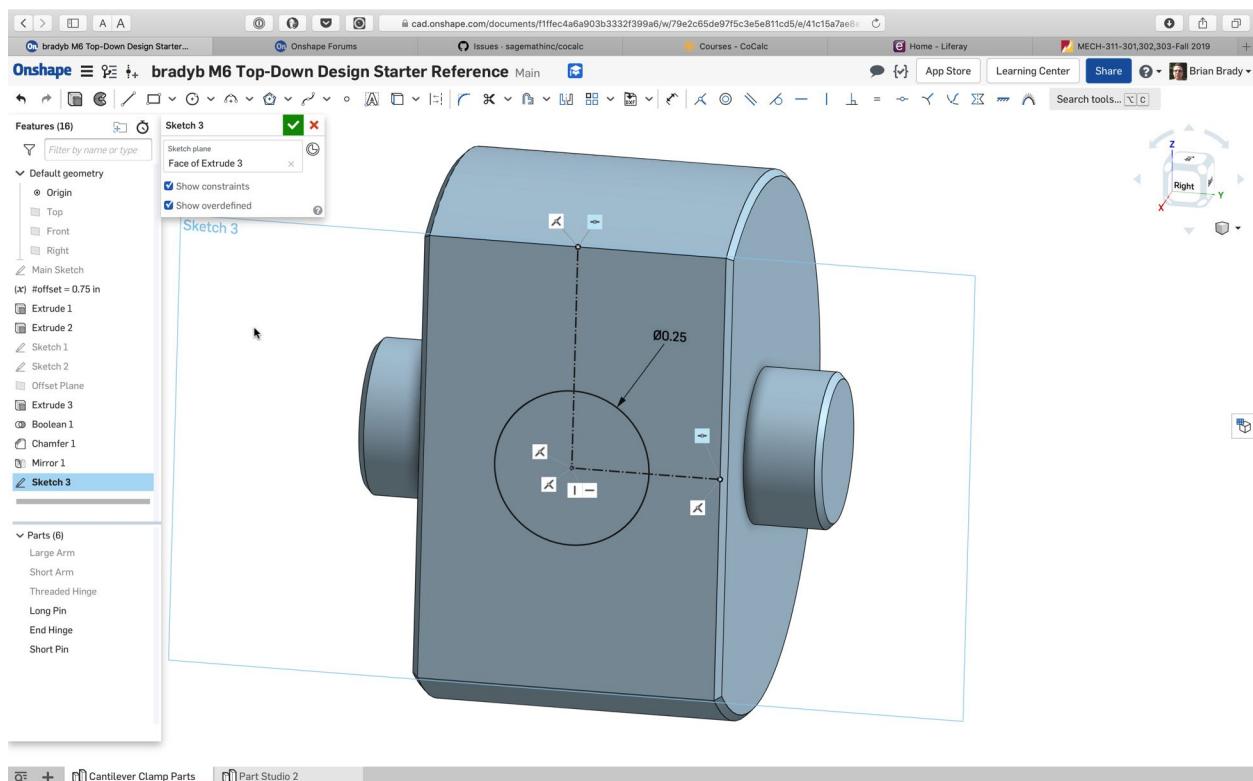


27. Use the Mirror (with Add selected) tool to mirror the 4 parts shown about the Offset Plane.

M6 Cantilever Clamp Parts - Top-Down Design

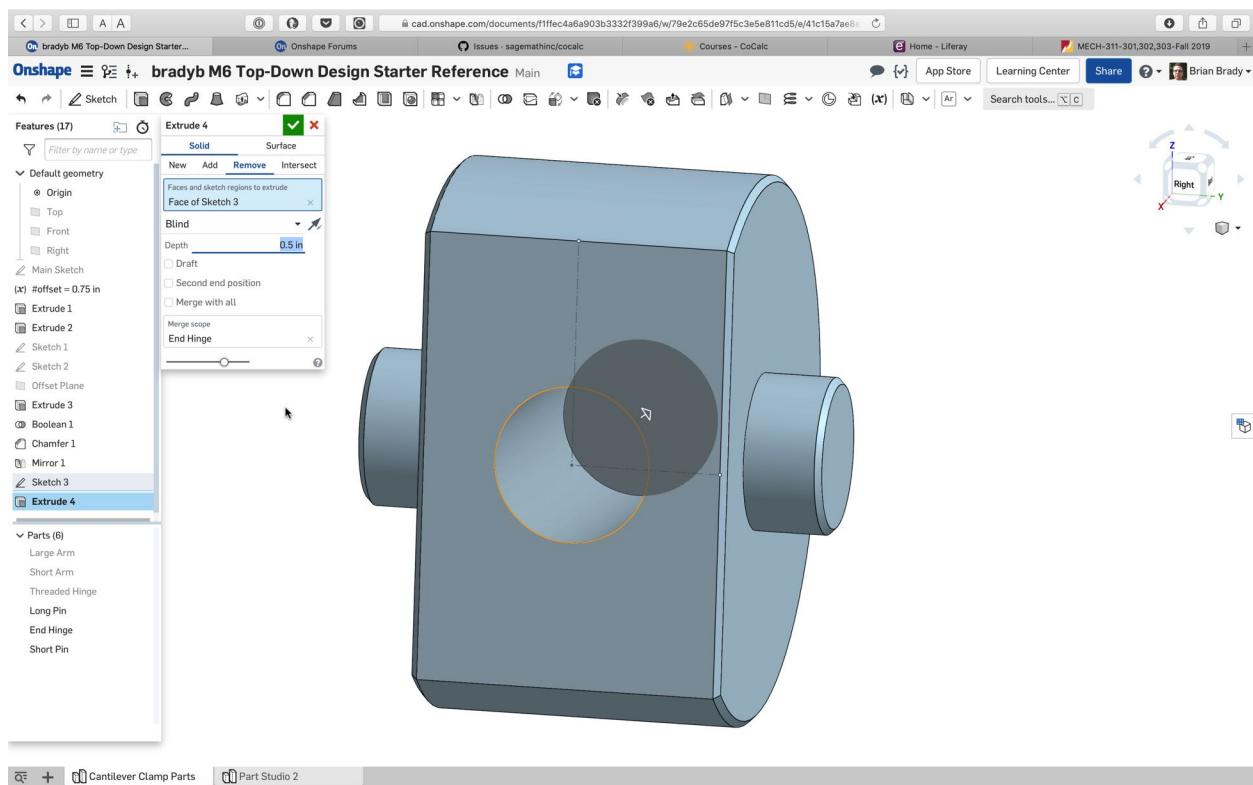


28. Hide the Threaded Hinge and select the flat face on the End Hinge for sketching.

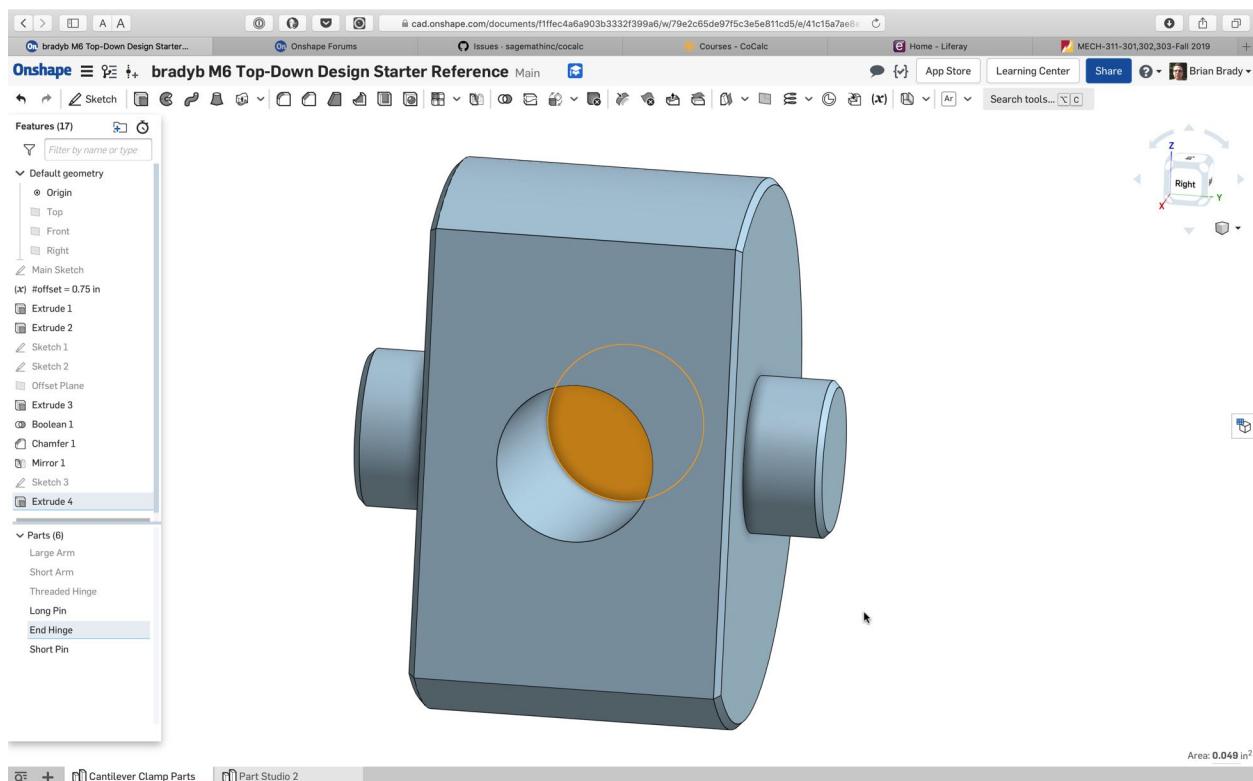


29. Create a Ø0.25 circle as shown that is located at the center of the flat face; use construction lines that are coincident with the midpoints of the edges.

M6 Cantilever Clamp Parts - Top-Down Design

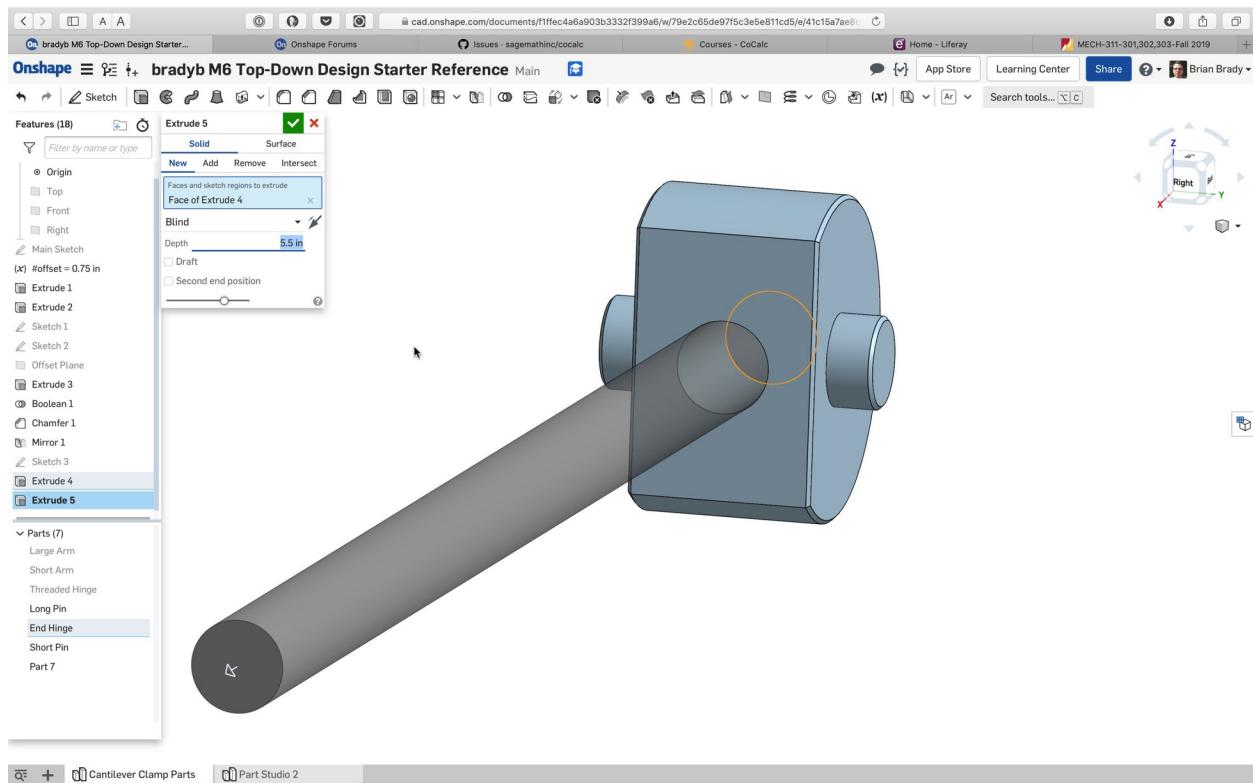


30. Extrude Remove the circle from the End Hinge at a depth of 0.5 inches.

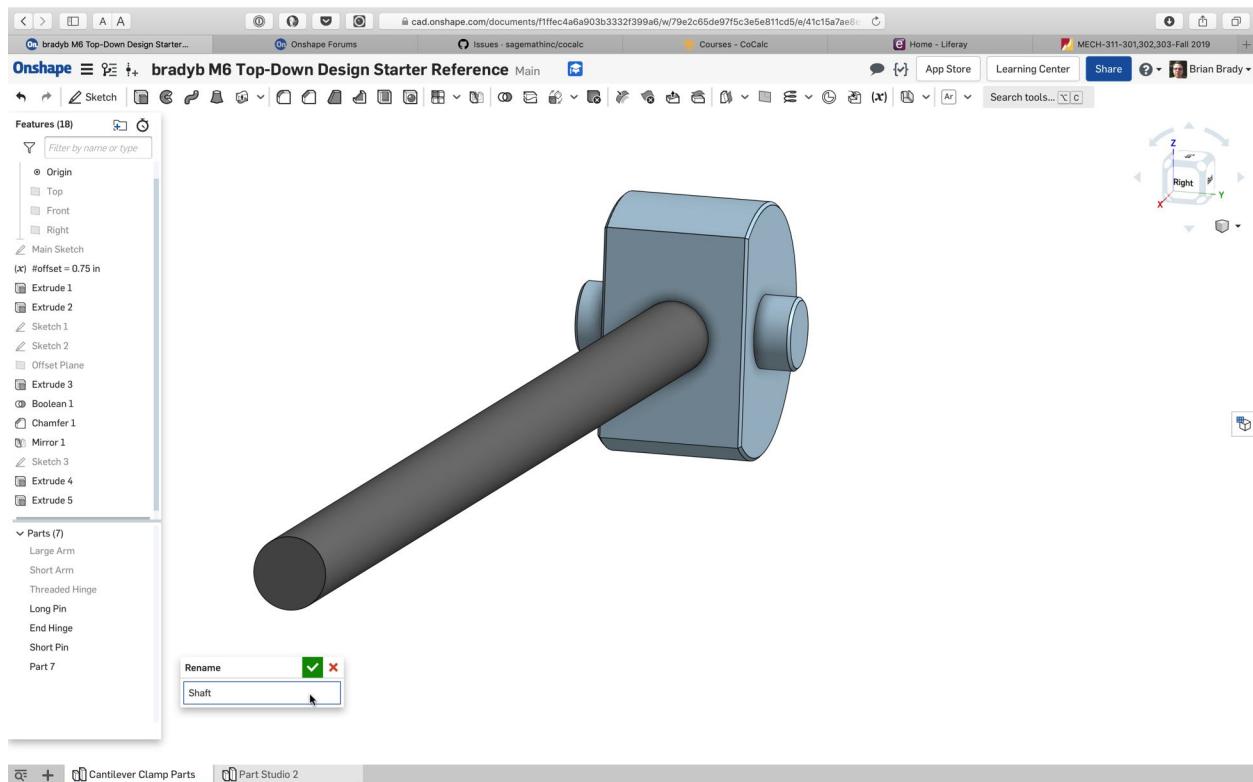


31. Select the bottom of the extruded pocket...

M6 Cantilever Clamp Parts - Top-Down Design

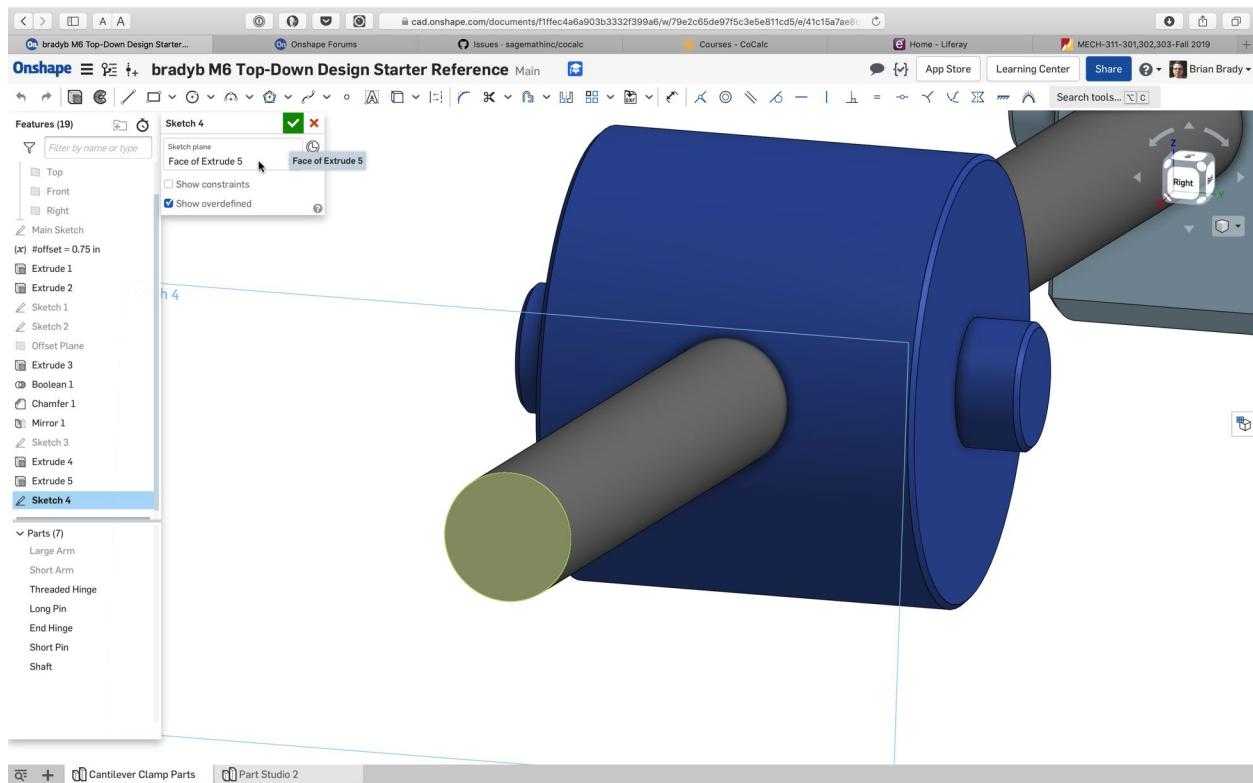


... and extrude it as a New part with a length of 5.5 inches.

