ME 24-688 – Week 3

Project 1 – Fillet Features

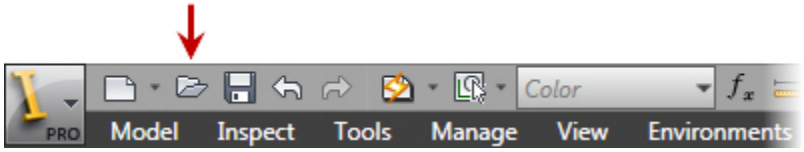
1 Advanced Fillet Creation

The following section will give a more in depth look into fillet creation. Fillet placement order, Full Round fillet, Face fillets, and Variable Radius fillets are covered.

1.1 Project 1

1. When using the Fillet tool the resulting fillet feature created can vary depending on the order of placement. When creating a fillet were several edges come together it is recommended to reference all edges in one fillet feature. In some cases this may not give the desired result, so multiple fillet feature placed in a certain order are required.

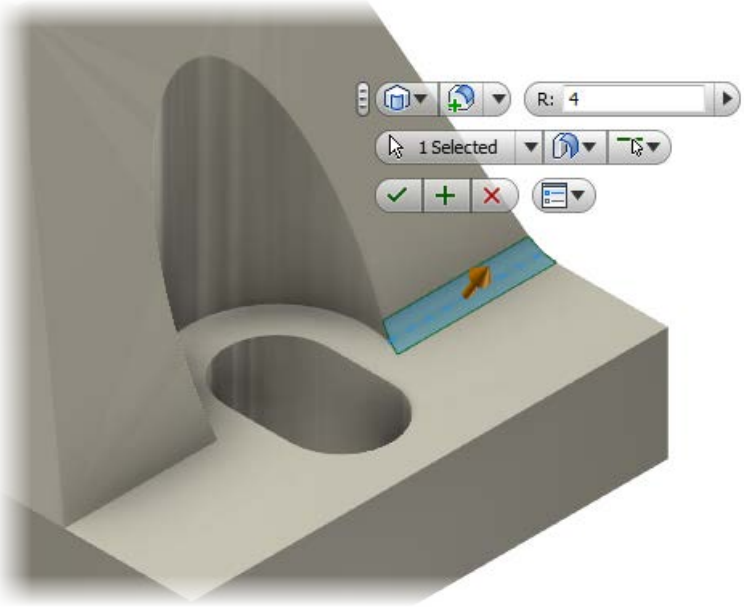
2. Open an existing part file.
   - On the Quick Access toolbar, click Open.



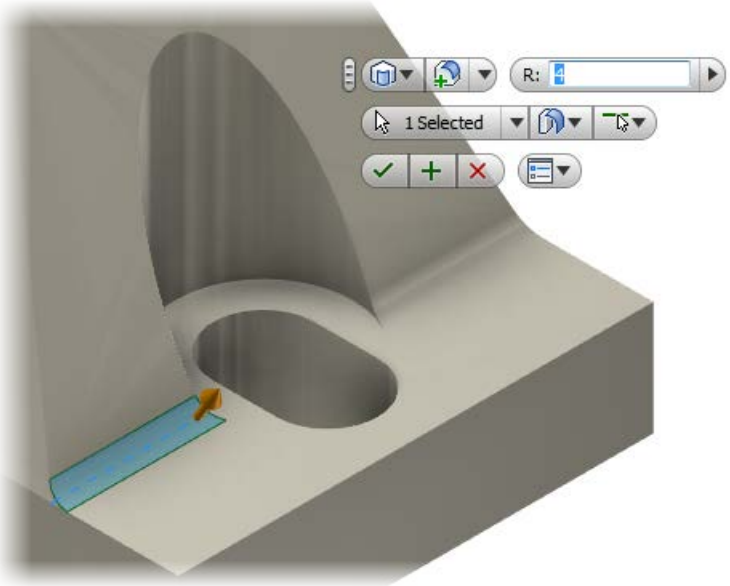
   - In the **Open** dialog box, select the file *Stop-Block.ipt*
   - Click **OK**.

3. First let's place several individual fillet features and see what the result is.
   - Start the **Fillet** tool

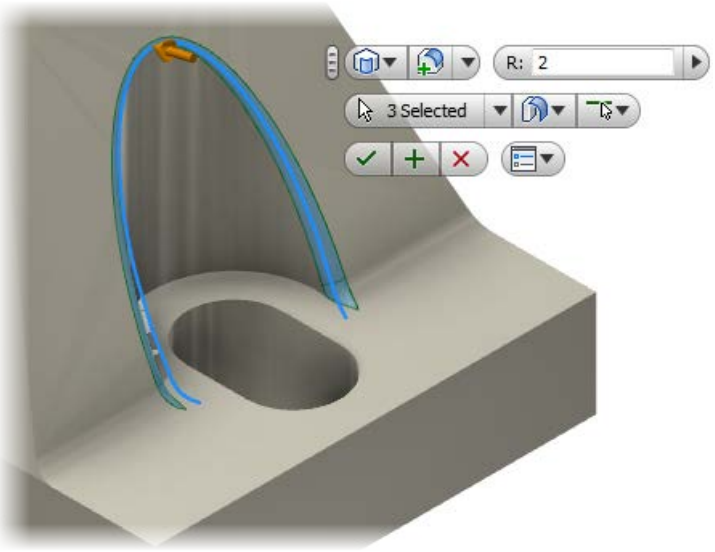
- Place a **4 mm** fillet on the edge shown, Click **Apply**



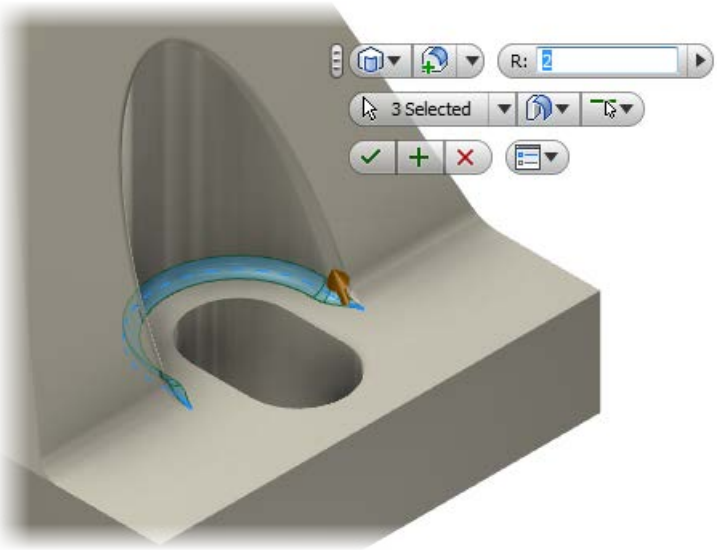
- Place a **4 mm** fillet on the edge shown, Click **Apply**



