Create and edit a 3D model

In this module, you'll use several sketches and features to create a solid body.

Learning objectives:

- Use Revolve.
- Use Extrude.
- Use Fillet.
- Create a circular pattern.
- Identify timeline feature.

The completed exercise

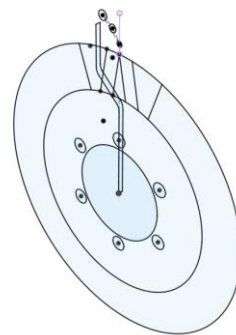
1. Open the supplied *brake rotor.f3D* file.

Figure 1. Open the supplied file

2. Expand the Browser's Sketches folder and notice that there are four separate sketches. Turn off the visibility for all the sketches except for the Revolve sketch.
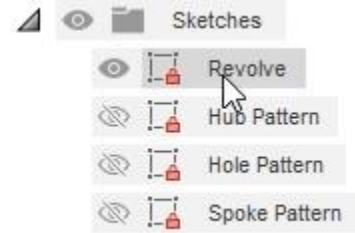
Figure 2. Explore and hide the sketches
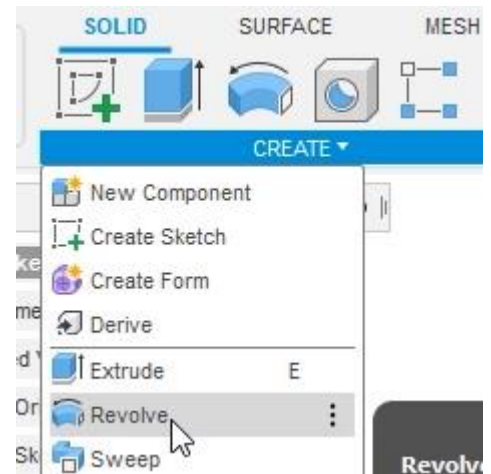
3. Click Create> Revolve.

Figure 3. Open the Revolve tool

4. Since there is only one sketch region available, it is automatically selected as the dialog's Profile selection. Choose the green Y axis as the dialog's Axis selection. OK the dialog to create the solid body.
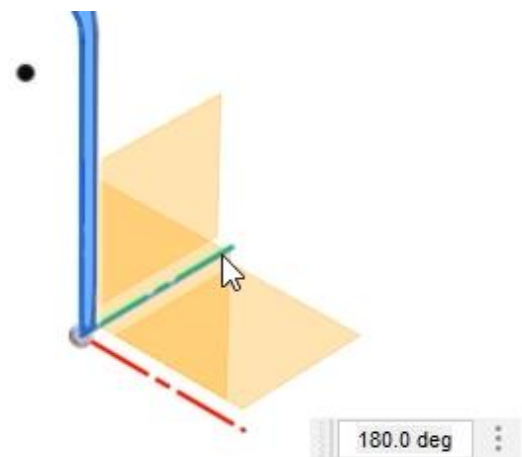
Figure 4. Choose the Axis

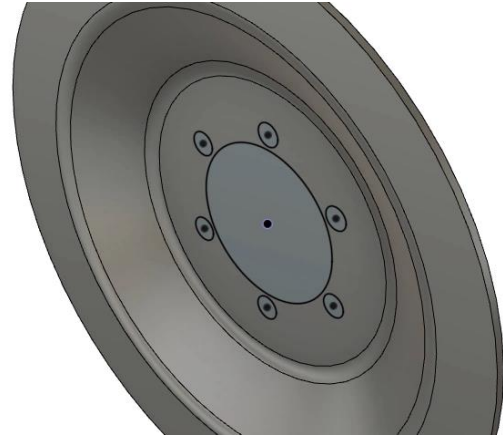**5.** Inspect the new solid body, then turn on the visibility for the Hub Pattern sketch.