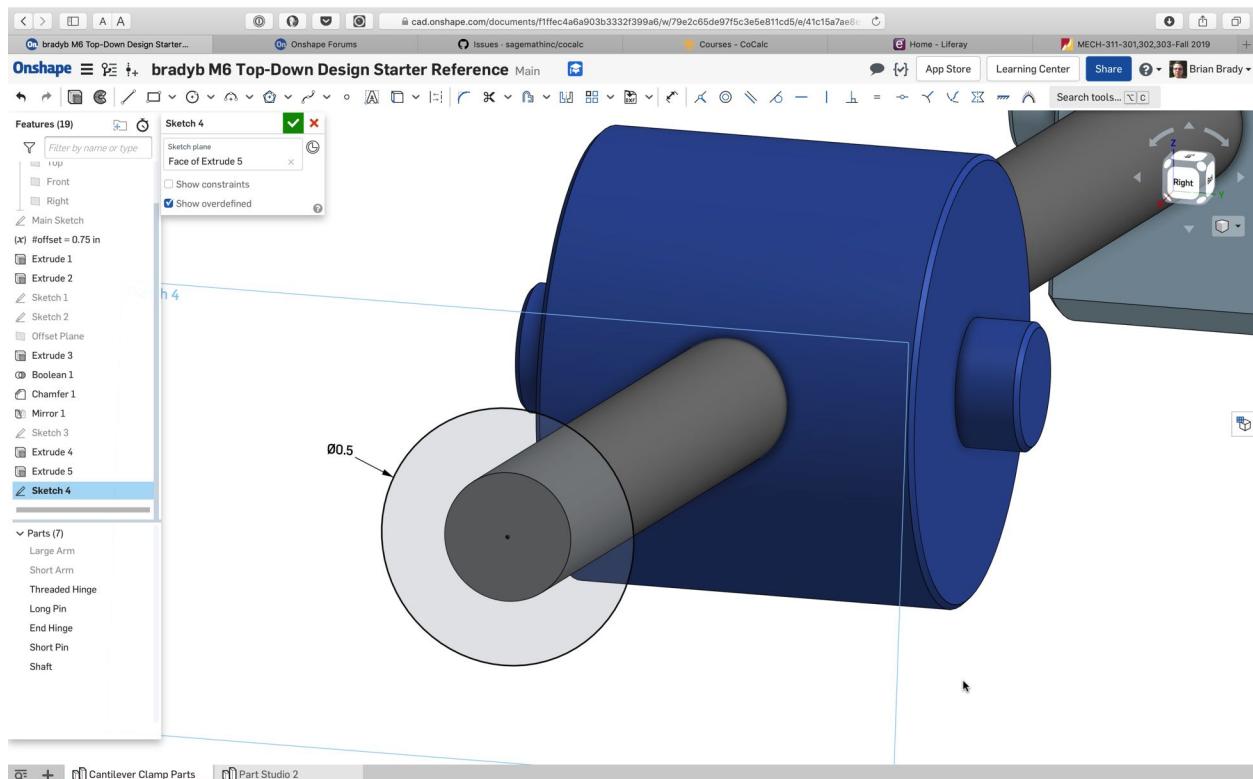


32. Rename the new part "Shaft"

M6 Cantilever Clamp Parts - Top-Down Design

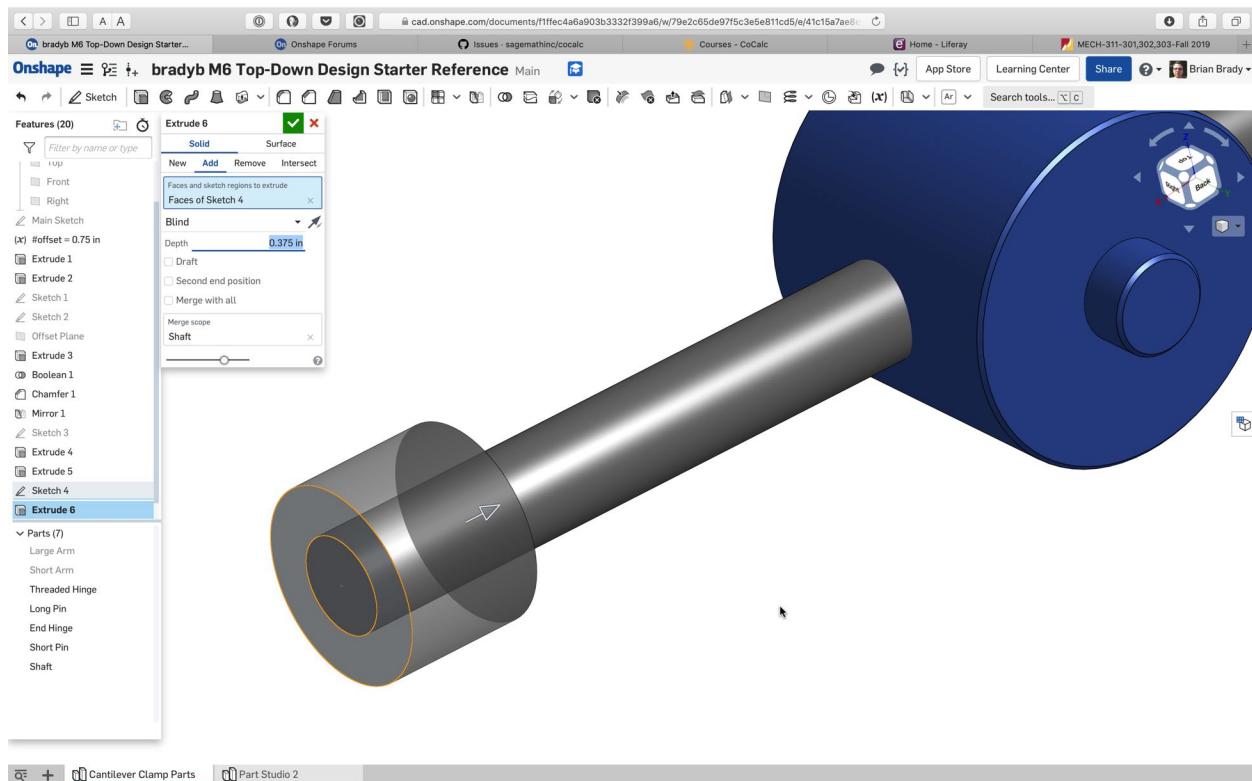


33. Select the end fo the Shaft and create a new sketch.

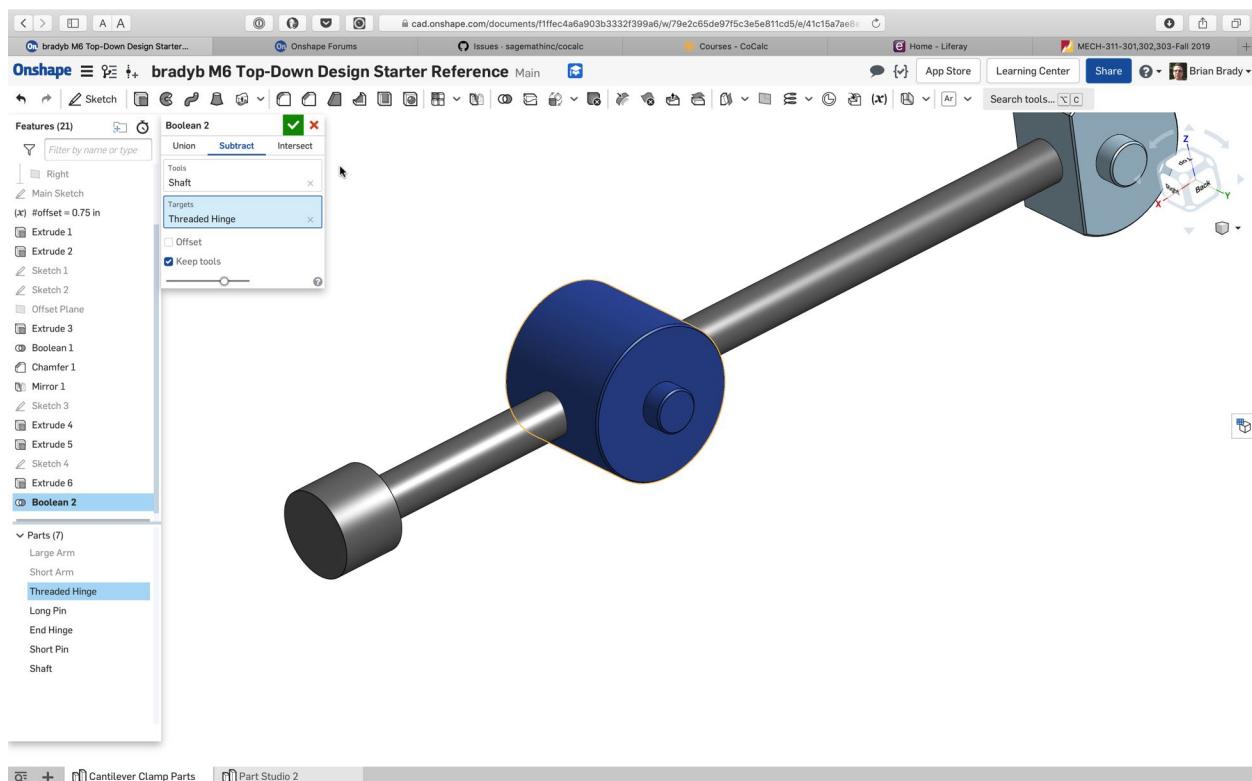


34. Draw a Ø0.5 circle that is concentric with the existing circle.

M6 Cantilever Clamp Parts - Top-Down Design

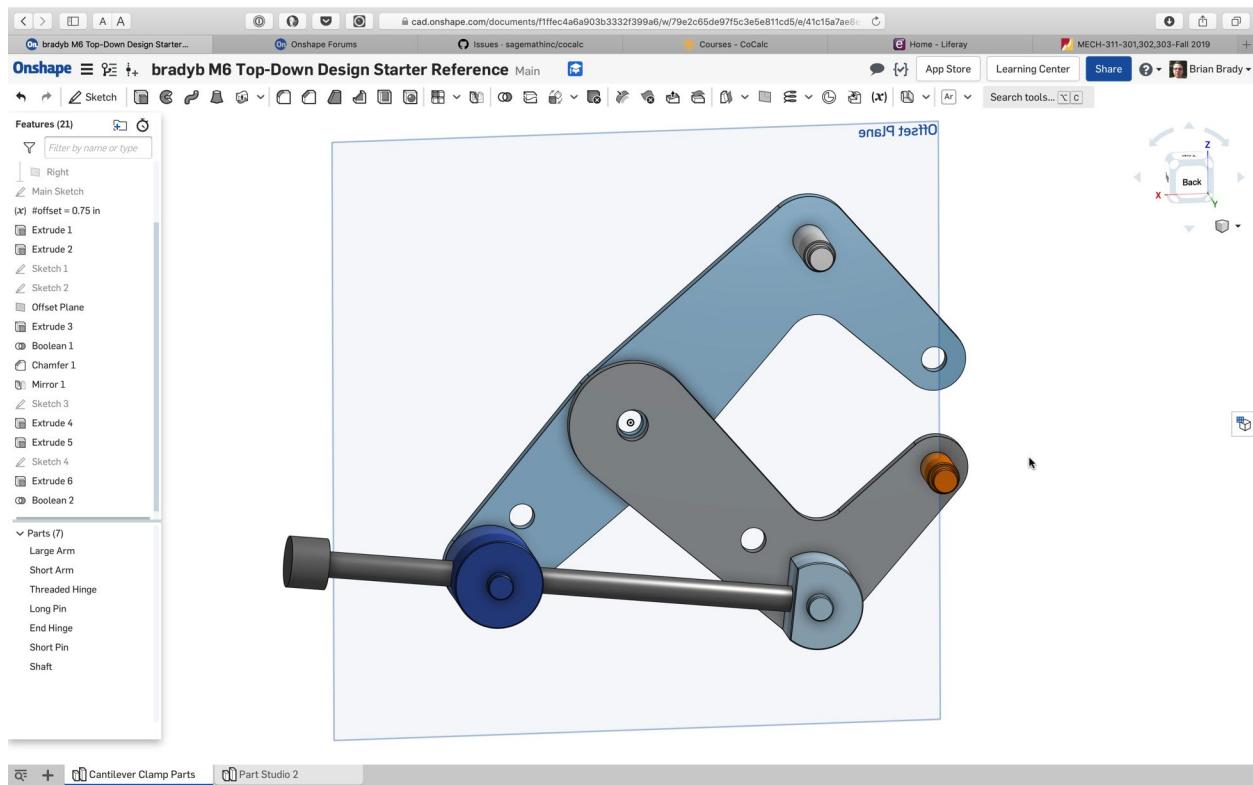


35. Extrude the sketch back towards the Threaded Hinge by 0.375 inches.

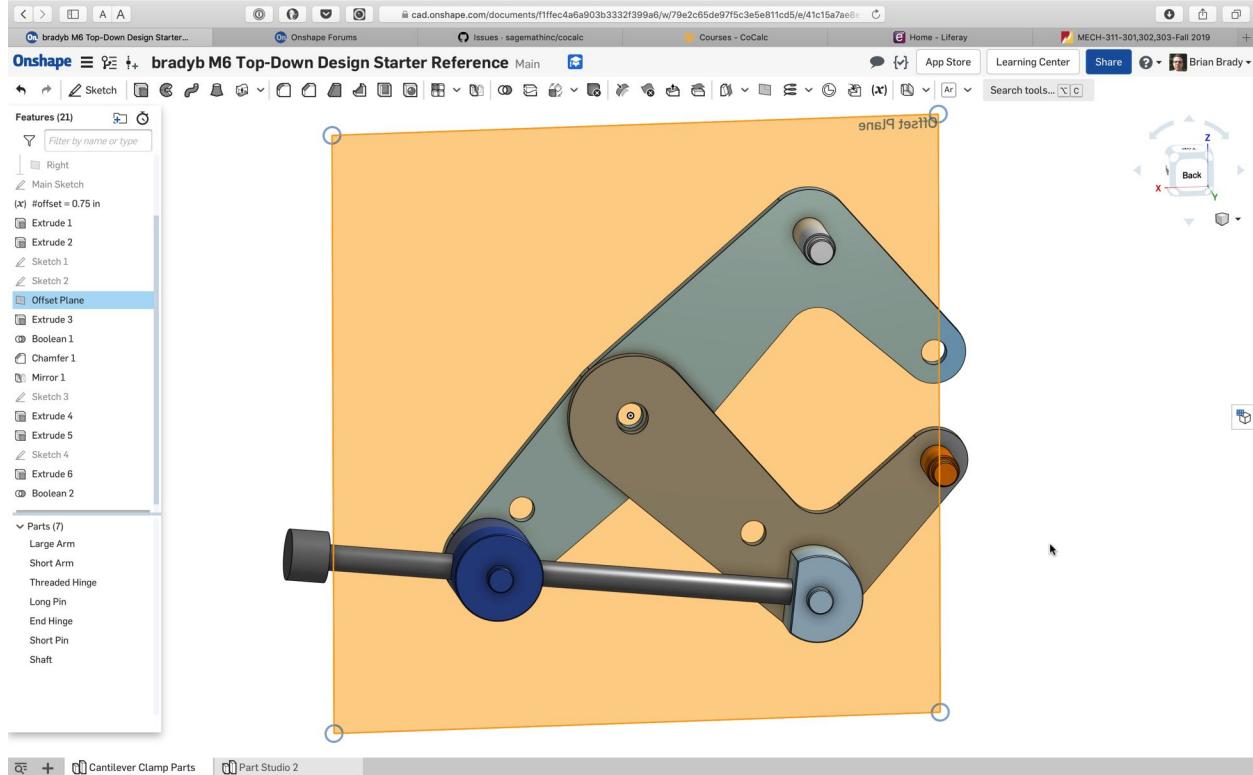


36. Use the Boolean tool to subtract the Shaft from the Threaded Hinge while keeping the tool.

M6 Cantilever Clamp Parts - Top-Down Design