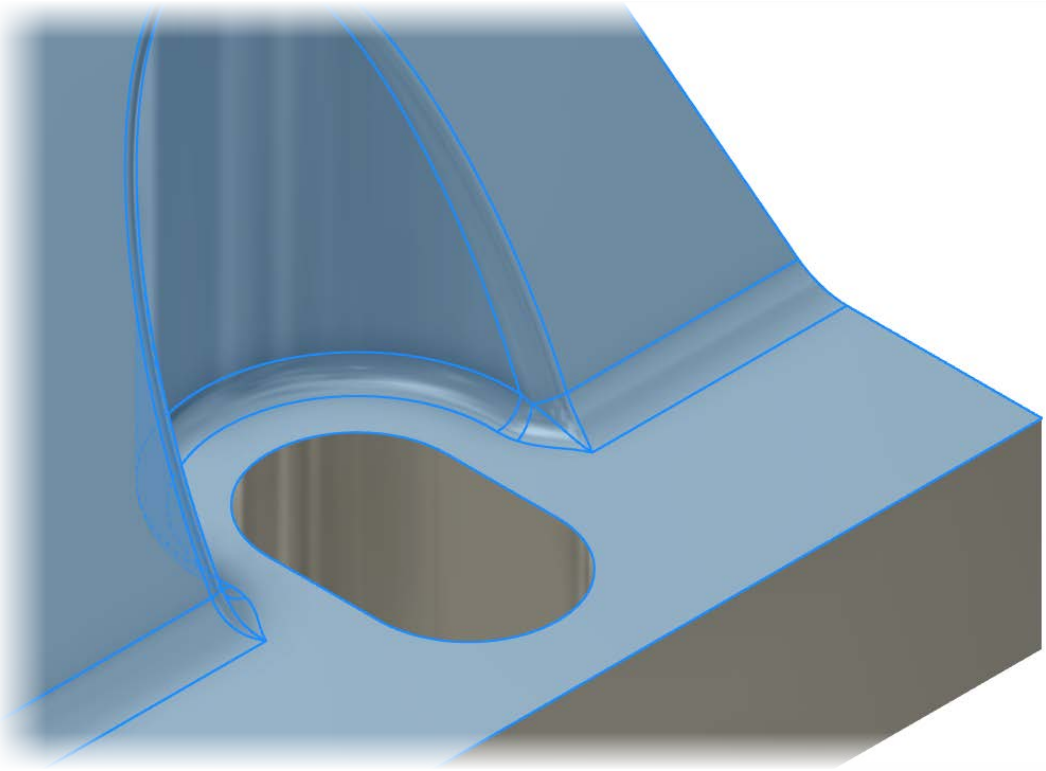
- Place a **2 mm** fillet on the edge shown, Click **Apply**