Figure 5. Show the Hub Pattern sketch

6. Press E to open the Extrude tool, then select the seven regions shown in the image on the right as the dialog's Profiles selection.
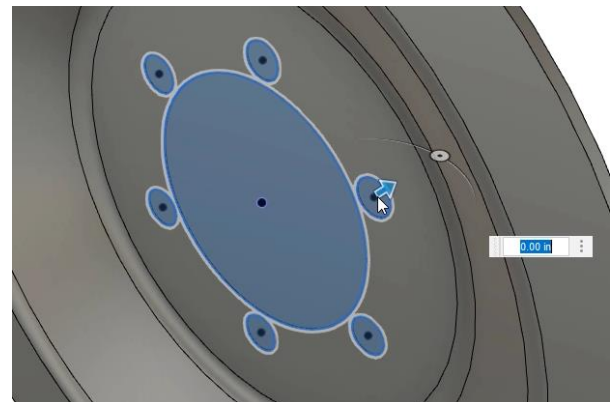

Figure 6. Open the Extrude tool

7. Choose the To Object option from the dialog's Extent Type menu.
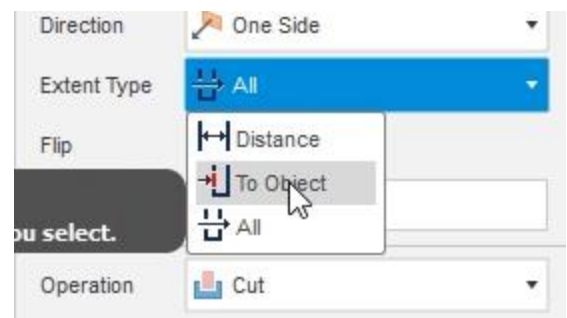

Figure 7. Choose the extrude's extent type

8. Rotate the model and choose the back face as the dialog's Object selection. If the brake rotor's thickness changes, this extrude will always cut up to this selected face regardless of how far away it is. OK the dialog.
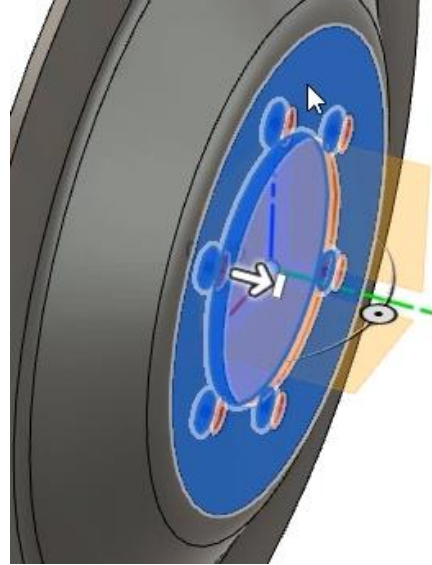

Figure 8. Choose the Object selection

9. Use the Browser to turn on the visibility for the Hole Pattern sketch, then press E to open the Extrude tool. Choose the four sketch regions shown in the image on the right as the dialog's Profiles selection.
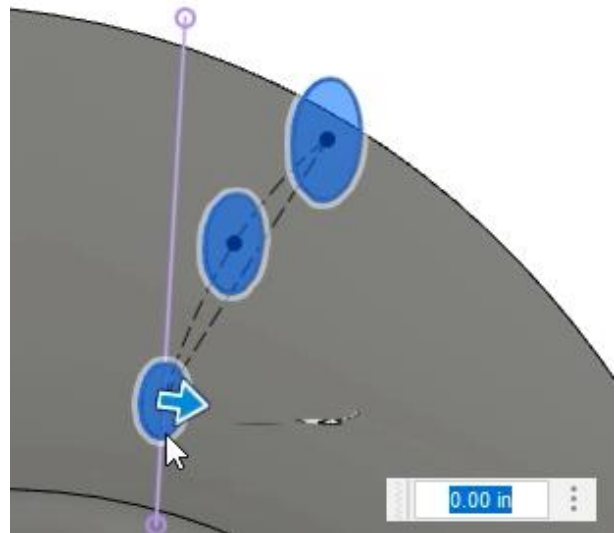