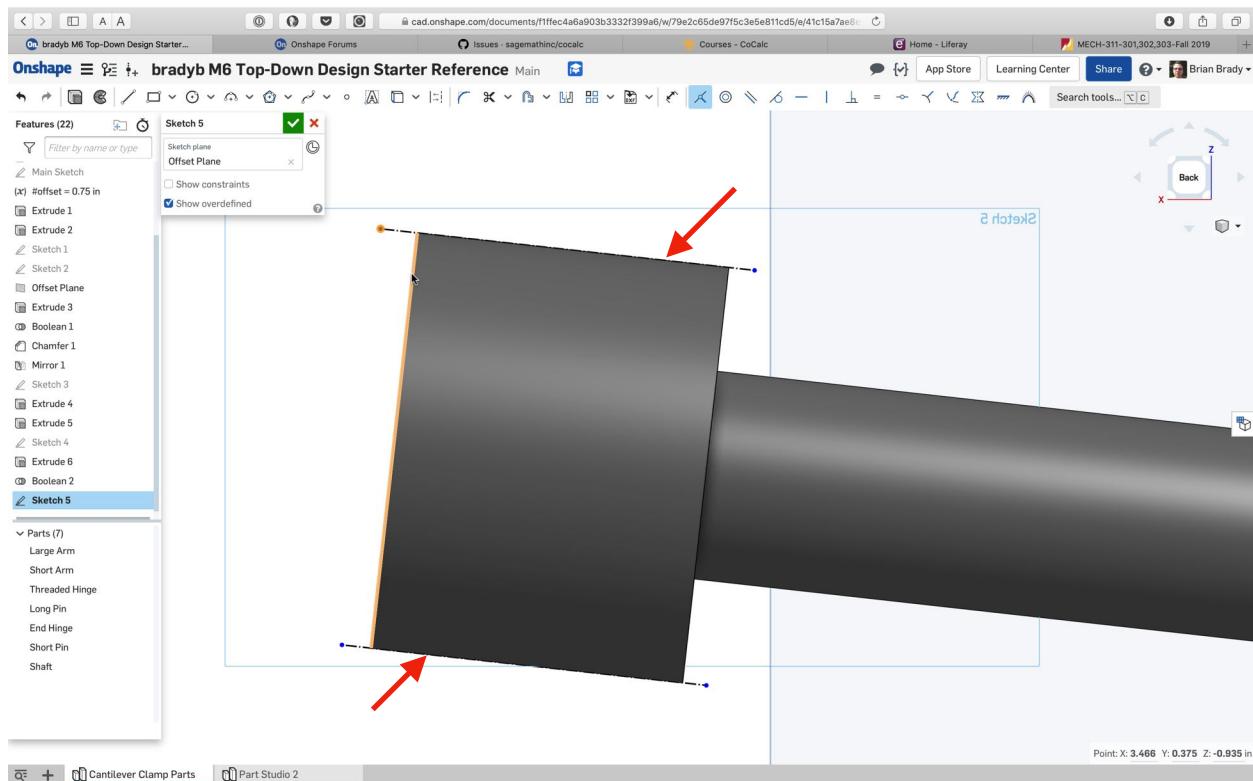


37. Unhide all parts to review what you have done so far.

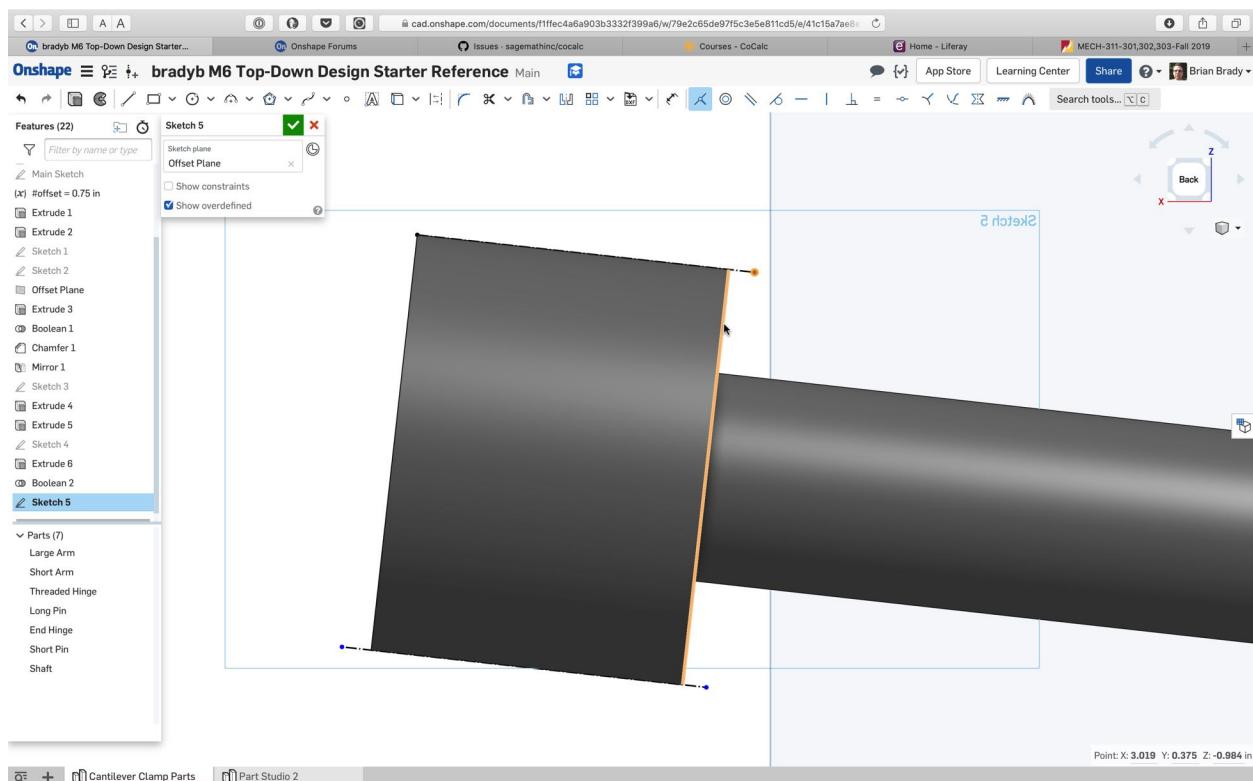


38. Select the Offset Plane to sketch on.

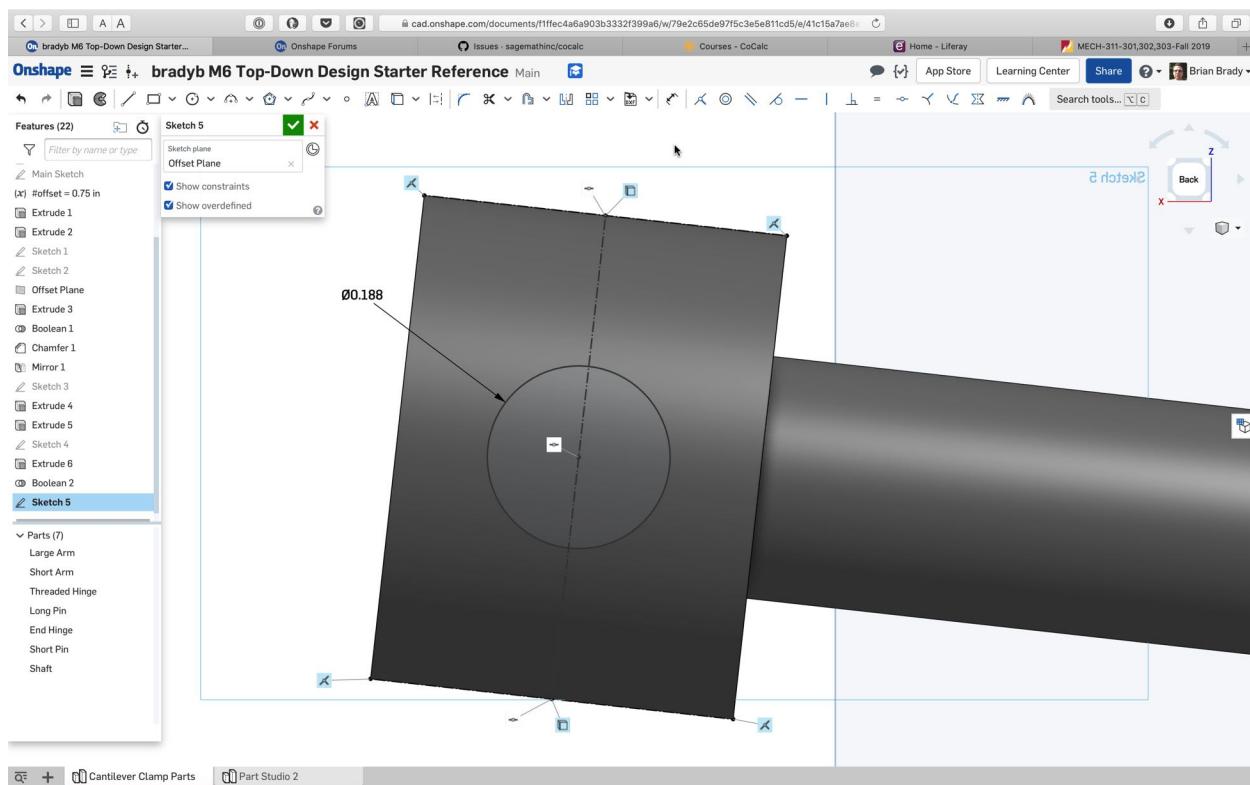
M6 Cantilever Clamp Parts - Top-Down Design



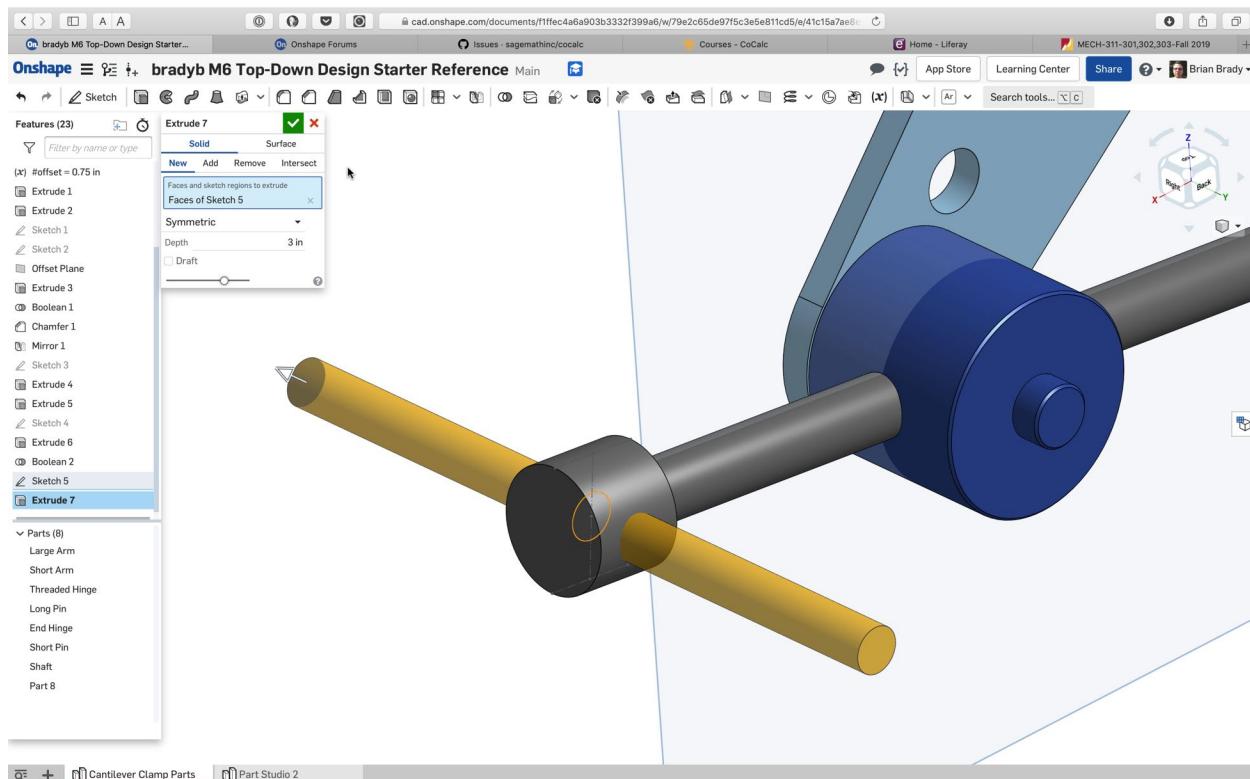
39. "Use" the two edges shown and drag the blue end points out so they are visible. Use coincident constraint tool to make the 4 points coincide with the highlighted edges.



M6 Cantilever Clamp Parts - Top-Down Design

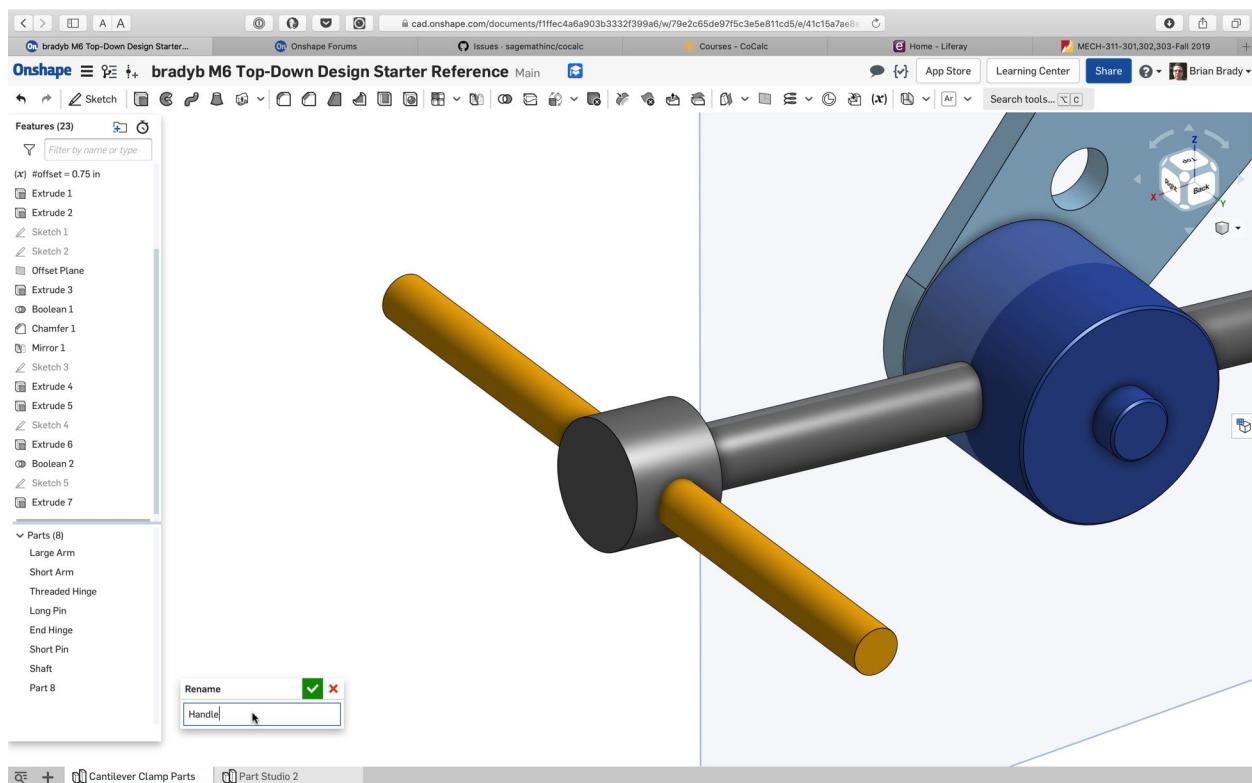


40. Draw a Ø0.188 circle that is located at the midpoint of a construction line that connects the midpoints of the two “used” lines.