- Place a **2 mm** fillet on the edge shown, Click **OK**

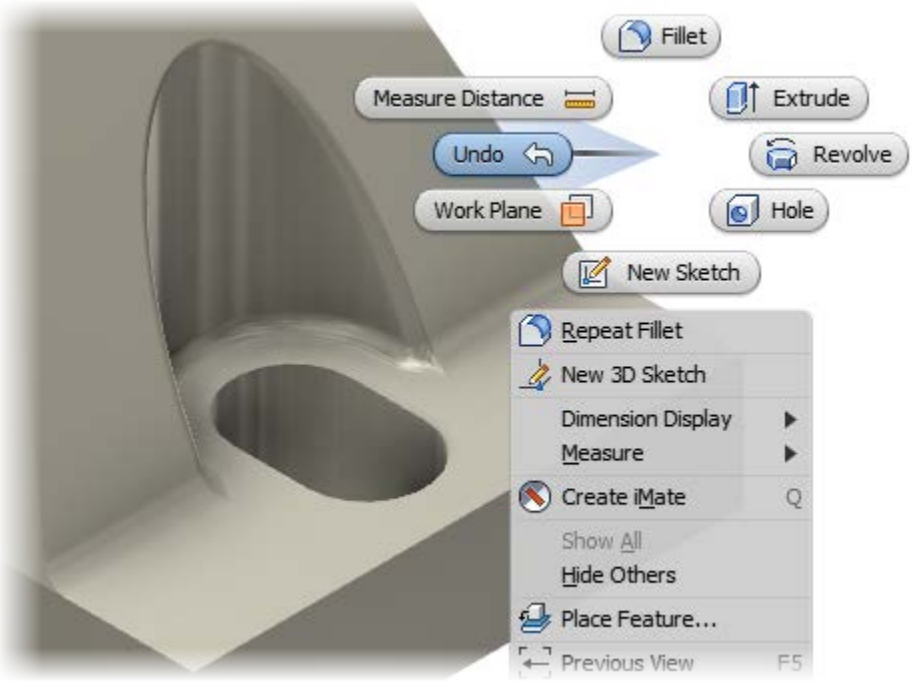


- Review the result

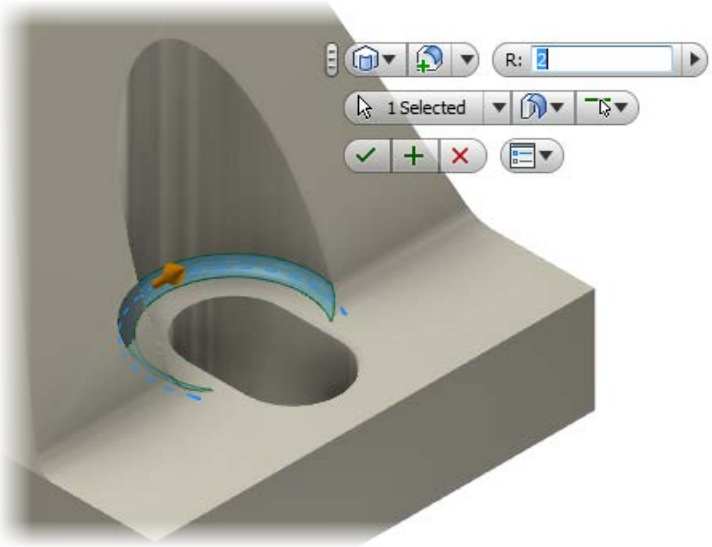


4. Now Delete the last two 2 mm fillet features and place them in reverse order

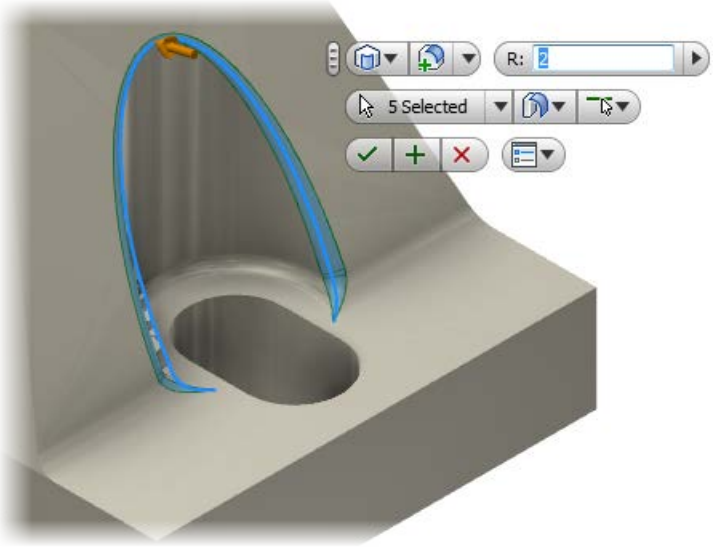
- Select **Undo** twice to undo the last two placed fillet feature



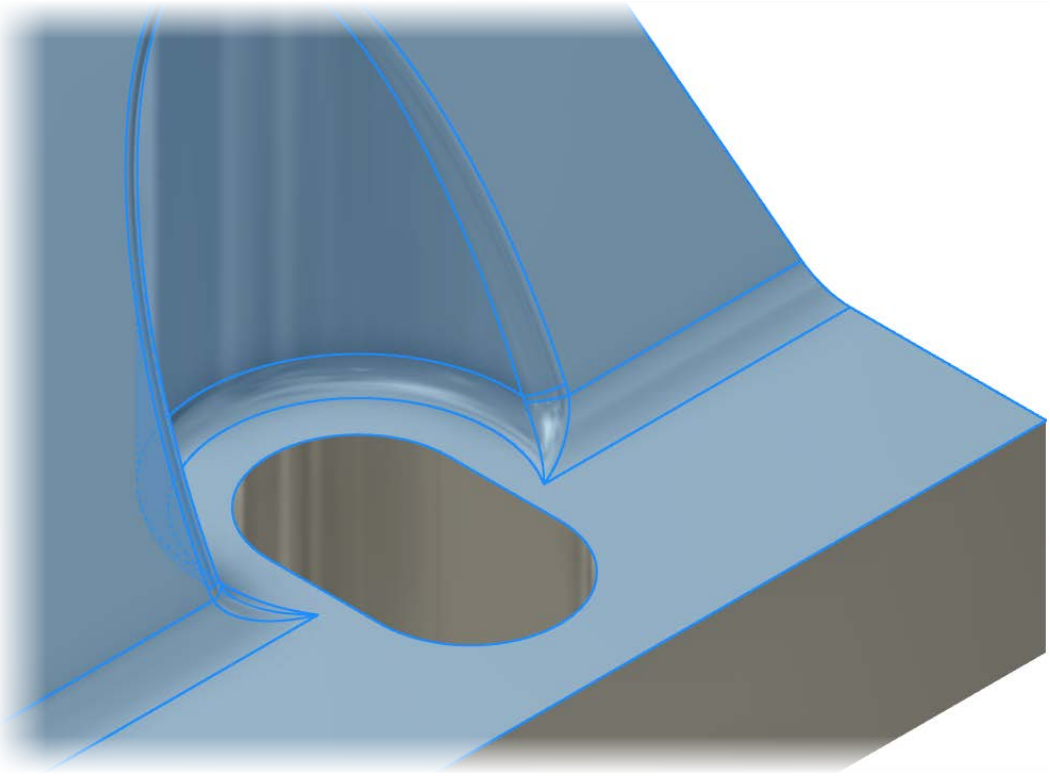
- Start the **Fillet** tool
- Place a **2 mm** fillet on the edge shown, Click **Apply**



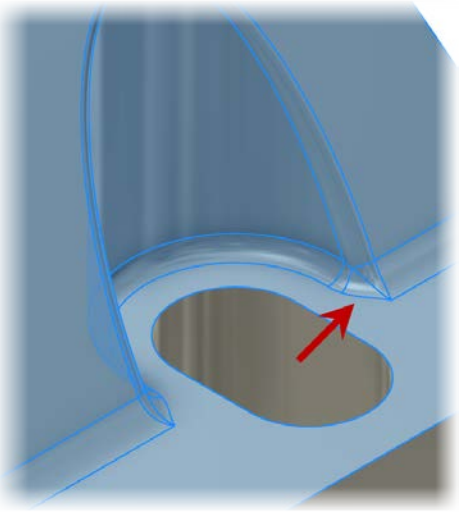
- Place a **2 mm** fillet on the edge shown, Click **OK**

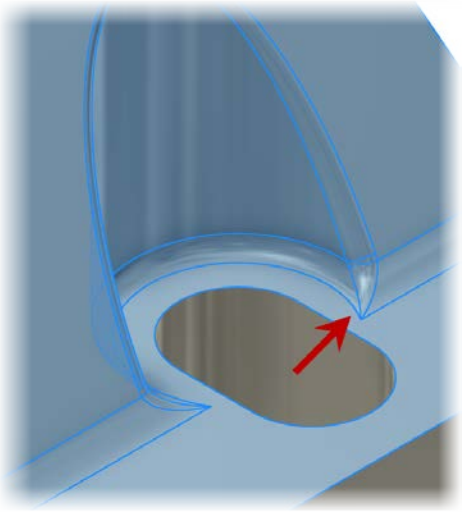


- Review the result



- Notice how even though the same radius dimensions were used, the order of placement causes two different results.