Figure 9. Extrude the Hole Pattern sketch

10. Choose the All option from the dialog's
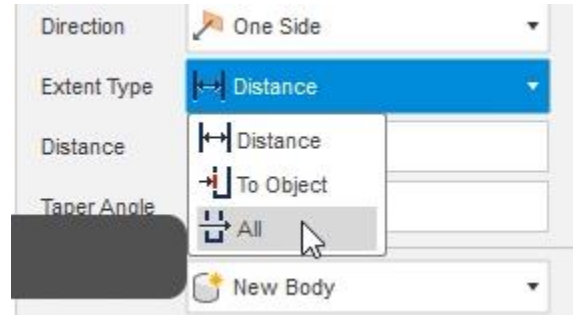Extent Type menu.

Figure 10. Choose the extent type

11. If your model does not match the
image on the right, click the dialog's
Flip option to flip the extrude's
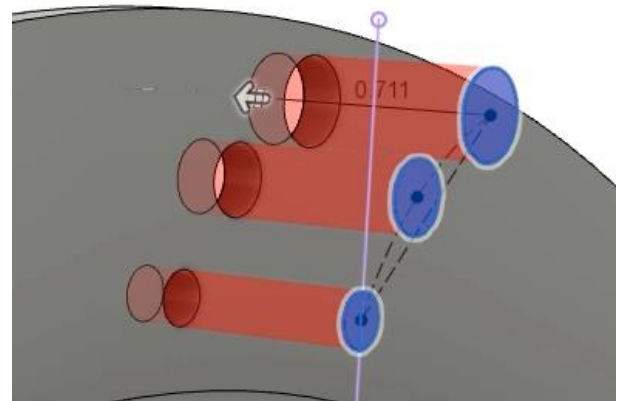direction. OK the dialog to cut the
holes through the brake rotor.

Figure 11. Inspect the extrude preview
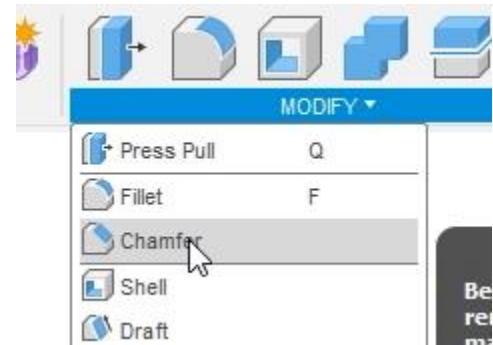
12. Click Modify> Chamfer.

Figure 12. Open the Chamfer tool

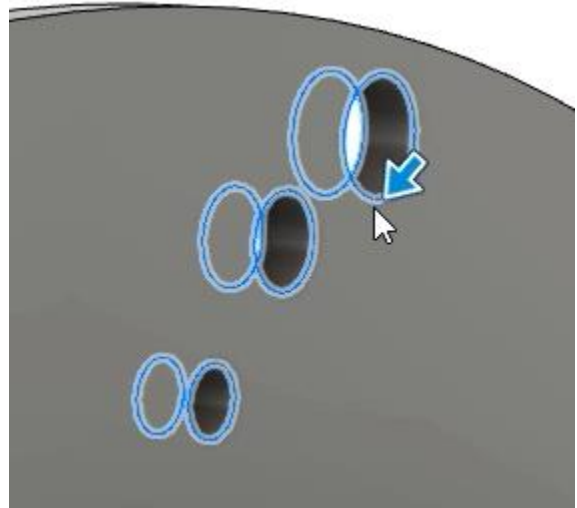**13.** Select the six edges shown in the image on the right.

Figure 13. Select the edges to chamfer

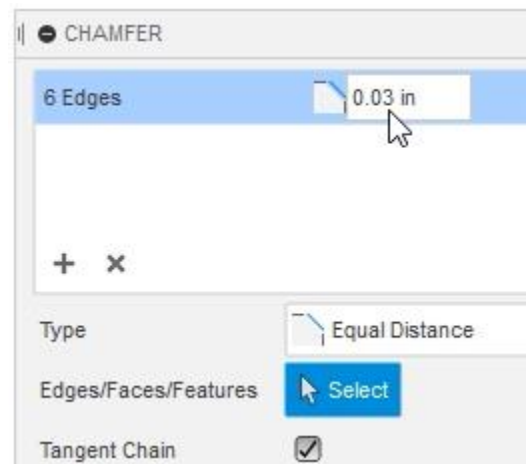**14.** Enter **0.03 inches** into the chamfer's dimension box, then OK the dialog.

Figure 14. Create the chamfer

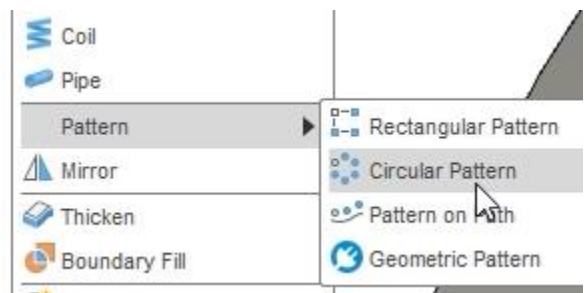**15.** Click Create> Pattern> Circular Pattern.