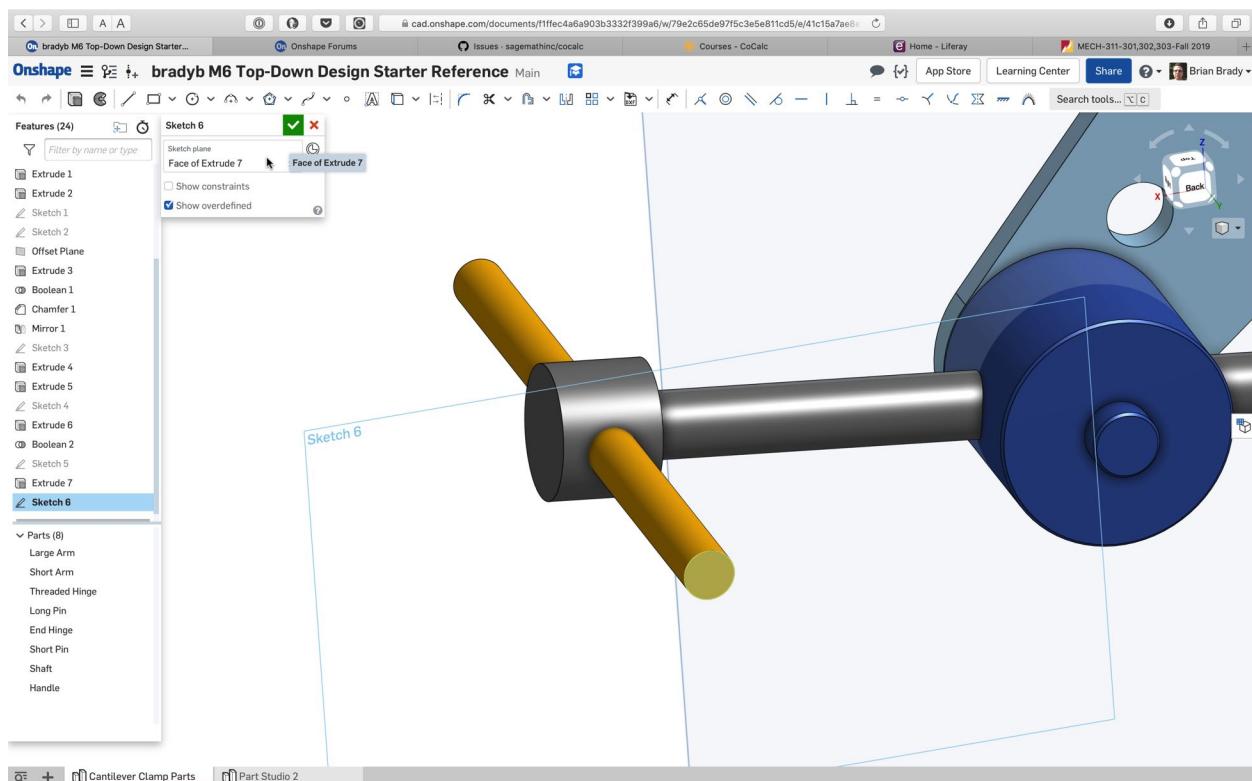


40. Extrude the sketch symmetrically a total of 3 inches as a New part.

M6 Cantilever Clamp Parts - Top-Down Design

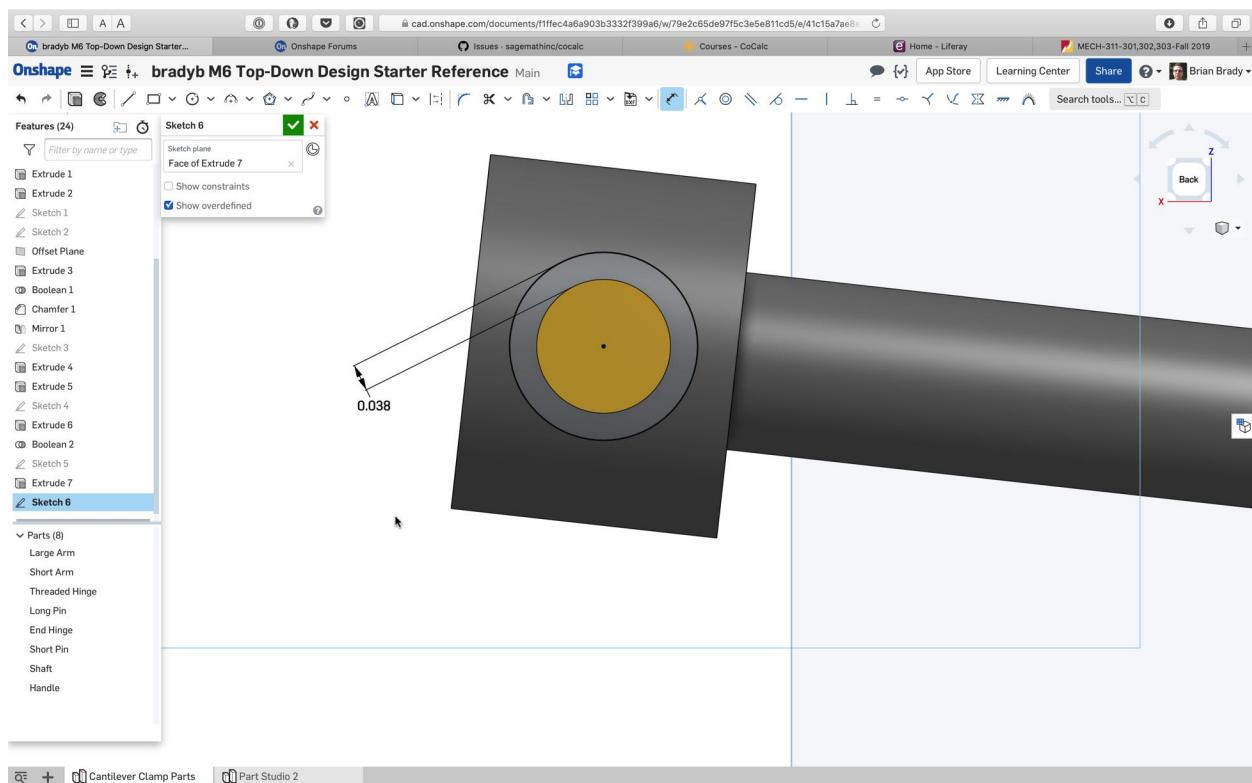


41. Rename the new part as “Handle”

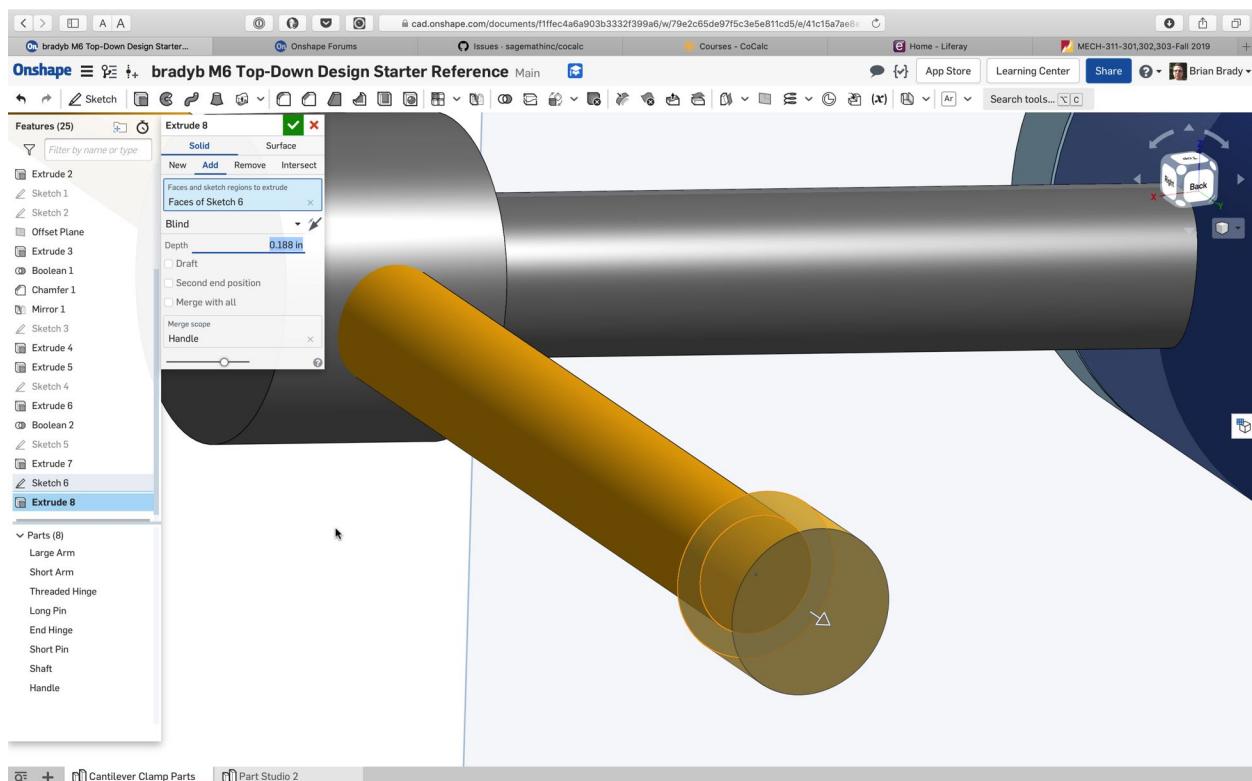


42. Select one end of the Handle for sketching.

M6 Cantilever Clamp Parts - Top-Down Design

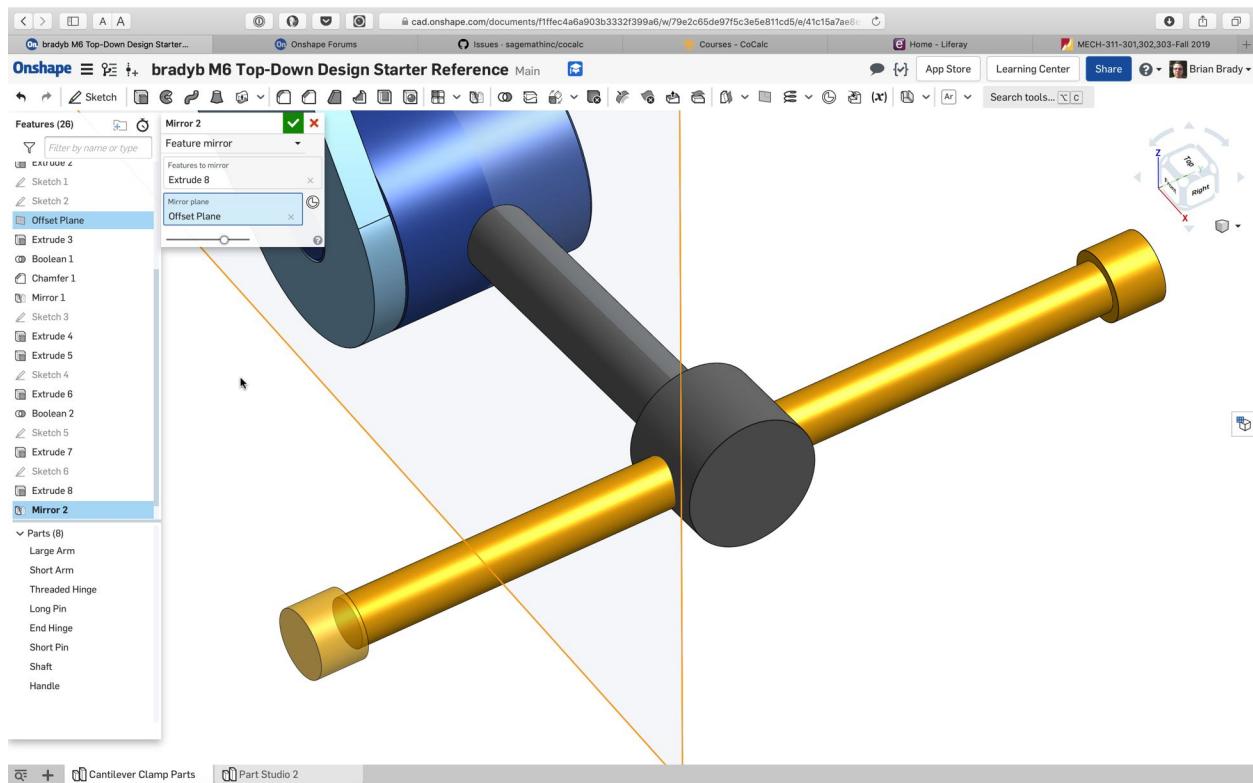


43. Draw a circle that is concentric to the handle with a 0.038 dimension from the edge of the circle to the edge of the handle (as shown).