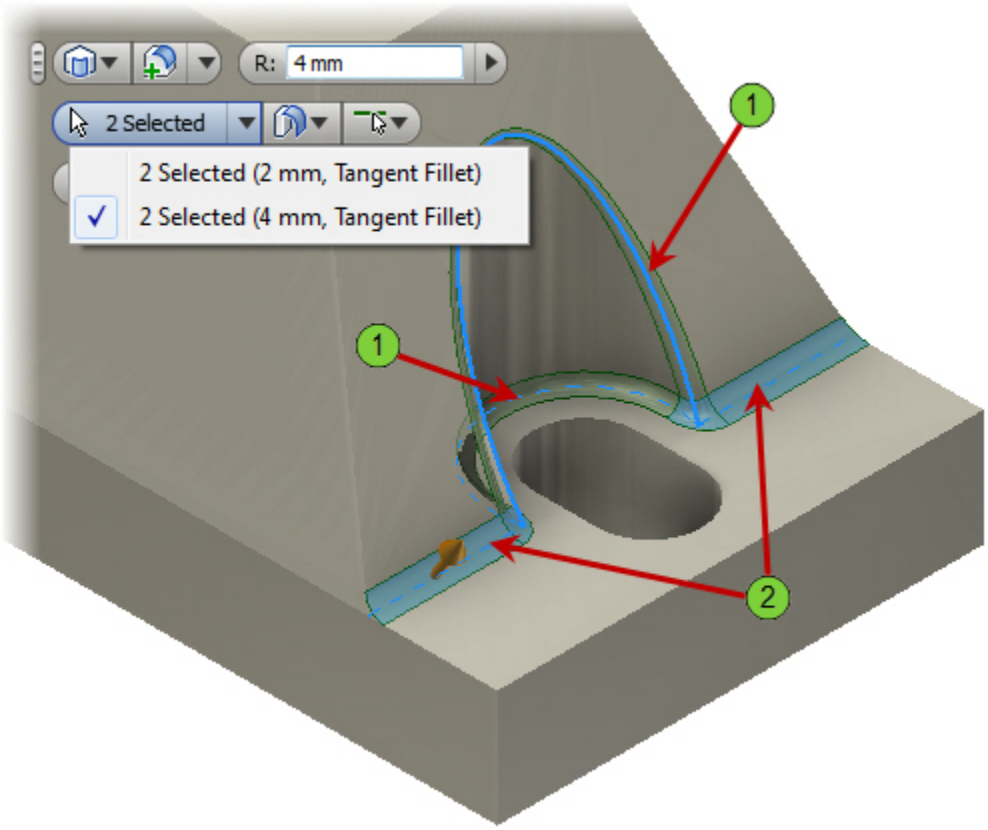




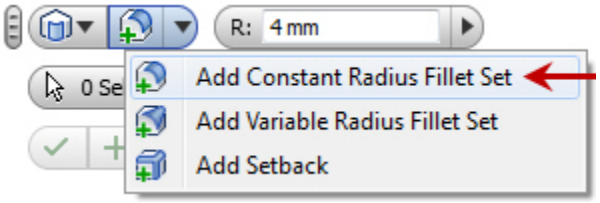
5. Delete all placed fillet features

6. Create **Constant Fillet Radius Set**

- Start the **Fillet** tool

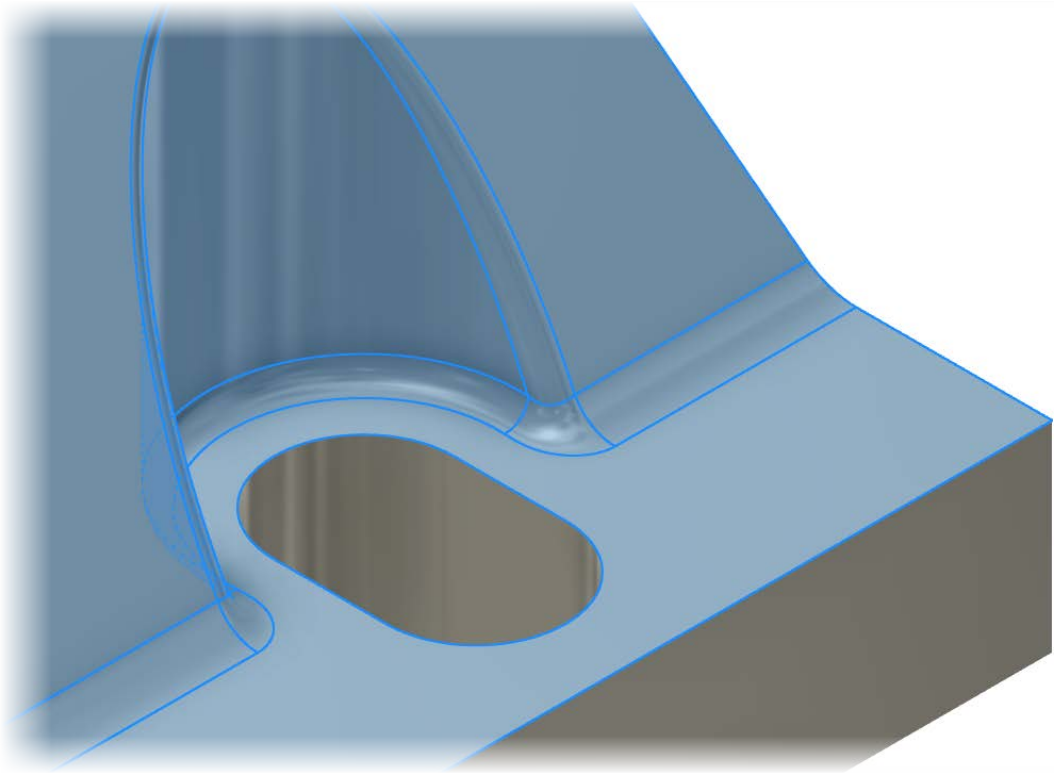


- Select the geometry labeled 1. For the radius, enter **2 mm**
- To create a second edge set select **Add Constant Radius Fillet Set** from the **Mini-Toolbar** and select the geometry labeled 2. For the radius, enter **4 mm**.