Figure 15. Open the Circular Pattern tool

16. For the dialog's Objects selection, choose the timeline's Extrude and Chamfer features.
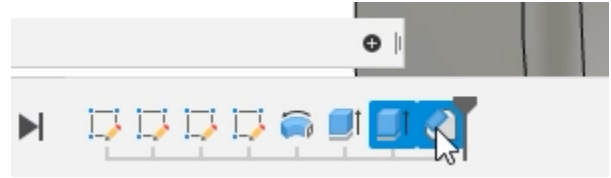

Figure 16. Choose the Objects selection

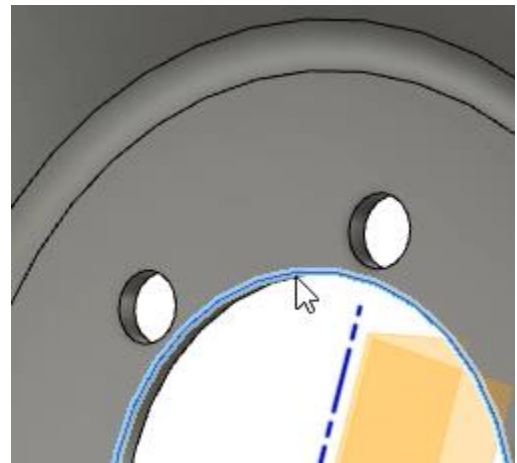**17.** For the dialog's Axis selection, choose one of the body's circular edges.

Figure 17. Choose the Axis selection

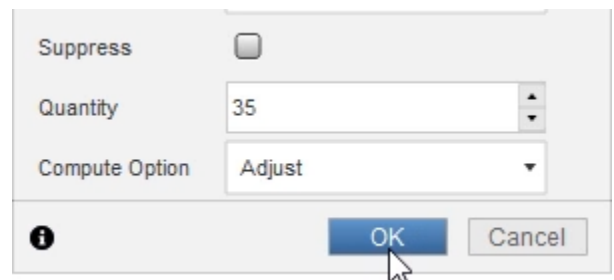**18.** Make sure the dialog's Quantity value is set to **35**, then OK the dialog.

Figure 18. Create the circular pattern

19. Use the Browser to turn on the visibility for the Spoke Pattern sketch, then press E to open the Extrude tool. Select the three regions shown in the image on the right as the dialog's Profiles selection.
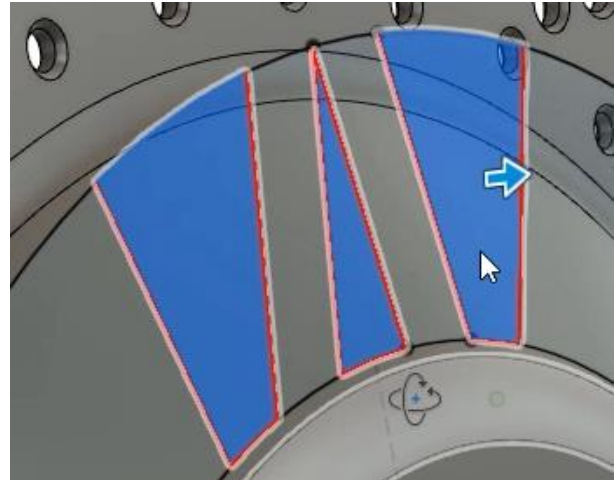