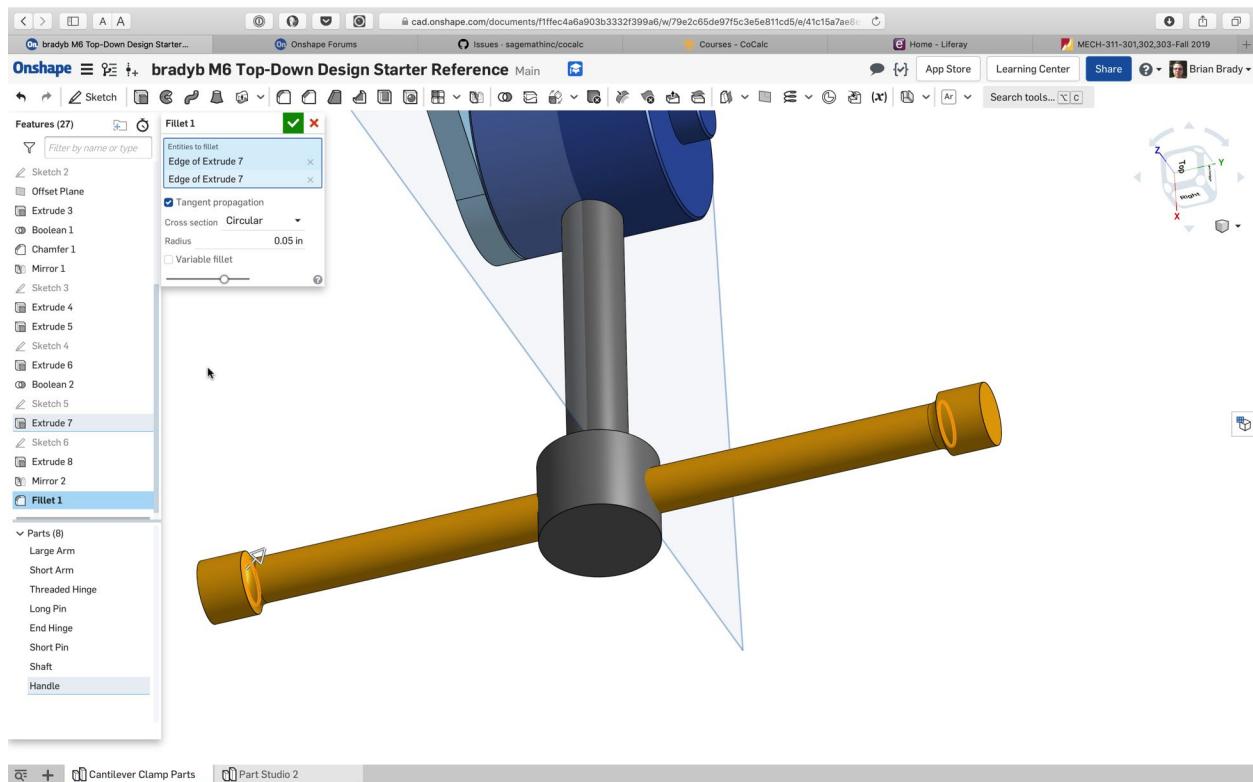


44. Extrude the circle away from the existing handle by 0.188 inches to create a knob.

M6 Cantilever Clamp Parts - Top-Down Design

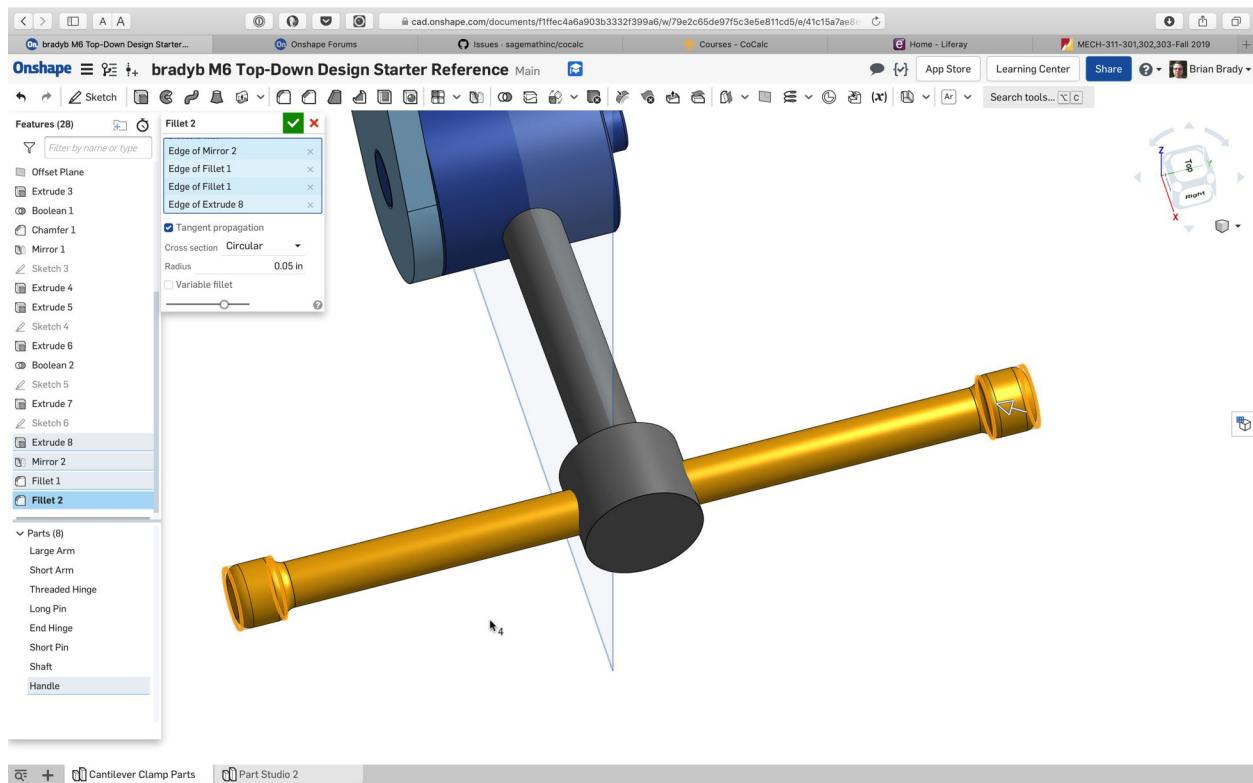


45. Use the Mirror tool (with the Feature mirror option) to mirror the knob about the Offset Plane.

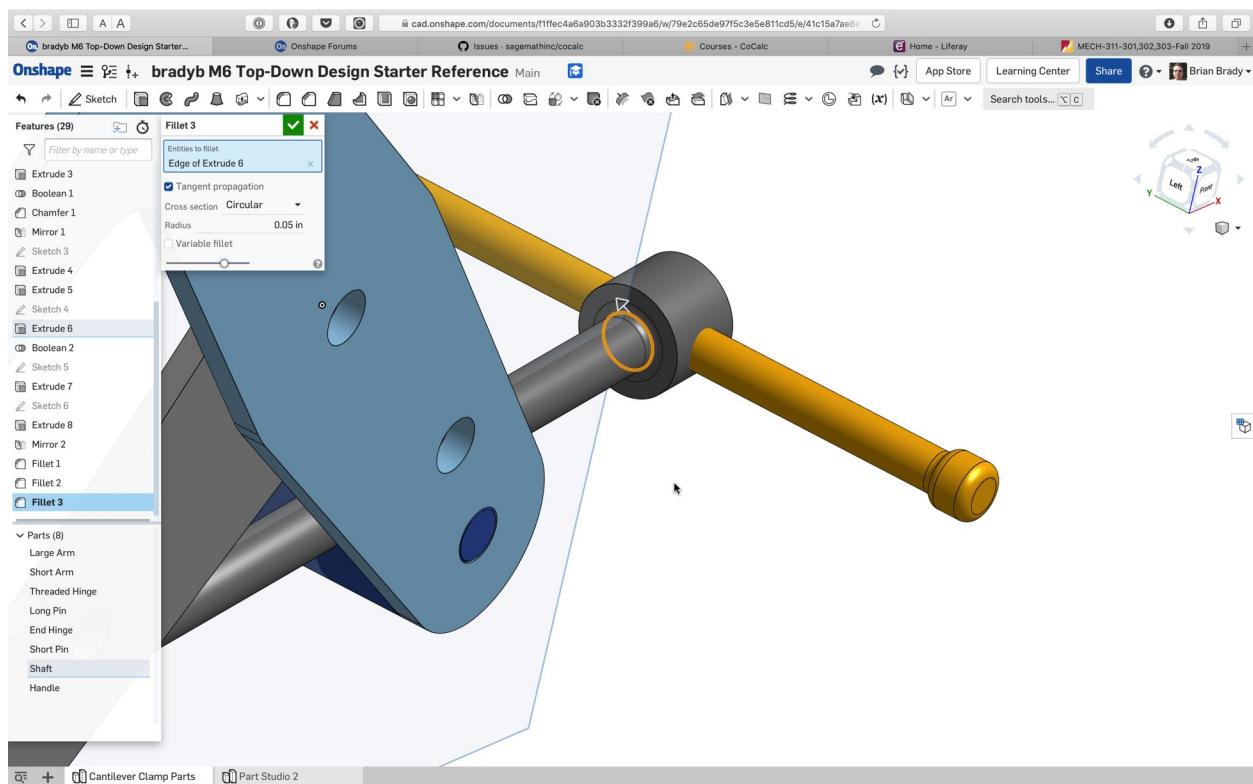


46. Add 0.05 inch fillets where the knobs meet the main part of the Handle.

M6 Cantilever Clamp Parts - Top-Down Design

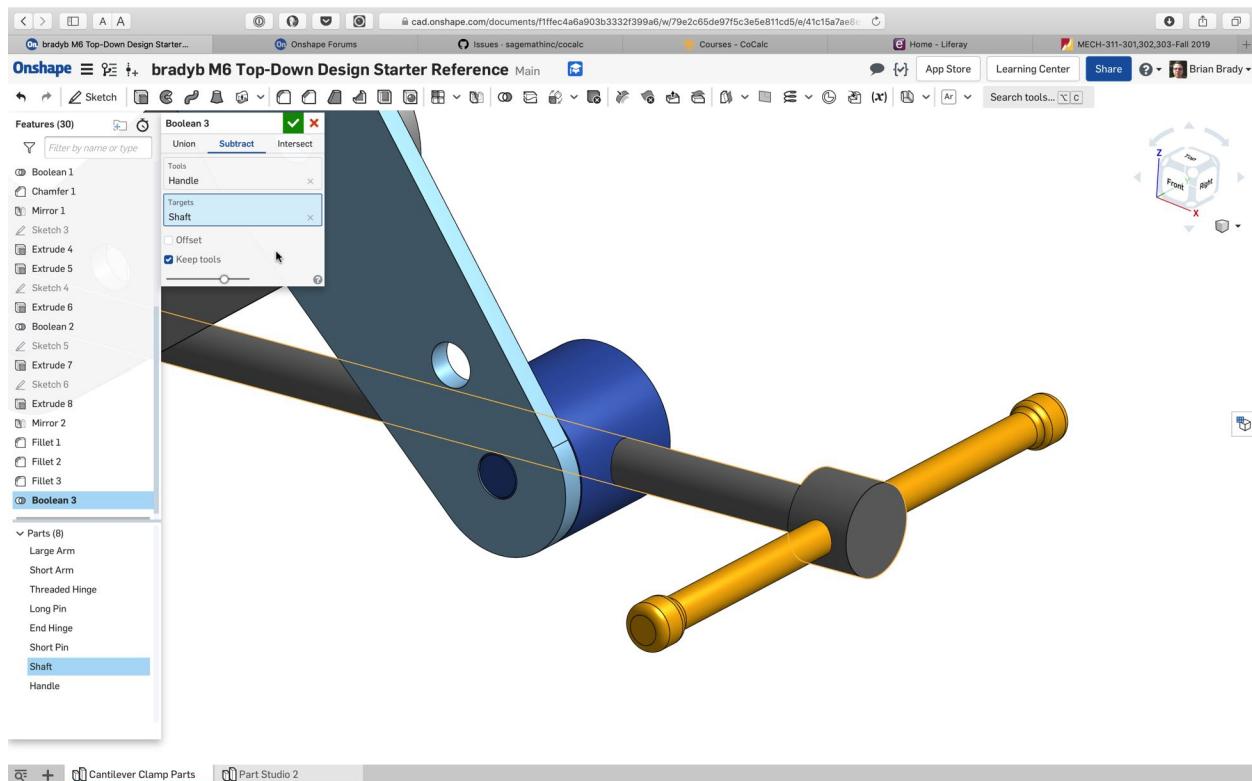


47. Create another Fillet feature (also 0.05 inches) to round the outer edges of the two knobs.

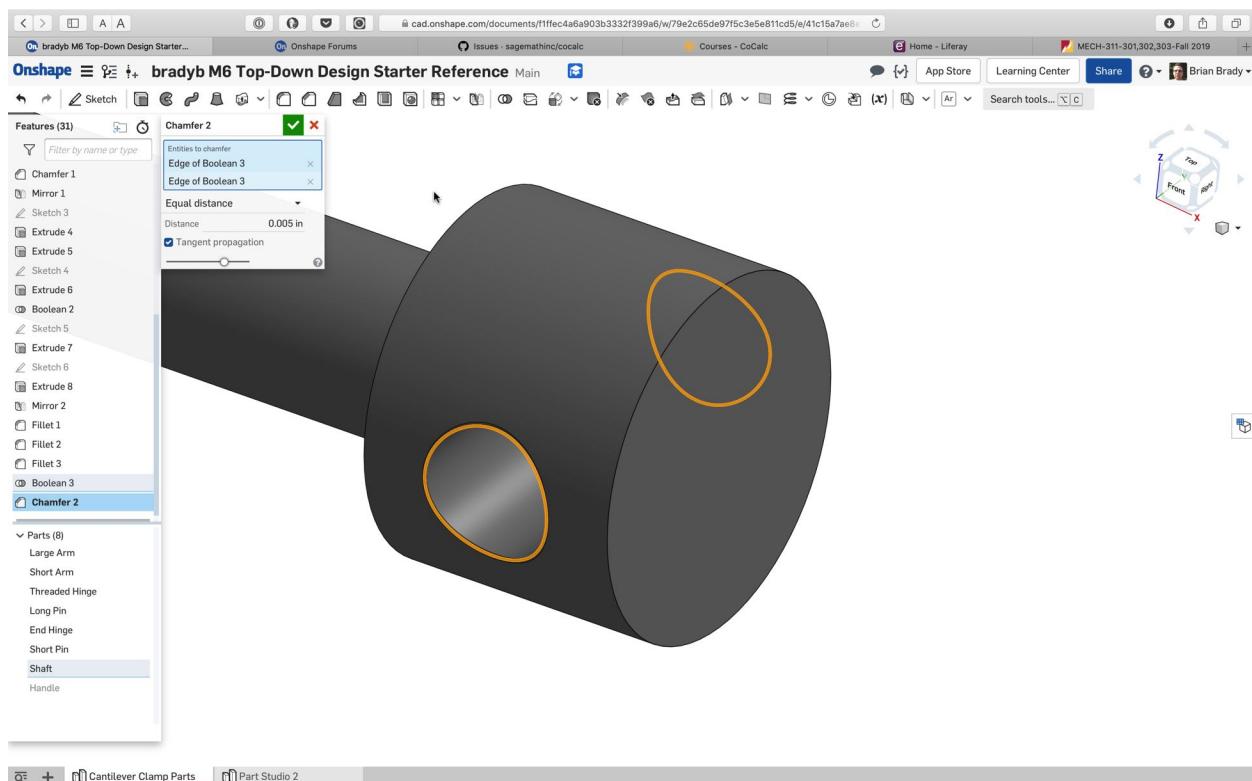


48. Fillet the edge shown on the Shaft as well (also 0.05 inches).

M6 Cantilever Clamp Parts - Top-Down Design

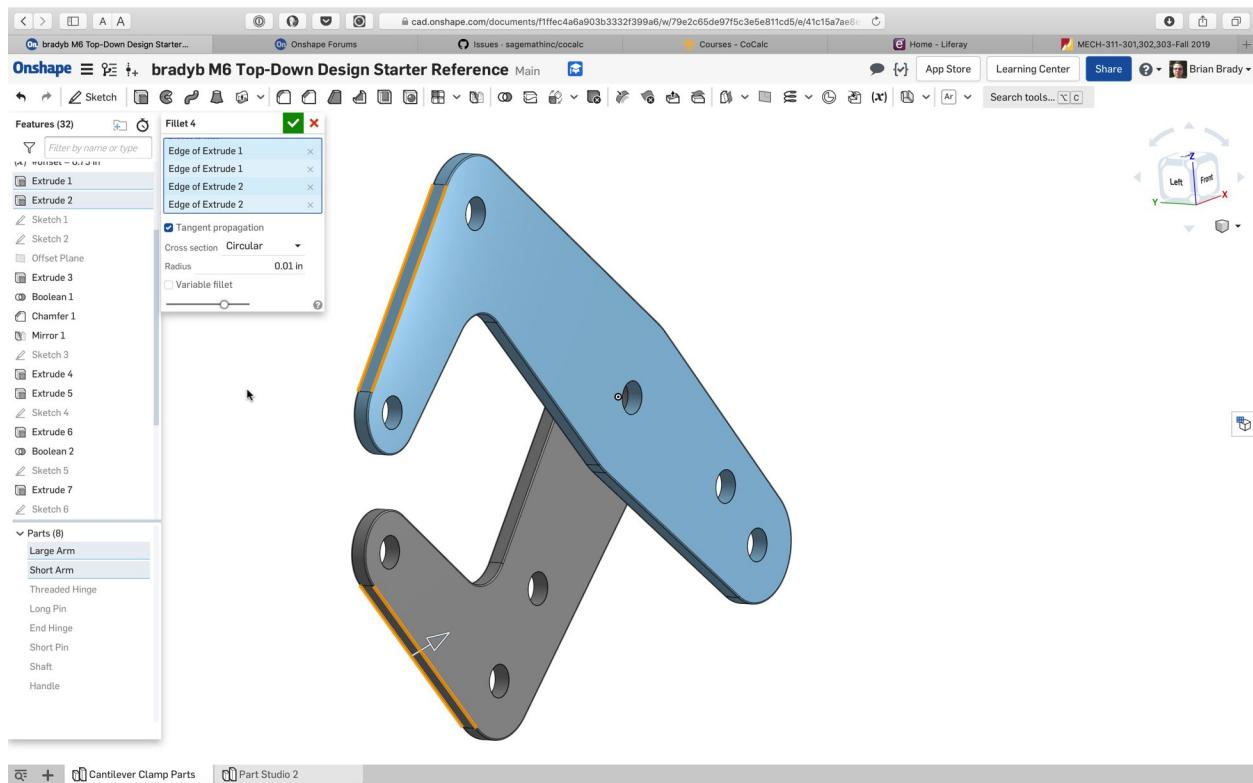


49. Use the Boolean tool to Subtract the Handle from the Shaft (keep the tool).

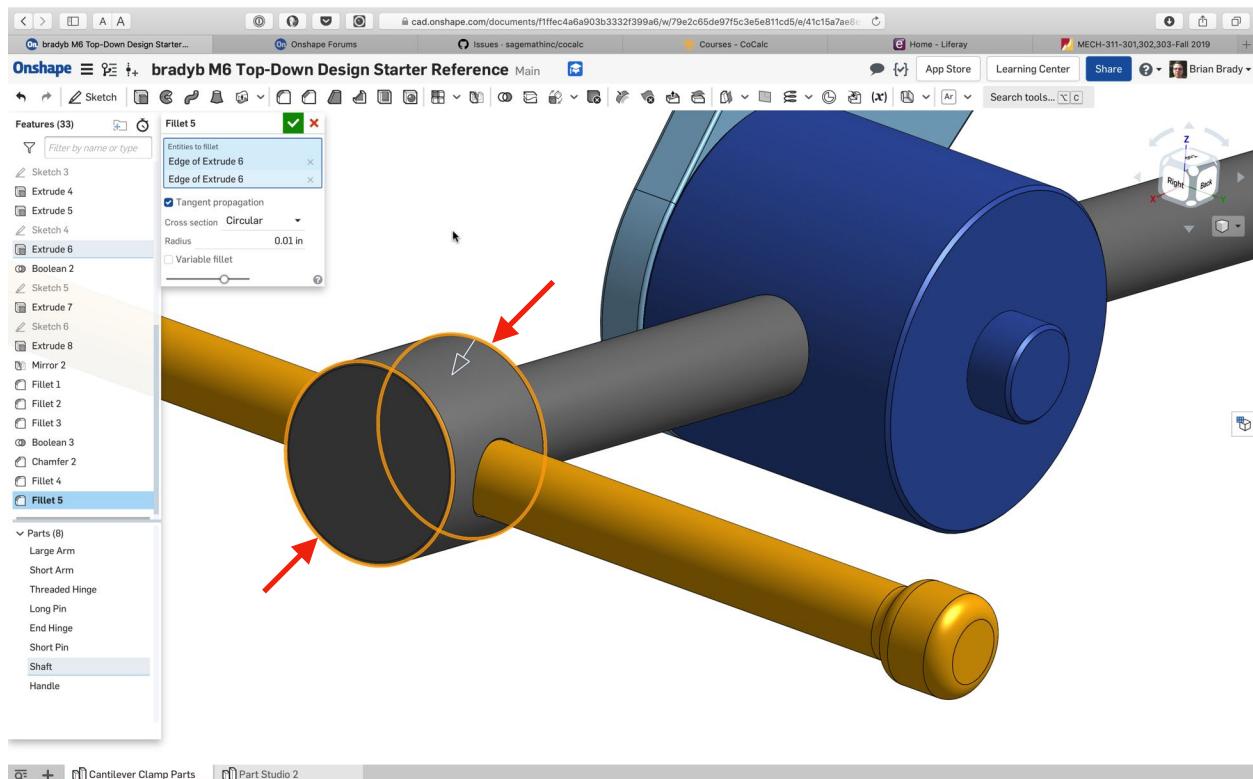


50. Hide the Handle and add 0.005 chamfers (edge breaks) to both edges of the hole in the Shaft.

M6 Cantilever Clamp Parts - Top-Down Design

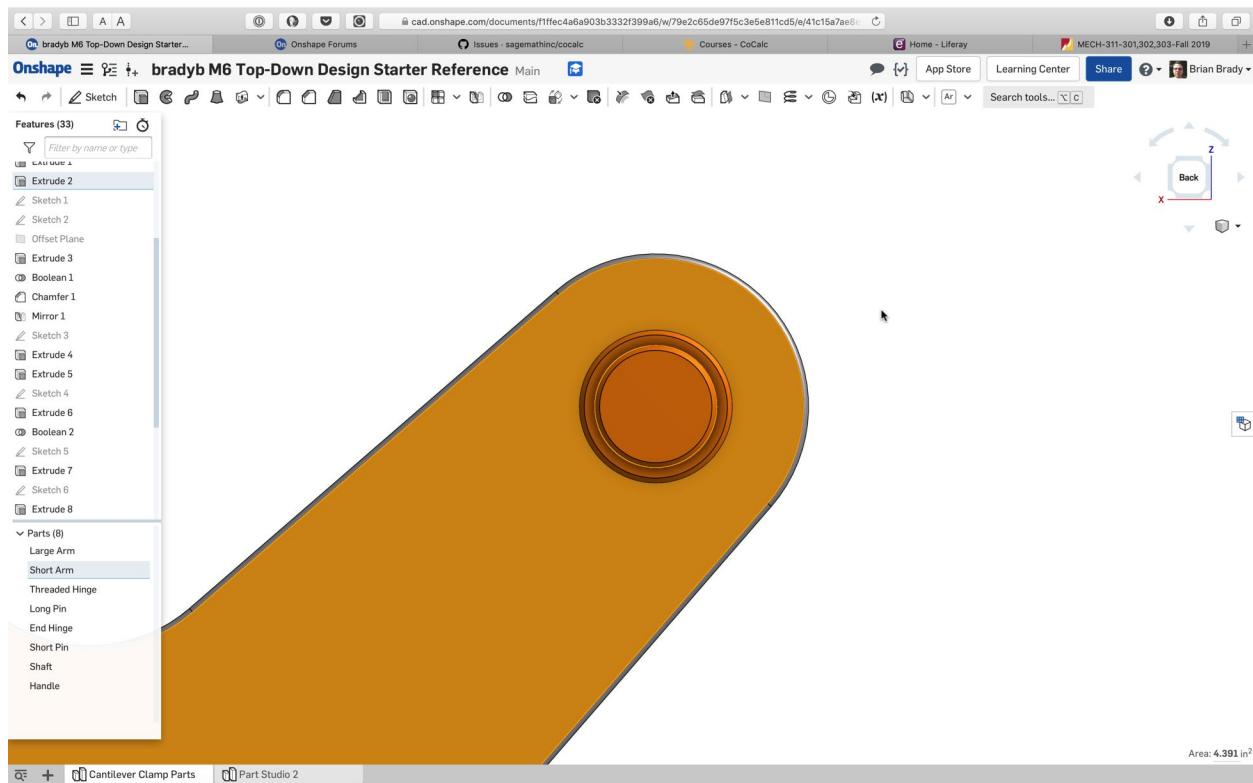


51. Hide all of the parts except the arms and add a 0.01 inch round around the outer perimeter of both sides of both arms.