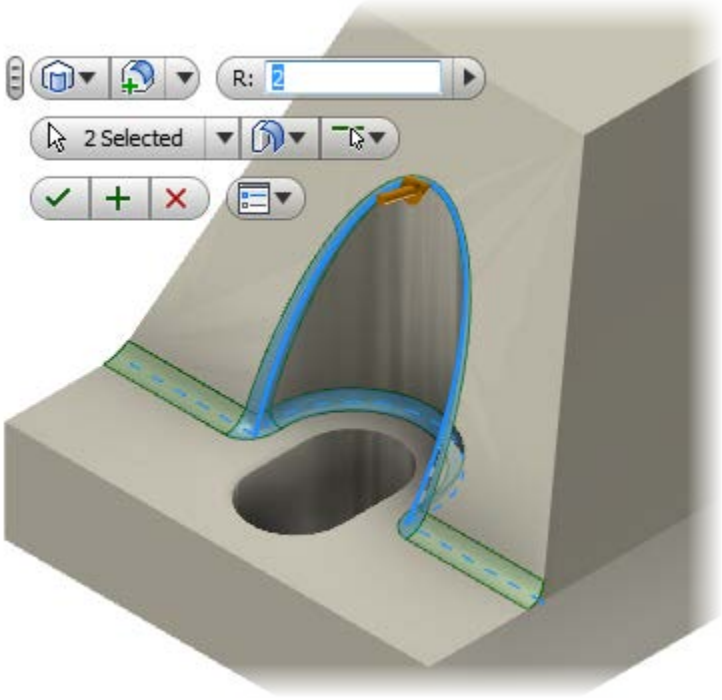
- Click **OK**

- Review the result

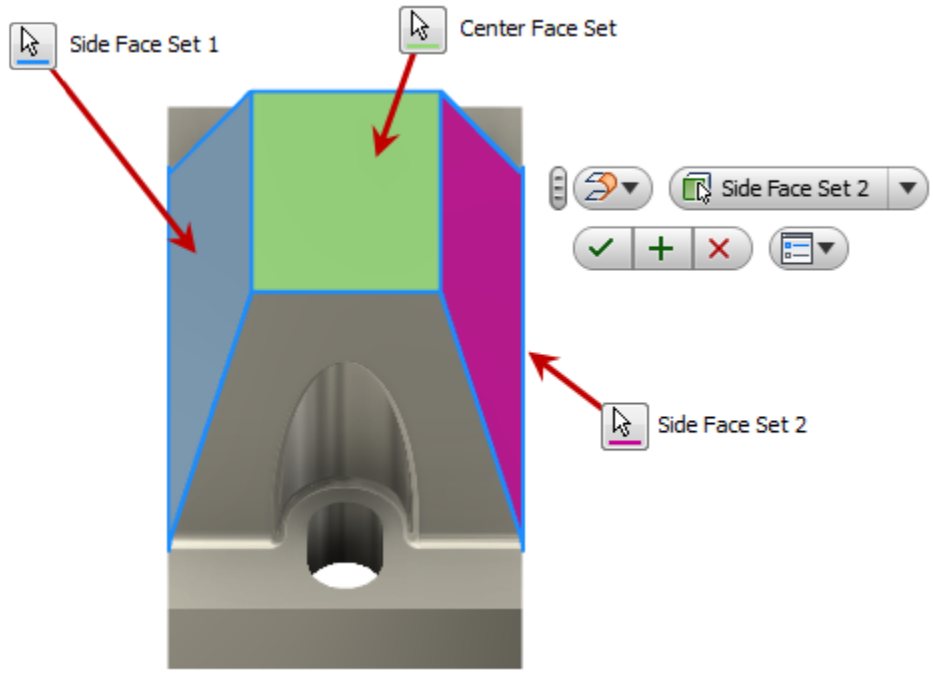


In most cases this would be the prefered result instead of the previous examples.

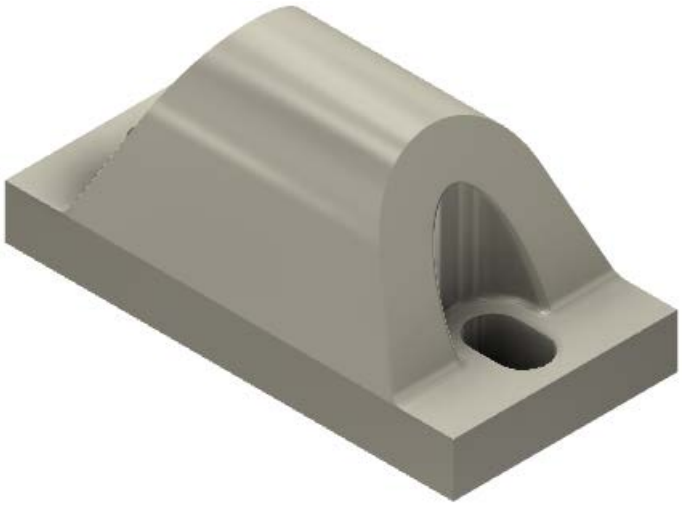
7. Repeat the steps in Step #6 on the opposite side of the part.



8. Start the **Fillet** tool.
   - Select the **FullRound Fillet** option
   - Select the faces indicated



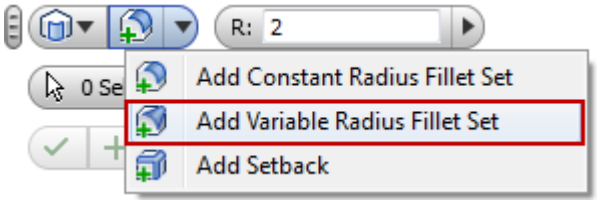
   - Click **OK**
   - Review the result