Figure 19. Create a new extrude

20. Choose the Two Sides option from the dialog's Direction menu.
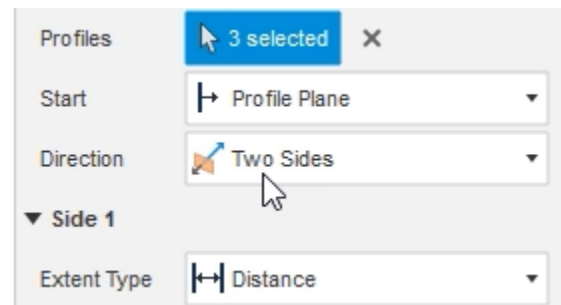

Figure 20. Specify the extrude's direction

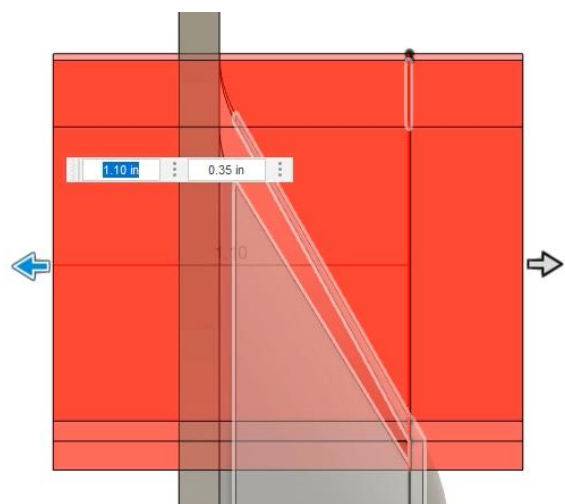**21.** Use the on-screen manipulator to extend the extrude all the way through the solid body. OK the dialog.

Figure 21. Create the extrude
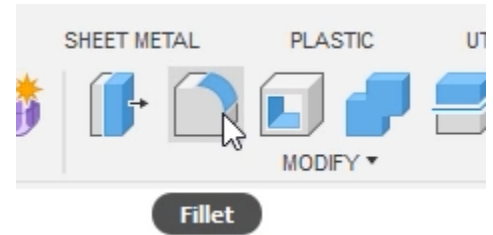
22. Click Modify> Fillet.

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Fillet

Figure 22. Open the fillet tool

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23. Select the seven edges shown in the image on the right, then apply a 0.125-inch radius fillet to them. OK the dialog.

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Figure 23. Select the edges to fillet

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24. Inspect the result.

Figure 24. Inspect the result

25. Click Create> Pattern> Circular Pattern. For the Dialog's Objects selection, choose the timeline's Extrude and Fillet features.

Figure 25. Pattern the Extrude and Fillet features

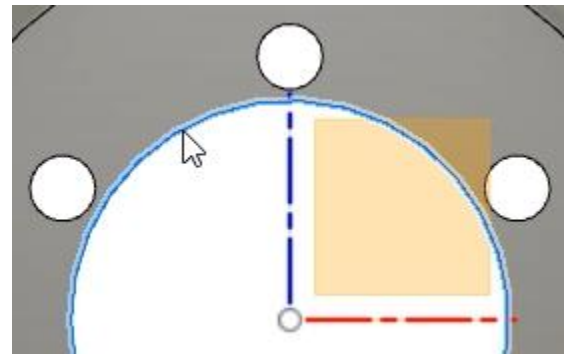**26.** Choose a circular edge as the dialog's Axis selection.

Figure 26. Choose the Axis selection

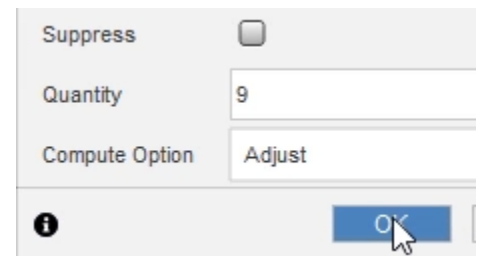**27.** Reduce the dialog's Quantity value to **9**, then OK the dialog.

Figure 27. Create the circular pattern

28. The features you created are captured in chronological order in the timeline. Click the button shown in the image on the right to rewind the timeline to the beginning.
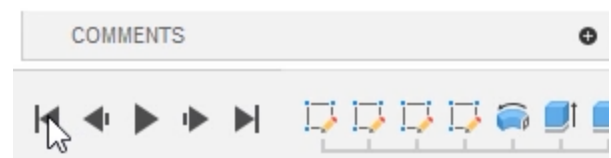

Figure 28. Roll the timeline marker back to the beginning of the timeline

29. Press the Play button to animate the timeline's features and see how the model was created. Save the file and continue to the next module.
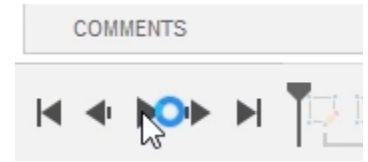

Figure 29. Press Play