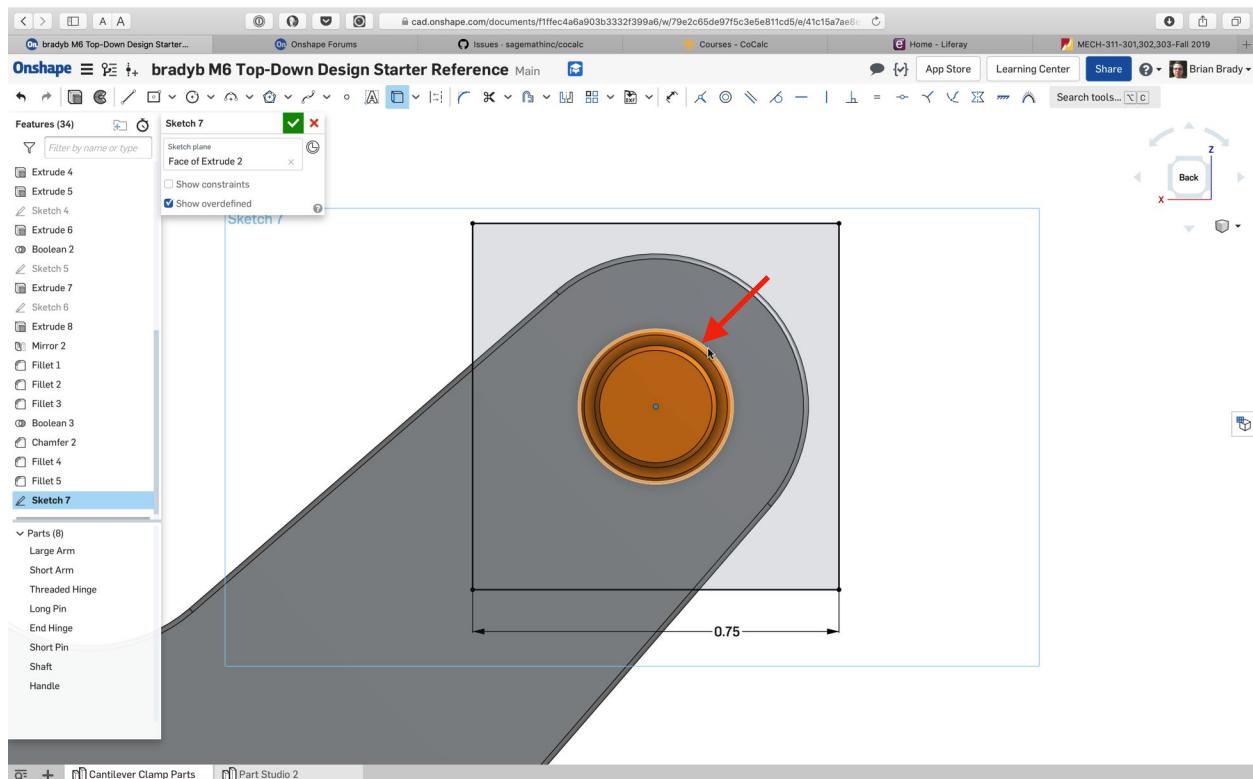


52. Add 0.01 inch rounds around the highlighted edges of the Shaft.

M6 Cantilever Clamp Parts - Top-Down Design

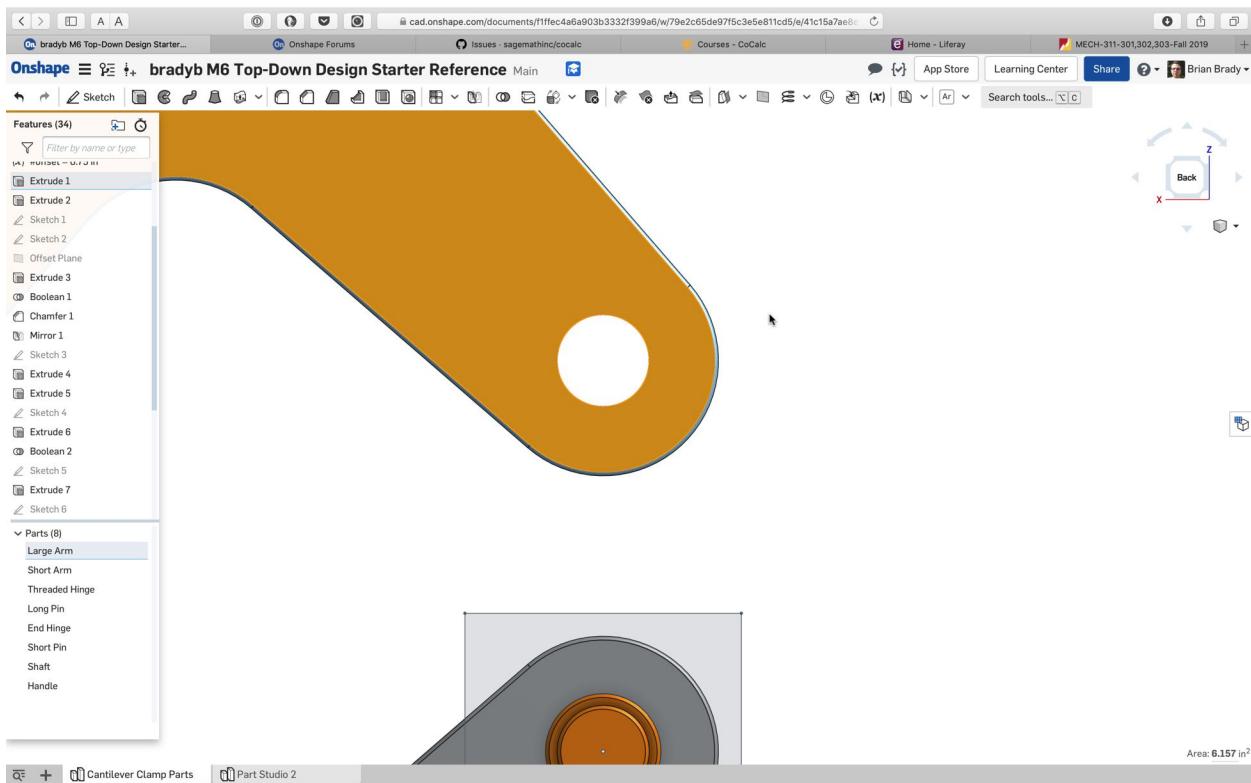


53. Select the face of the short arm shown (the side with the pin protruding from it) for sketching.

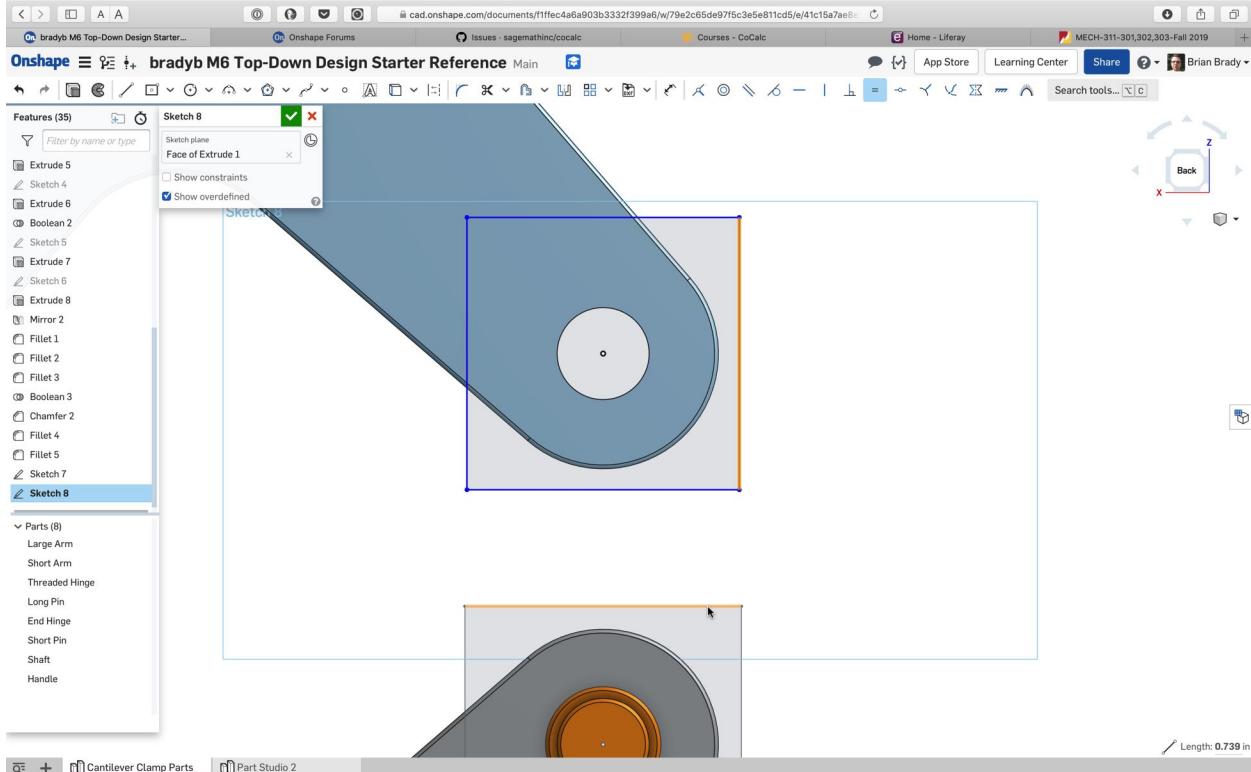


54. Sketch a 0.75 inch square that is centered on the pin/hole and “Use” the outermost edge of the pin.

M6 Cantilever Clamp Parts - Top-Down Design

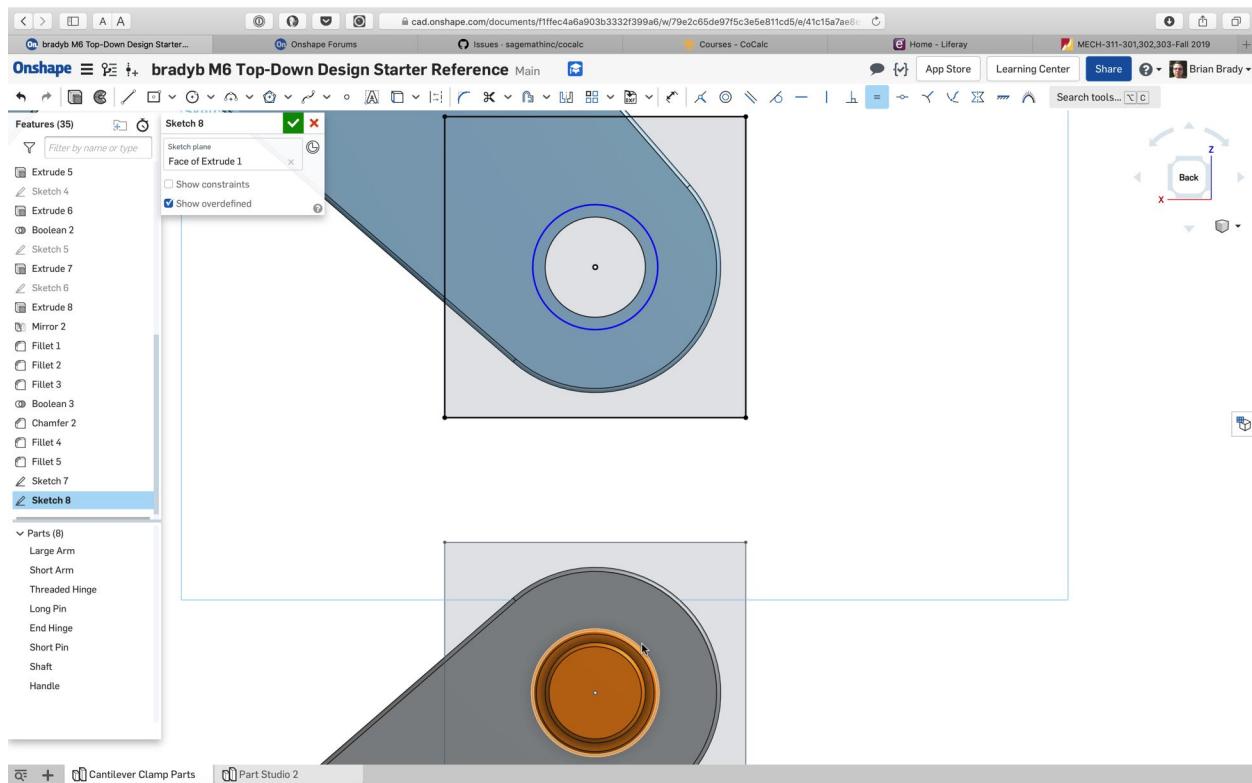


55. Select the similar face of the Large Arm for sketching.

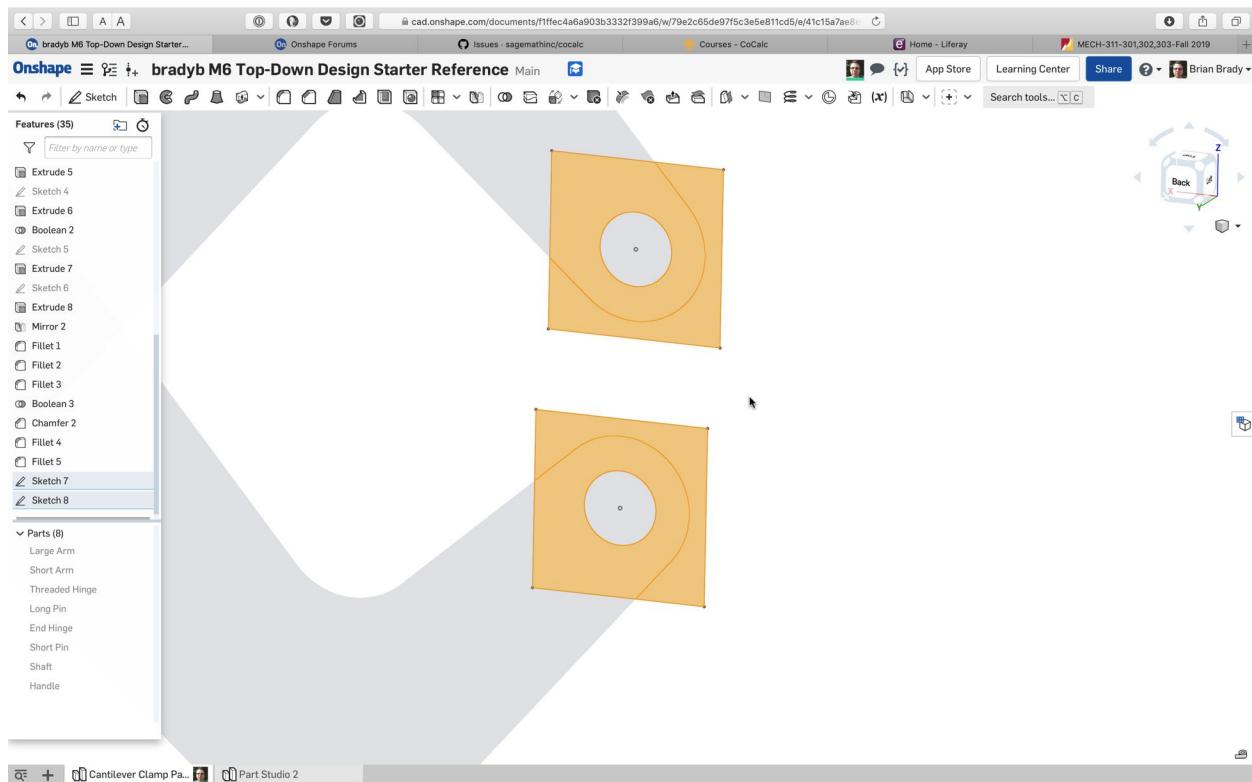


56. Sketch a square centered on the hole and set the length equal to the square from the previous sketch.

M6 Cantilever Clamp Parts - Top-Down Design

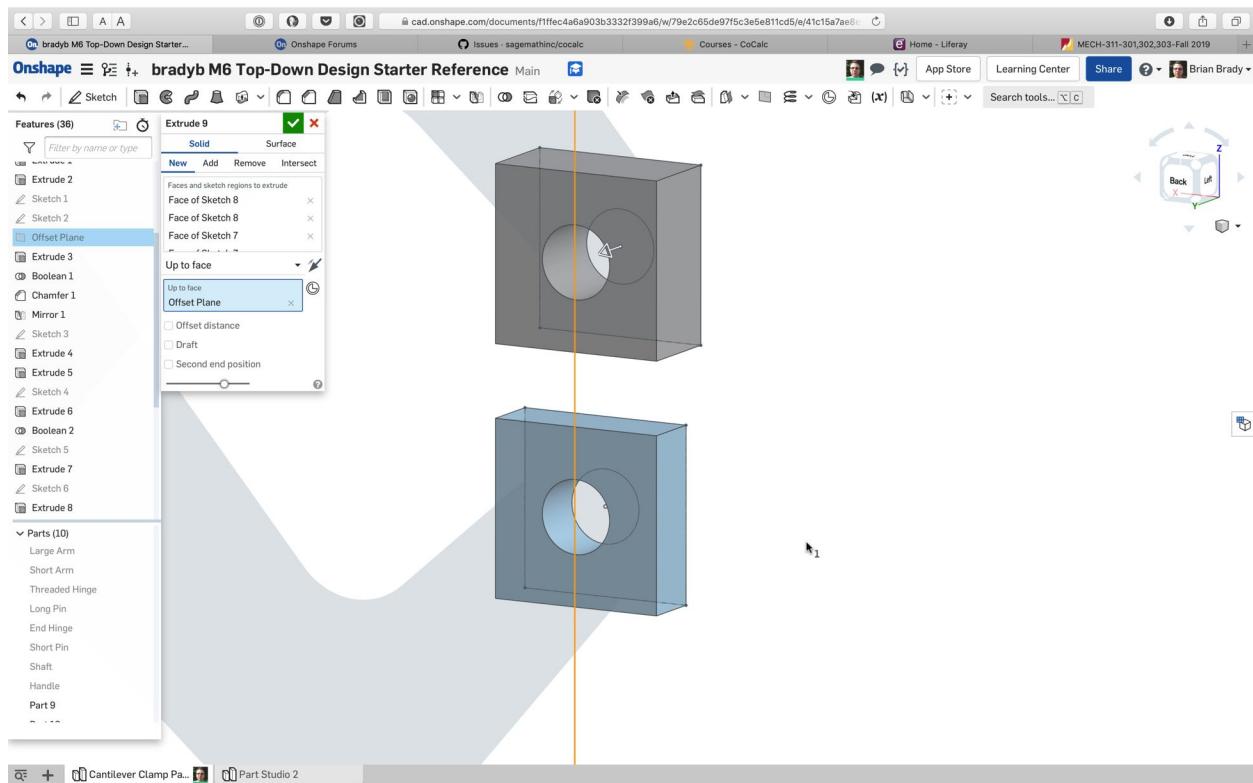


57. Sketch a circle that is concentric to the hole in the Large Arm and set it equal to the circle from the previous sketch.