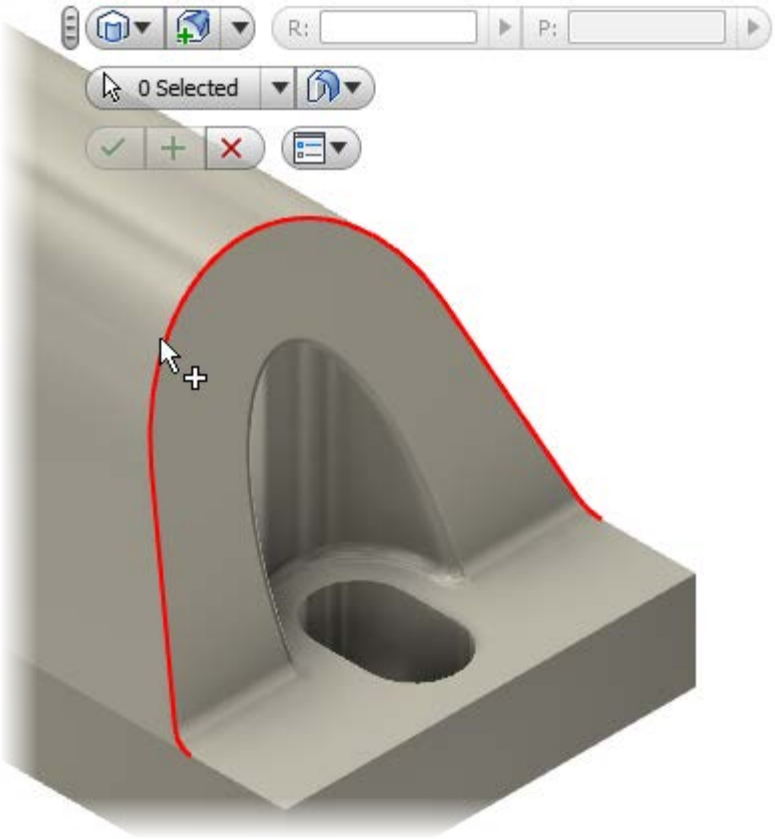
Note that the **Center Face Set** is replace by a full round fillet that is tanget to the two side faces.

9. Place a **Variable Radius Fillet** feature

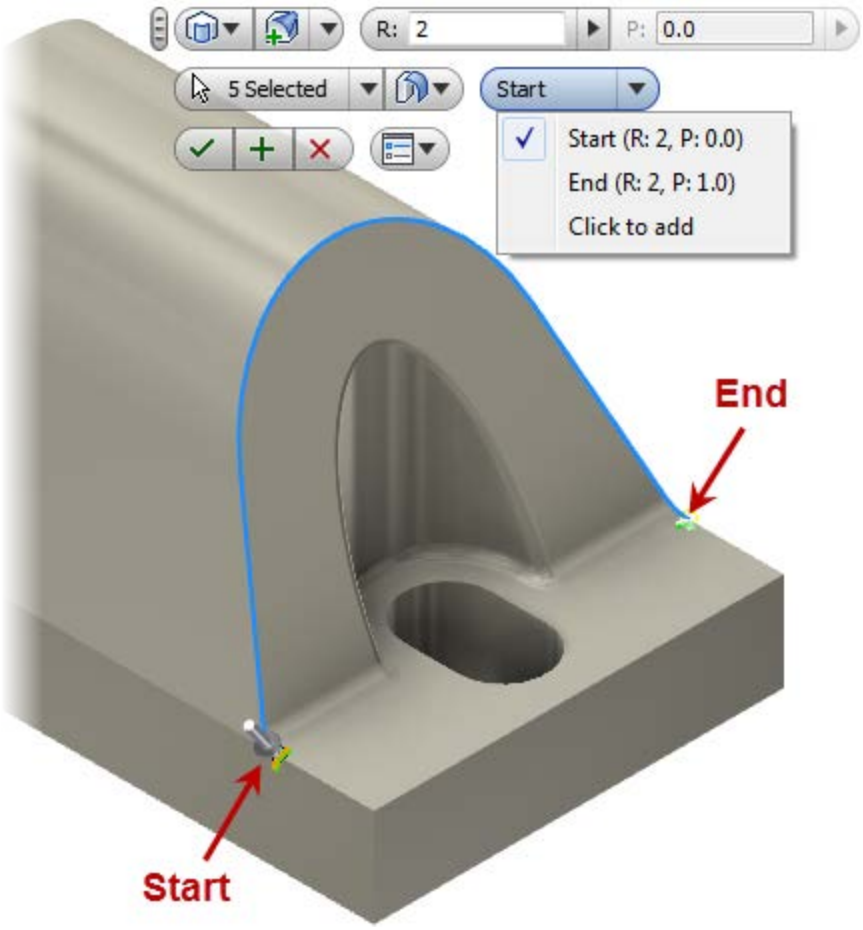
- Start the **Fillet** tool
- Select **Add Variable Radius Fillet Set** on the **Mini-Tool Bar**



- Select the edge shown

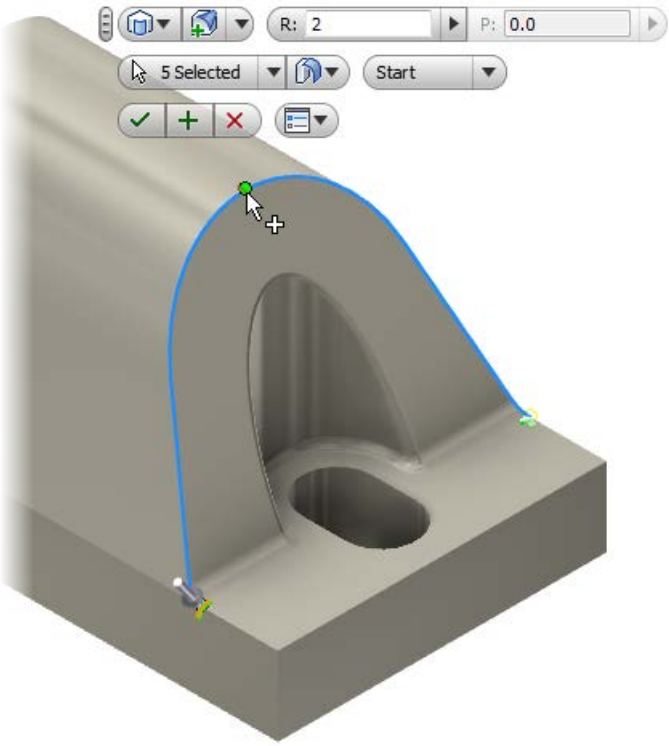


- A **Start** and **End Point** are created.
  The **Start Point** is at **Position 0.0**
  The **End Point** is at **Position 1.0**