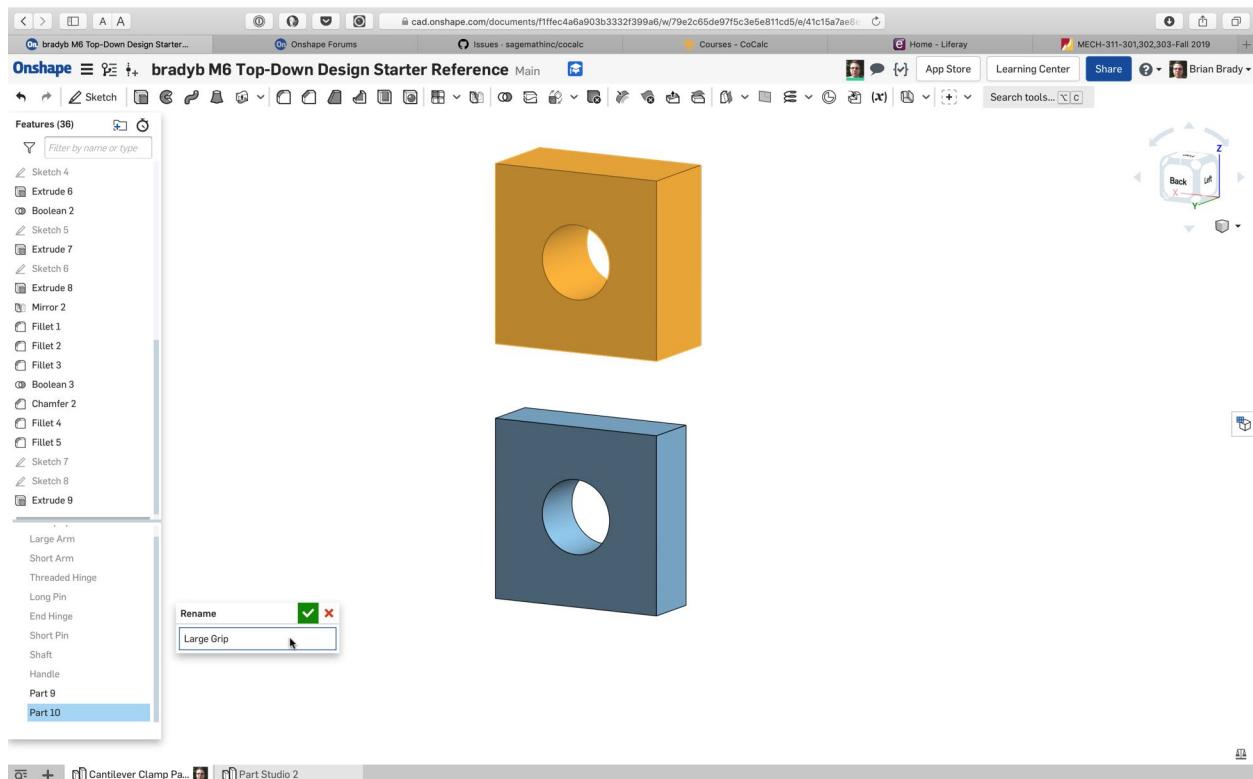


58. Hide the arms and select the regions shown from the previous two sketches for extruding.

M6 Cantilever Clamp Parts - Top-Down Design

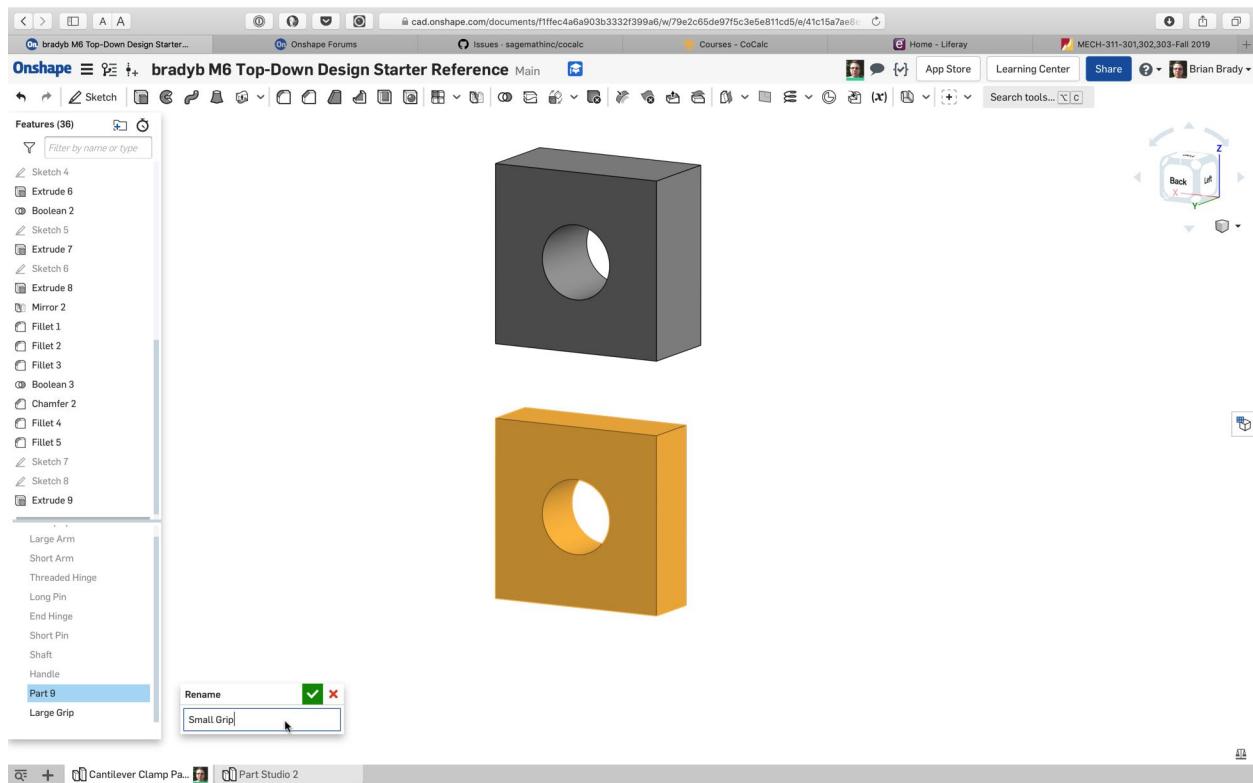


59. Extrude the regions as New parts up to the Offset Plane.

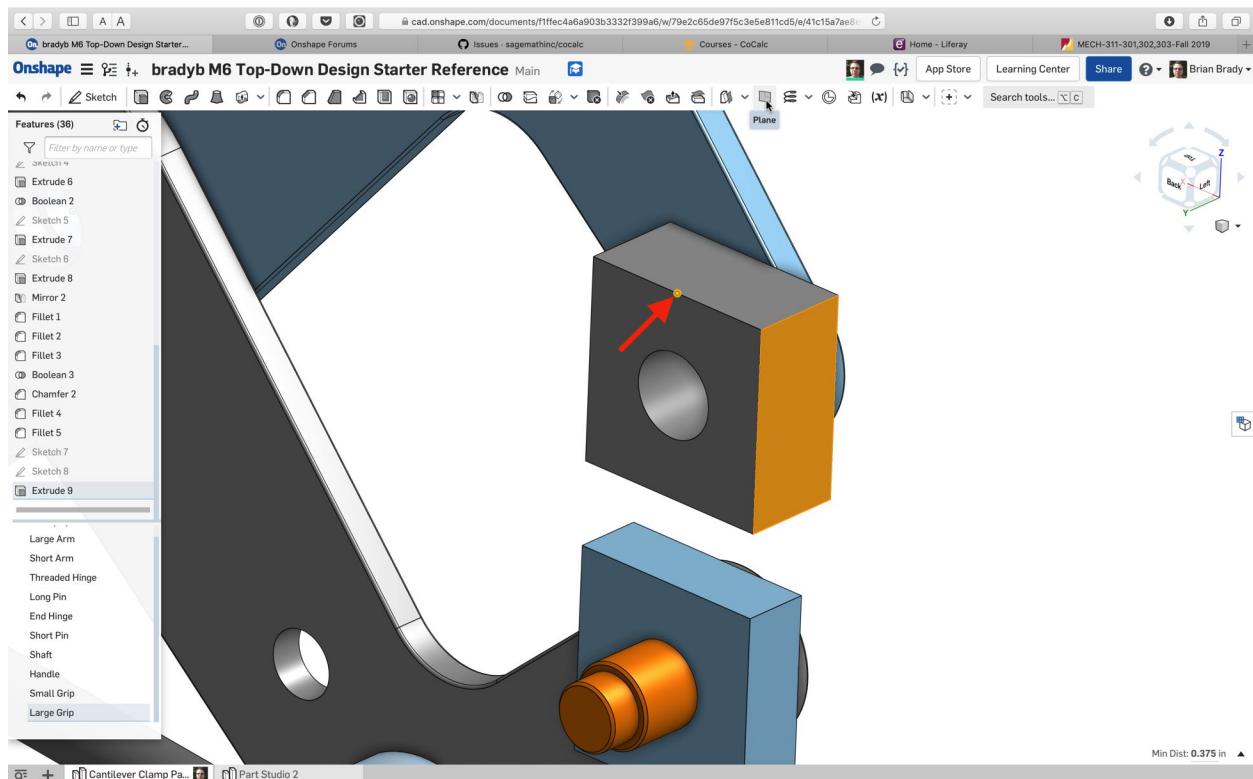


60. Rename the upper (thicker) part as "Large Grip"...

M6 Cantilever Clamp Parts - Top-Down Design

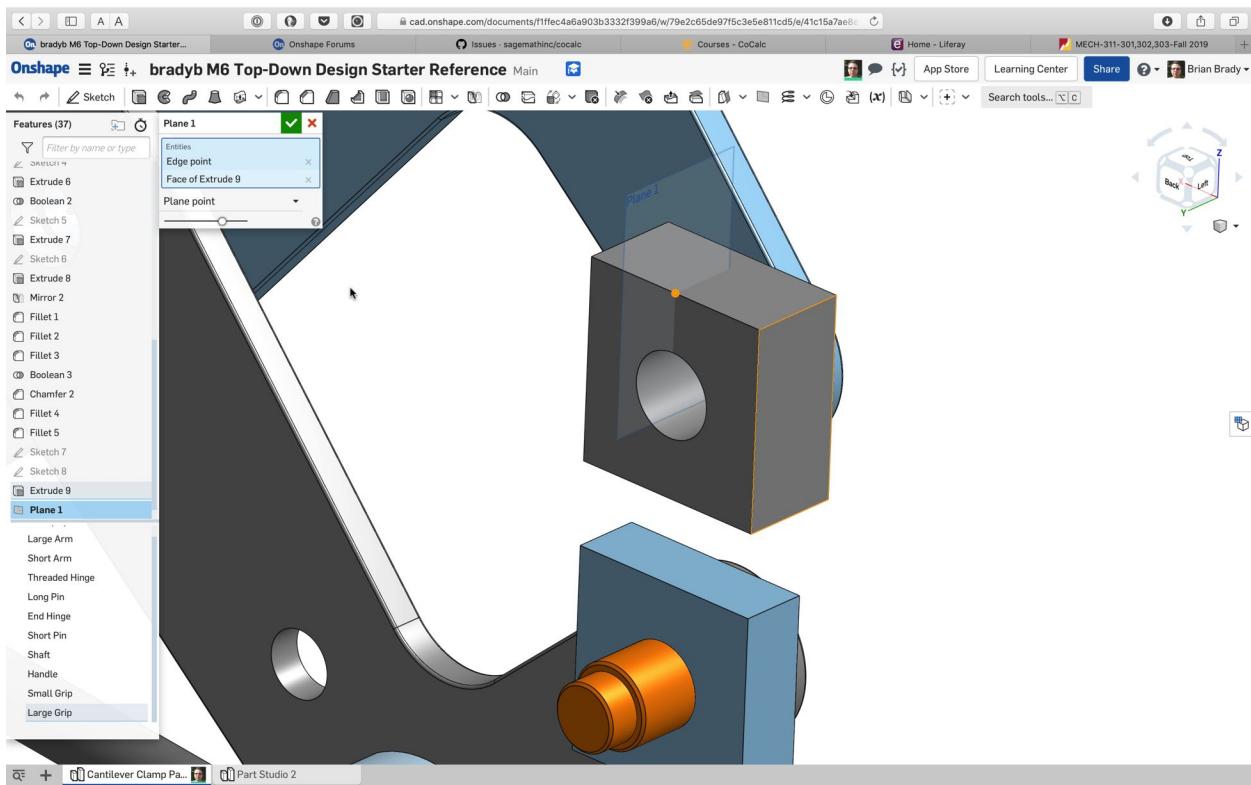


...and the lower (thinner) part as “Small Grip.”

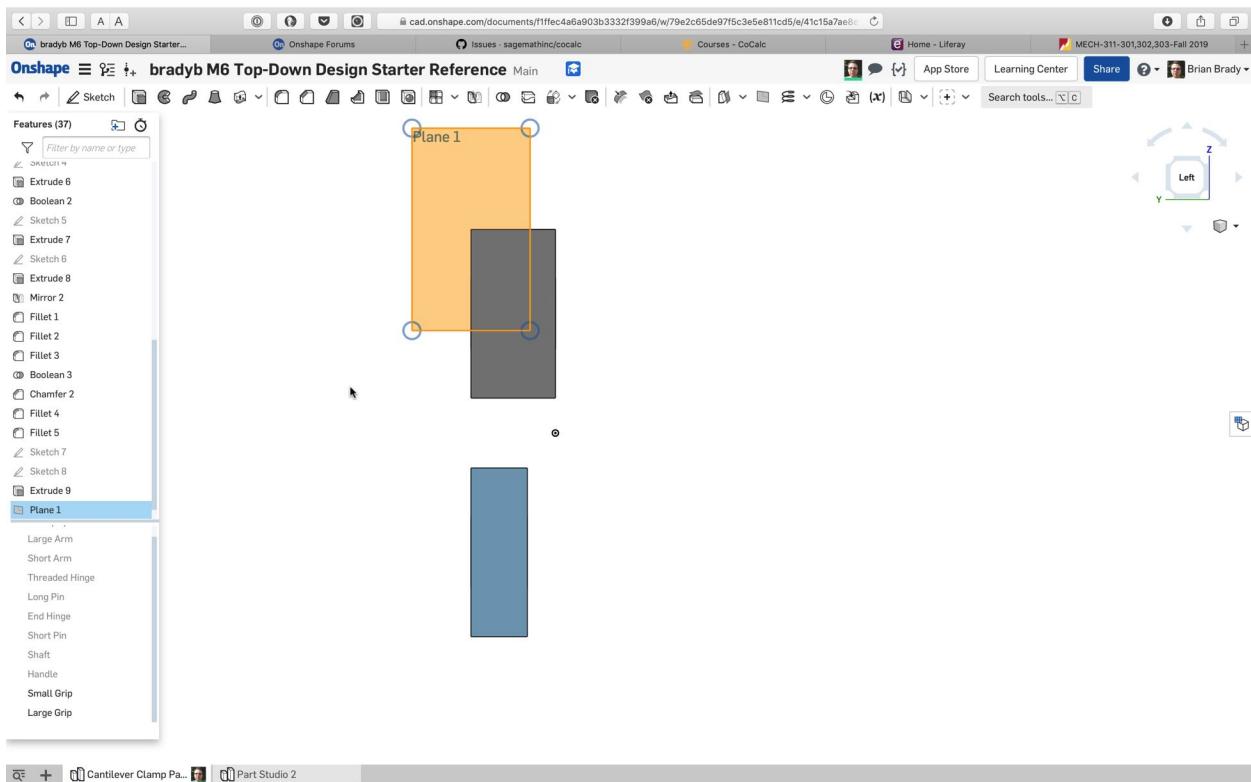


61. Select the surface of the Large Grip as shown and the midpoint of the horizontal edge of the Large Grip.

M6 Cantilever Clamp Parts - Top-Down Design

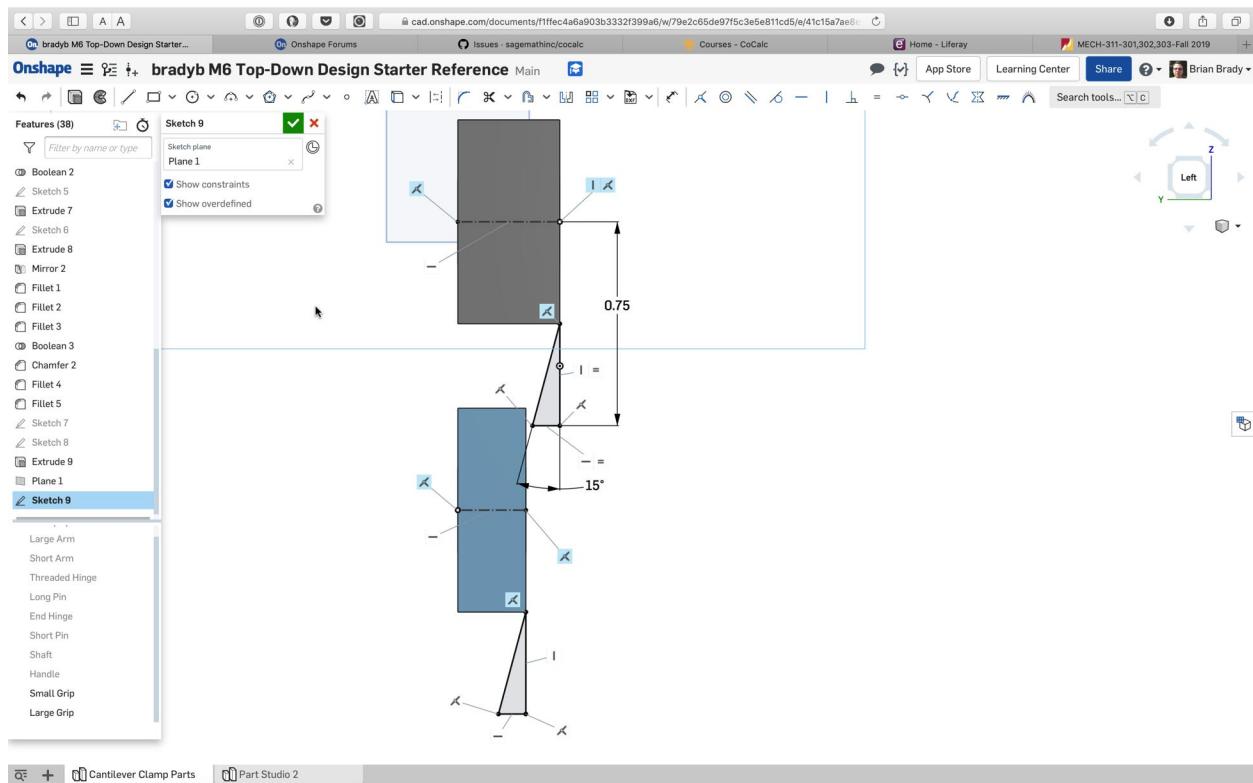


62. Create a new plane using the selected surface and point (it will pass through the point and be parallel to the surface).

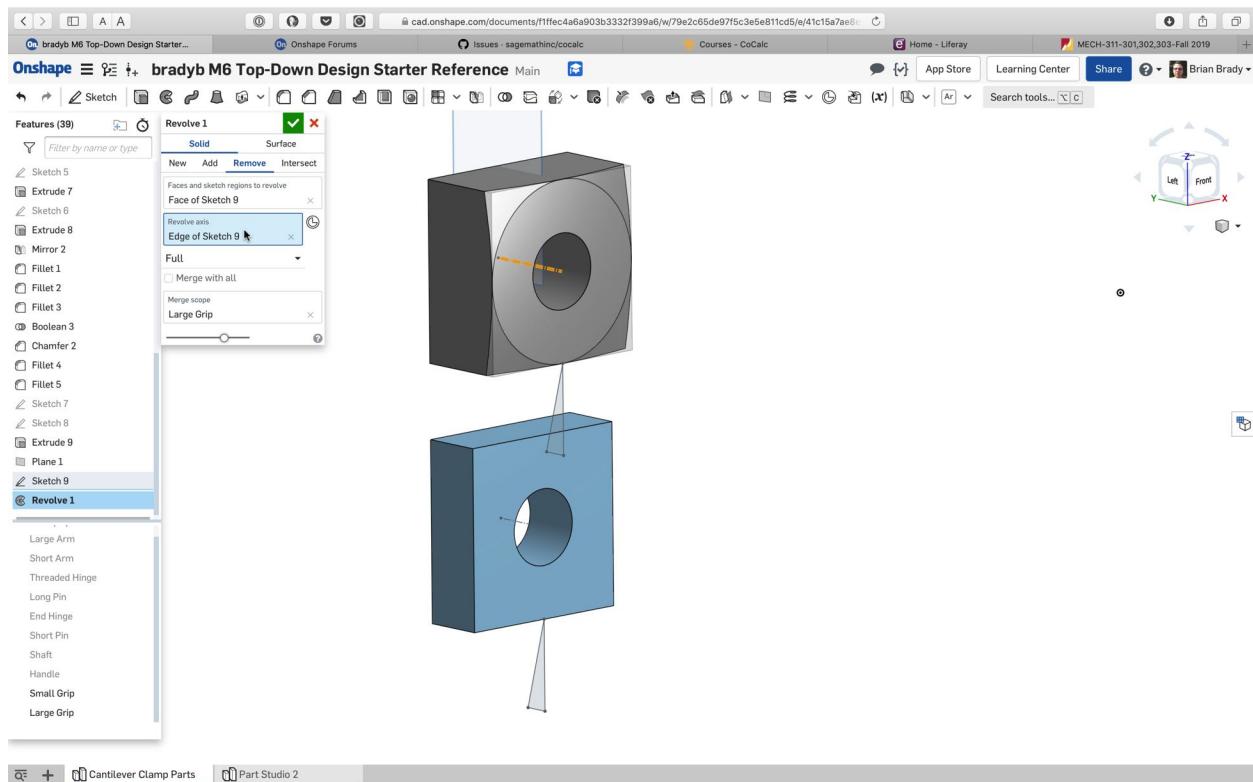


63. Select the new plane for sketching.

M6 Cantilever Clamp Parts - Top-Down Design

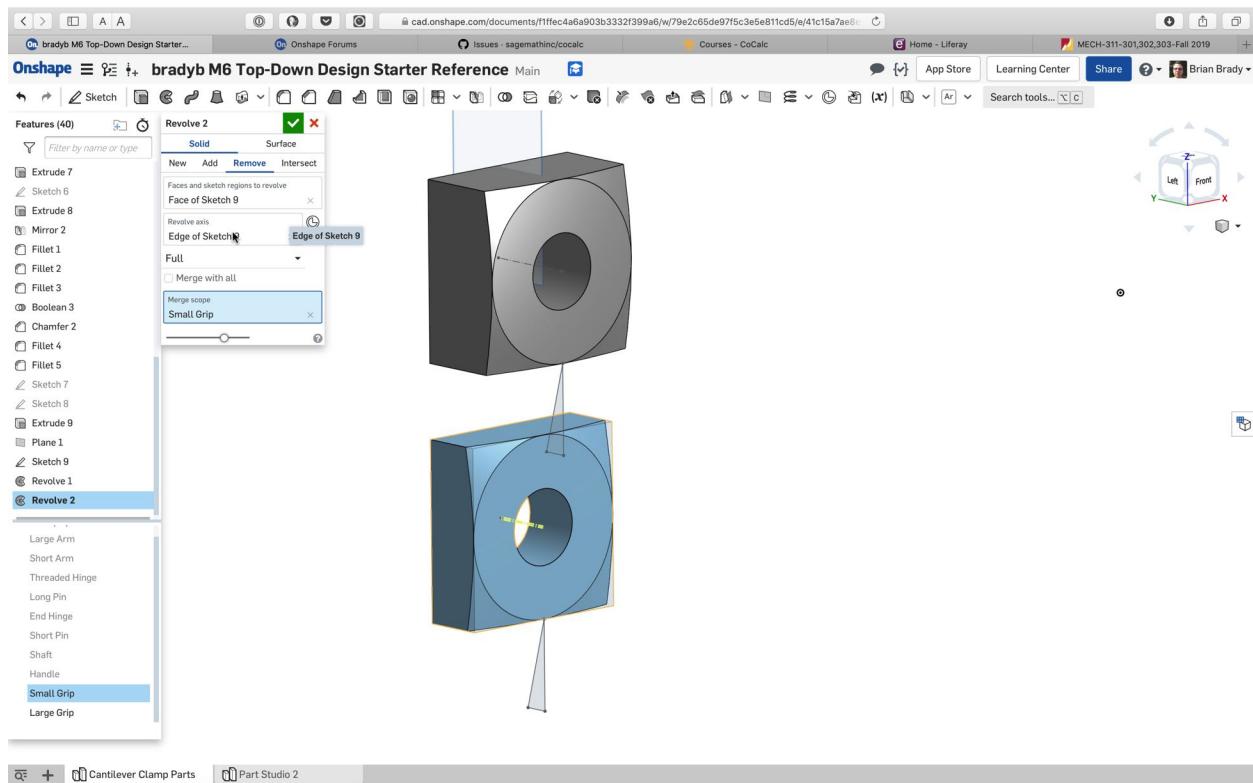


64. Create the sketched triangles shown. The upper vertices of the triangles should be coincident with the corner of the grips. Both triangles are identical in size and shape.

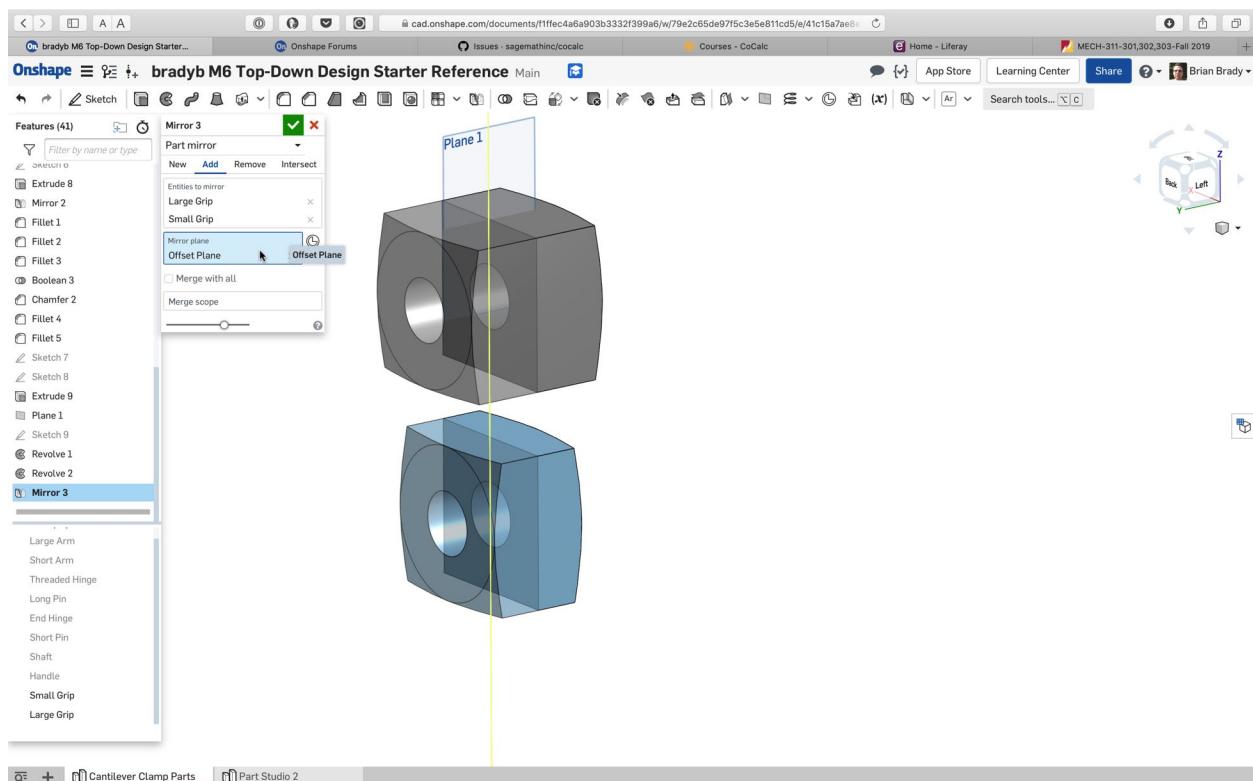


65. Revolve (Remove) the triangle nearest the Large Grip about the sketched centerline.

M6 Cantilever Clamp Parts - Top-Down Design

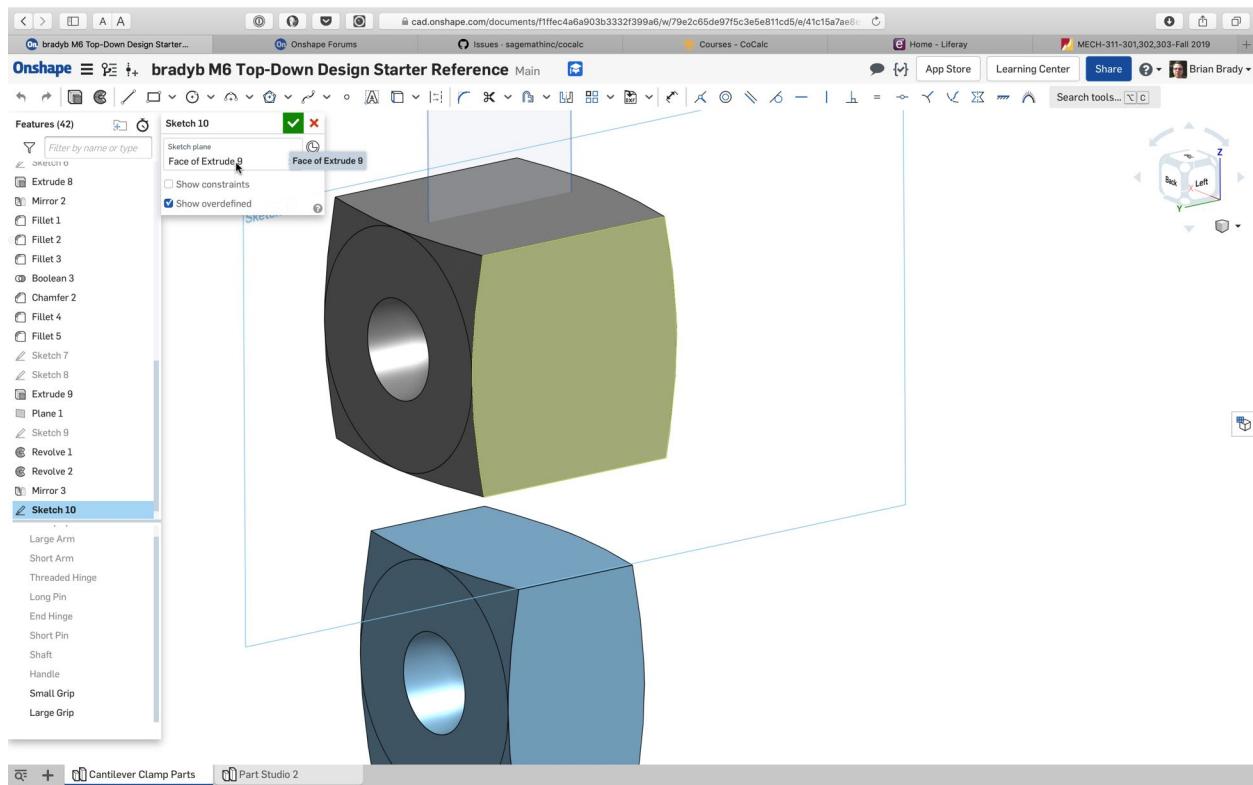


66. Revolve (Remove) the lower triangle about the centerline that passes through the Small Grip. You will need to set the merge scope as the Small Grip.

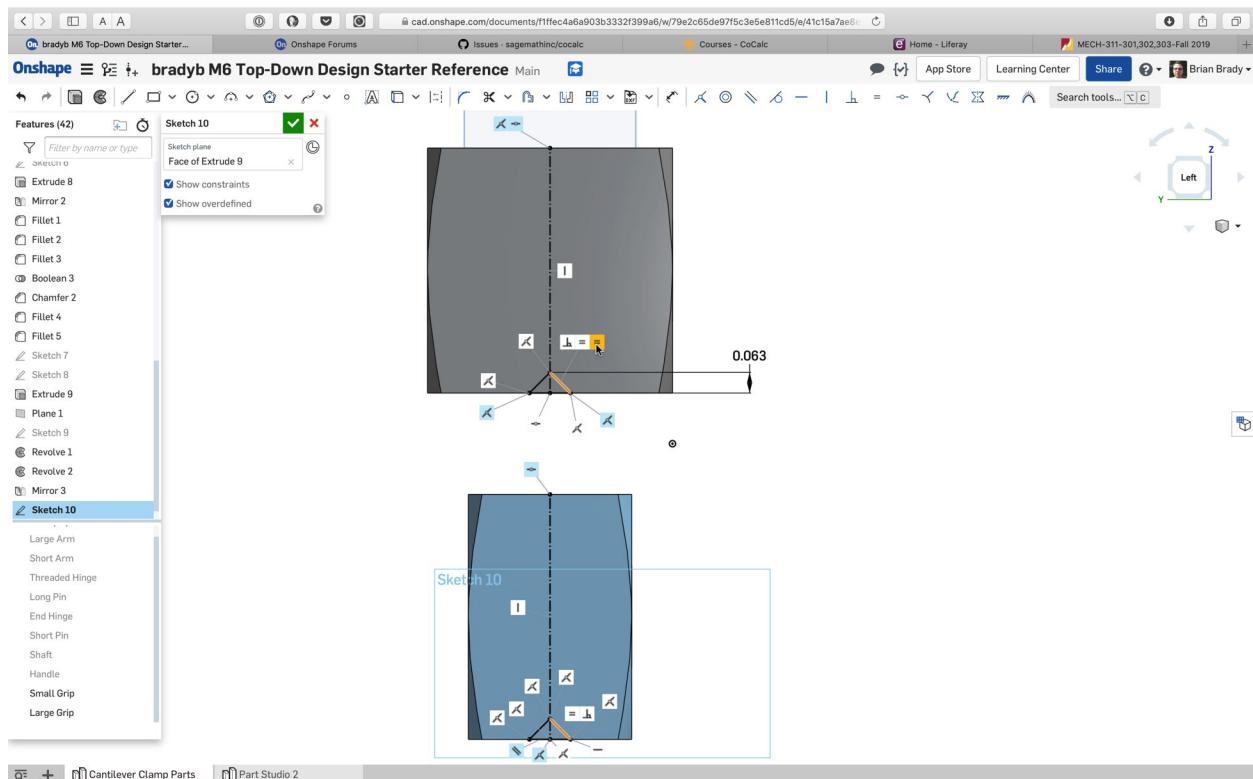


67. Mirror (Add) the Large Grip and Small Grip parts about the Offset Plane.

M6 Cantilever Clamp Parts - Top-Down Design

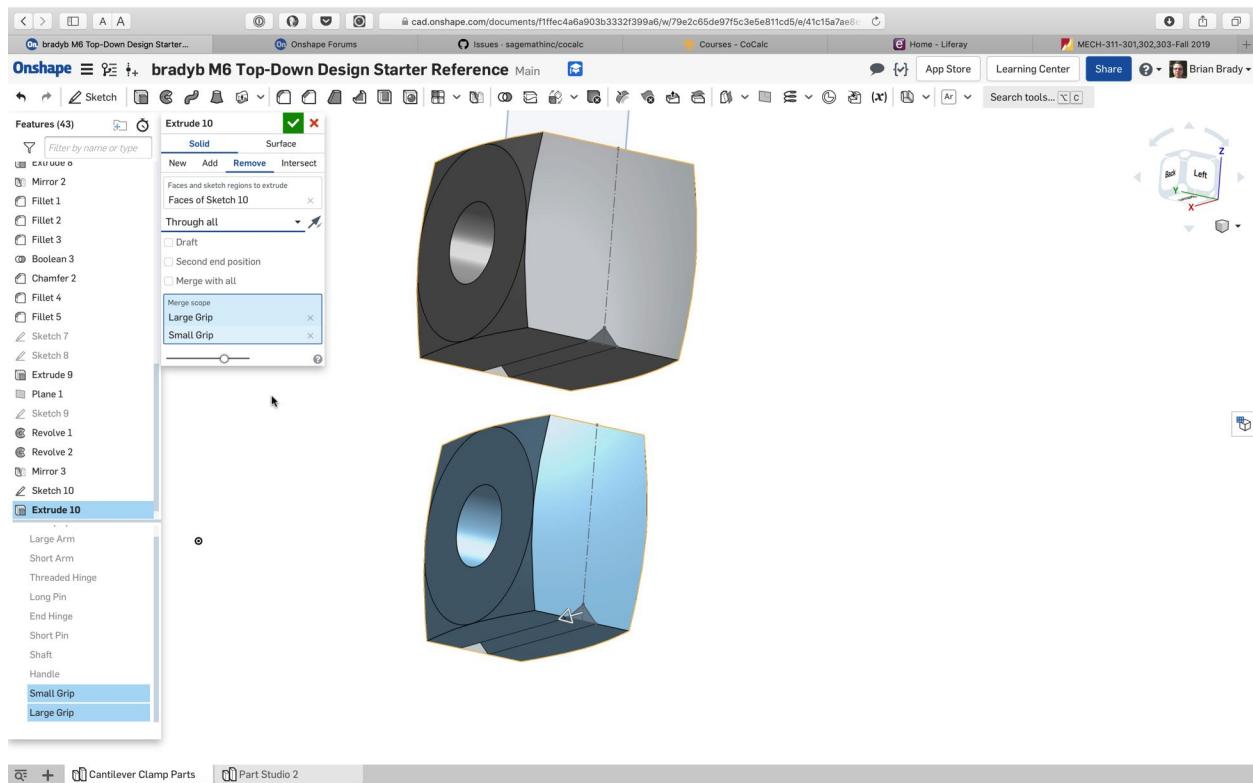


68. Select the face of the Large Grip Shown for sketching.

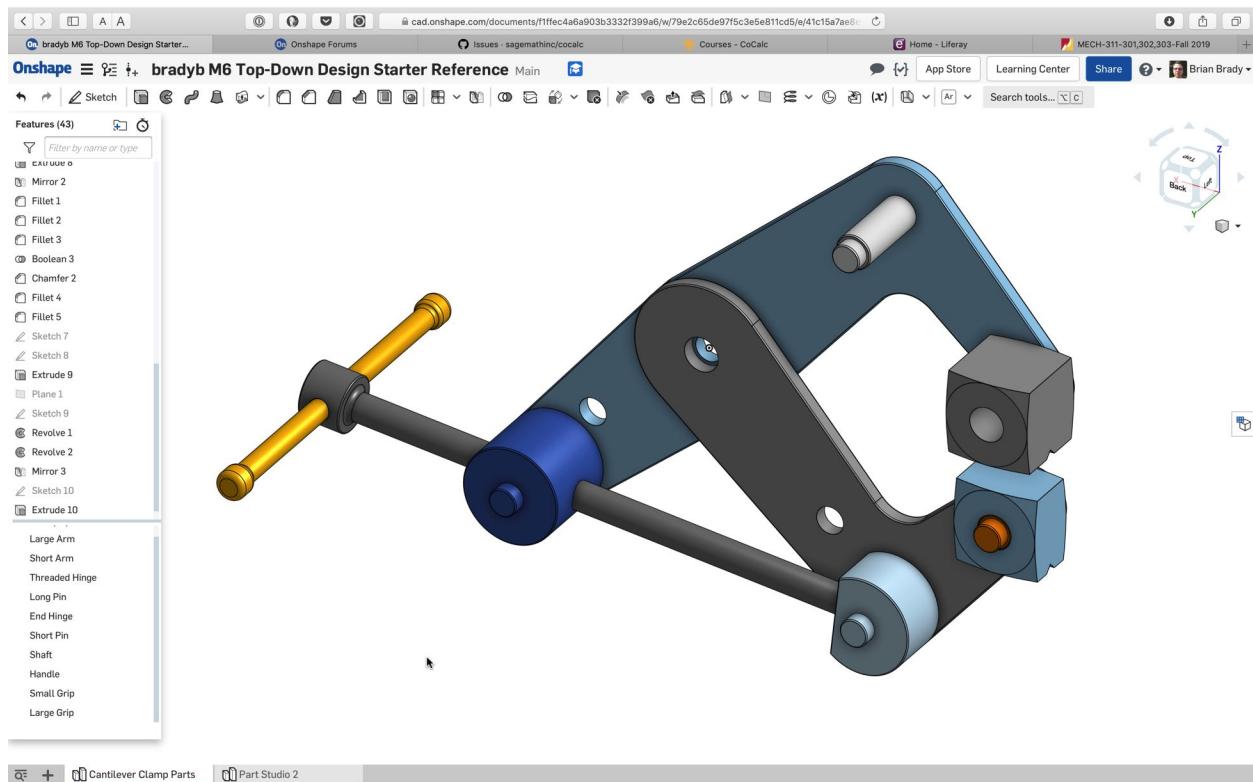


69. Sketch the two triangles and construction lines on the two Grips. You will have to use coincident and midpoint constraints. The angled lines are perpendicular to each other.

M6 Cantilever Clamp Parts - Top-Down Design



70. Extrude (Remove) the sketch through all with both the Large Grip and Small Grip included in the merge scope.



71. Congratulate yourself for creating all of the parts needed for a cantilever clamp using top-down design.