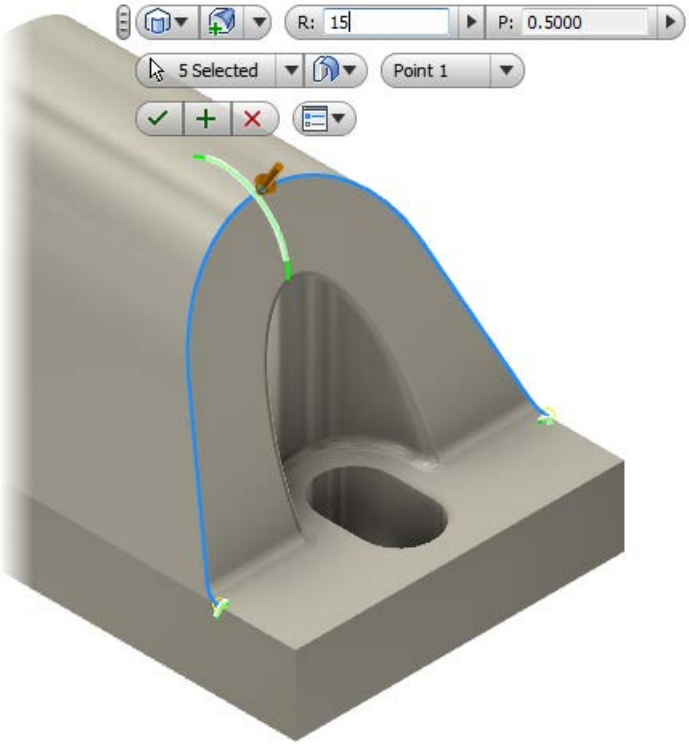


- Clicking on the line will add additional **Points**. Each **Point** location can have a different radius value applied to it.

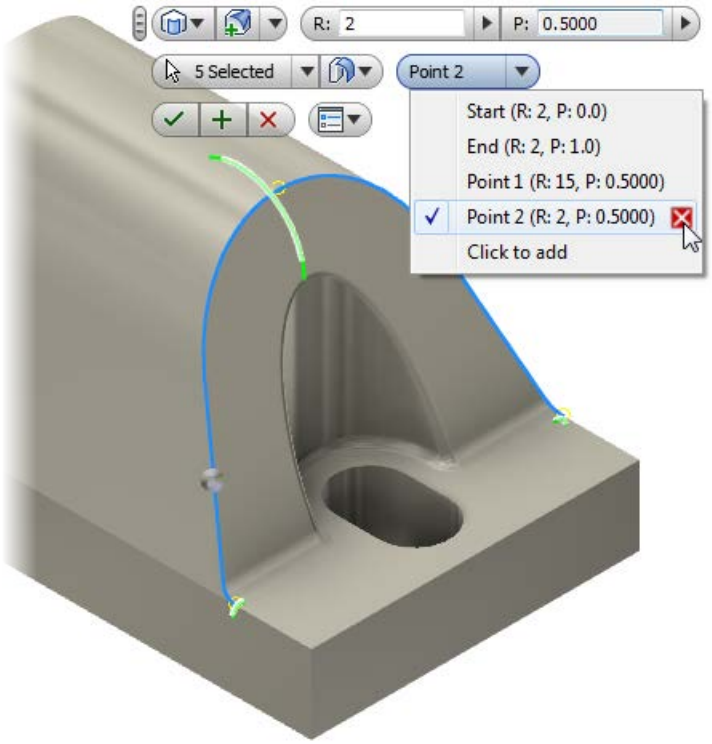
  For this example add one addition Point at the mid-point of the arc segment. As the arrow reaches the mid-point it will snap to mid-point and indicate you have snapped to it with a green dot. Click on this point.



- Enter a radius vaule of **15 mm** for *Point 1*



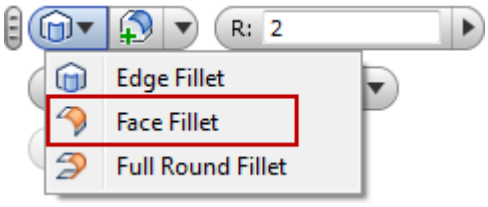
- If you need to remove any unwanted **Points** you can do so by clicking on the **X** next to that **Point** on the **Points List**.



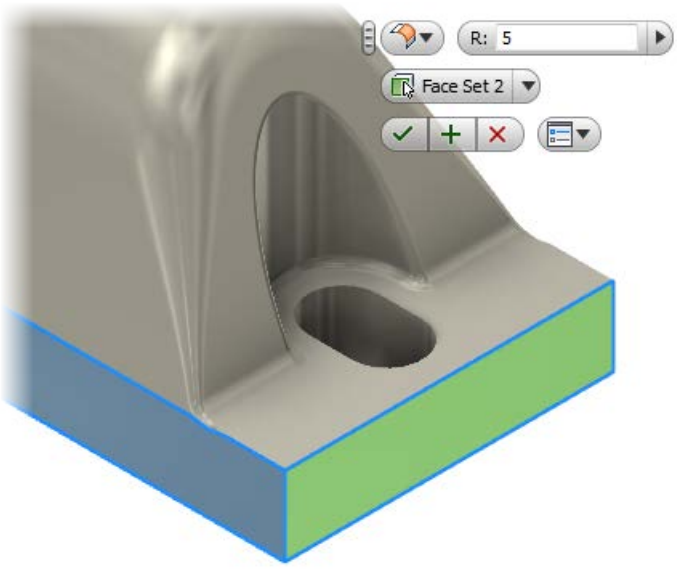
- Click **OK** to place the three point varaible radius fillet feature.

10. Create a **Face Fillet**

- Start the **Fillet** tool
- Select **Face Fillet** from the **Mini-Toolbar**



- Select the two side faces shown
  Enter **5 mm** for the fillet radius

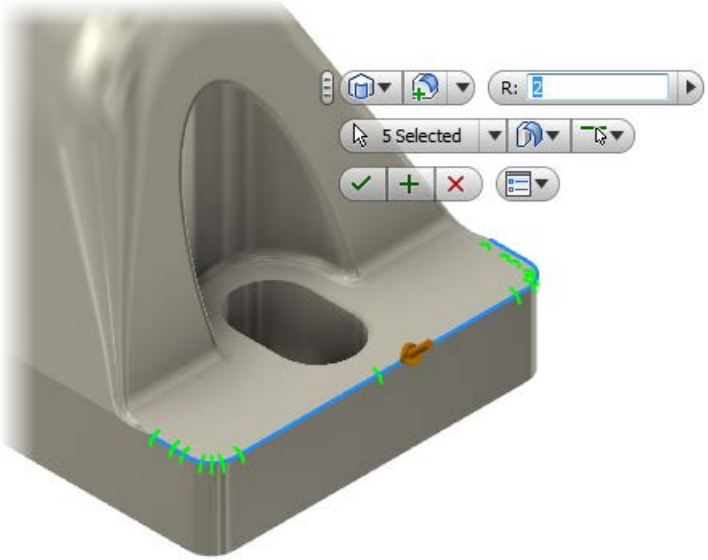


- Click **Apply**

- Repeat these steps for the other corner on this side of the part.

11. Create a **Constraint Radius** fillet

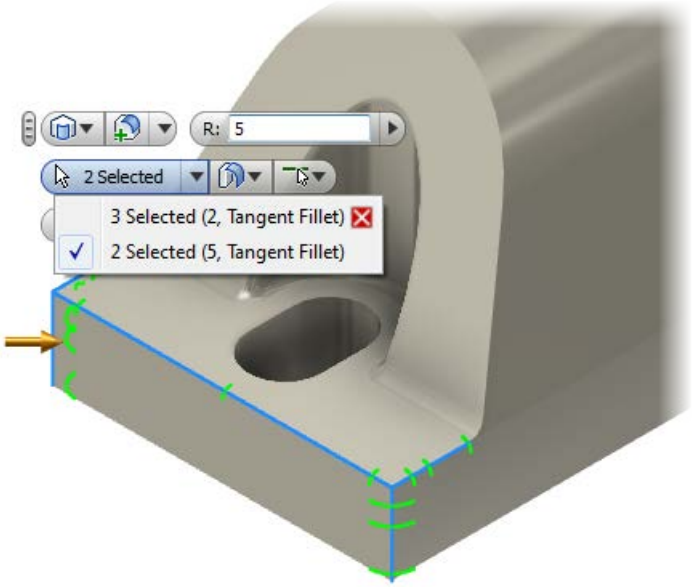
- Select the edge loop as shown
  Enter **2 mm** for the fillet radius



- Click **OK**

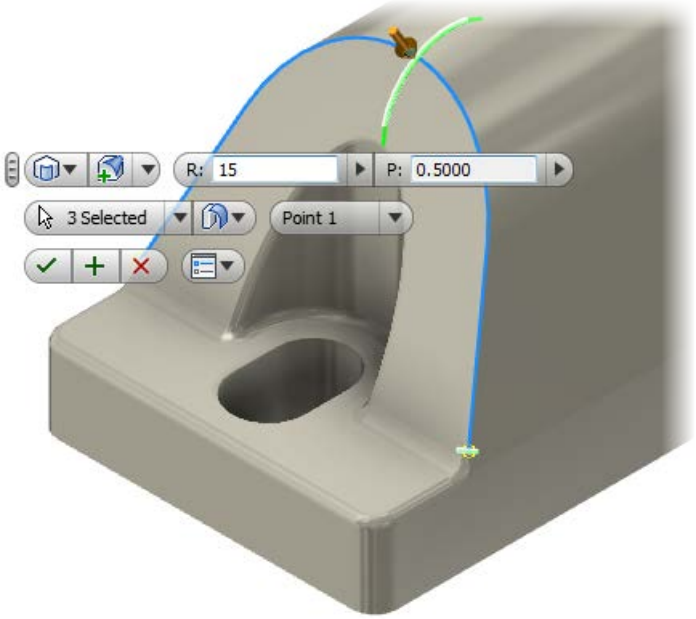
12. On the opposite side of the part create a **Constraint Radius Fillet Set**

- Enter a fillet radius value of **2 mm** for the three horizontal edges
- Enter a fillet radius value **of 5 mm** for the two vertical horizontal edges



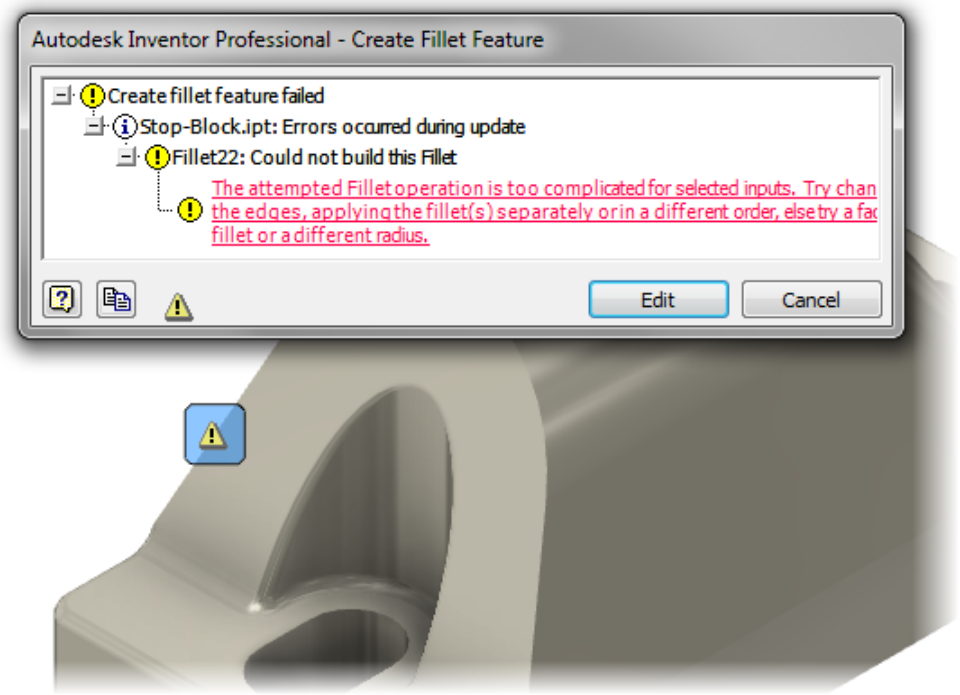
- Click **Apply**

13. Place a **Variable Radius Fillet** with the following options
Start Point: **2 mm**
End Point: **2 mm**
Point 1: **15 mm** (Placed at the mid-point of the arc segment as shown)



- Click **OK**

- Notice that this fillet feature fails



Even though the fillets on this side of the part are similar to those placed on the other side, the order in which they are placed results in a different outcome.

14. Finish creating the fillets on this side of the part in the same order as the other side.