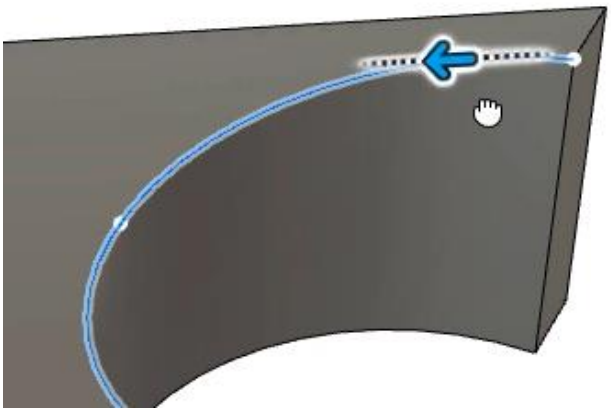
AUTODESK

Create Construction Planes and Axes

In this module, you'll explore the many ways to create planes, axes, and points.

Learning objectives:

- Create construction planes and axes.



The completed exercise

1. Open the supplied *Planes and Axes Sample.f3d* File. There are two bodies in the design and one of the bodies has a cylindrical cutout.

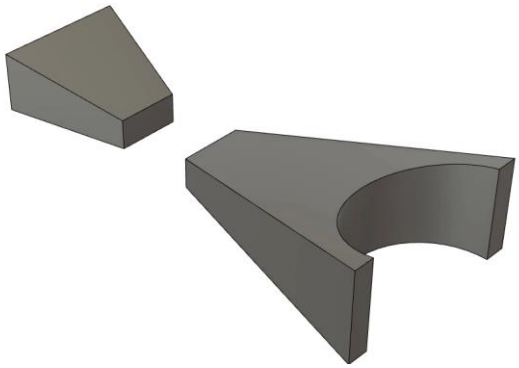


Figure 1. Open the supplied file

2. Click Construct> Offset Plane.



Figure 2. Open the Offset Plane tool

3. Select one of the bodies' planar faces to create an offset plane based on that face.

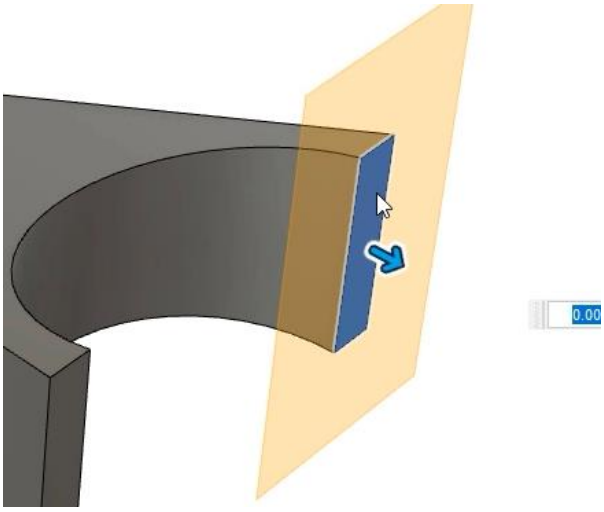


Figure 3. Select a face

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

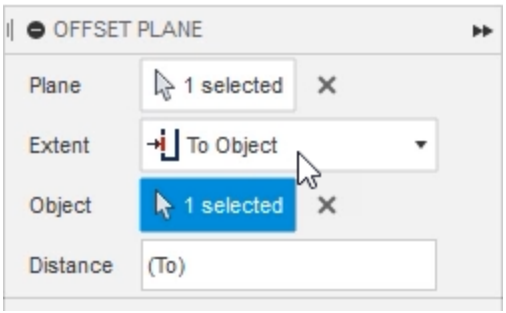


Figure 4. Change the Extent type

5. Select a point on the body to offset the plane up to the selected point. Click the dialog's Cancel to avoid creating the plane.

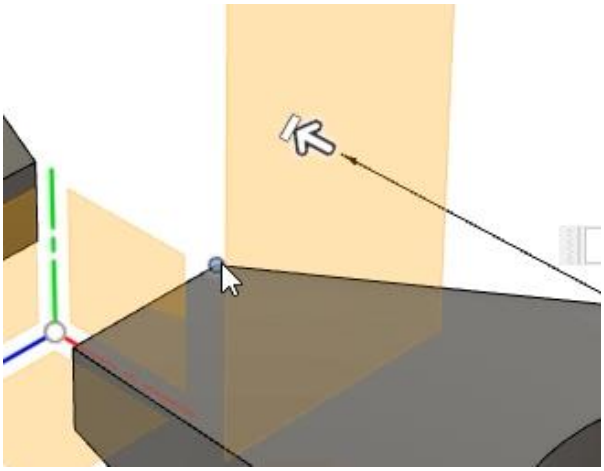


Figure 5. Choose a point on the body

6. Other types of planes can also be created. Click Construct> Plane at Angle.



Figure 6. Open the Plane at Angle tool

7. Select one of the body's straight edges and notice that you can create a plane at a specified angle. Enter the precise angle you want into the box to control the plane's angle. Alternately, you can use the rotation handle to control the plane's angle. Cancel the dialog to avoid creating the new plane.

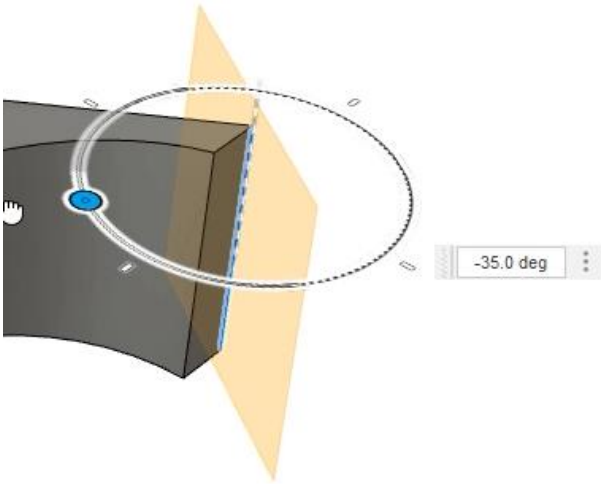


Figure 7. Create a plane at an angle

8. Click Construct> Tangent Plane.



Figure 8. Open the Tangent Plane tool

9. Select the cylindrical face and notice that the new plane is placed tangent to it. Once again, the plane's angle can be controlled using the rotation handle or by entering a value into the Angle box.

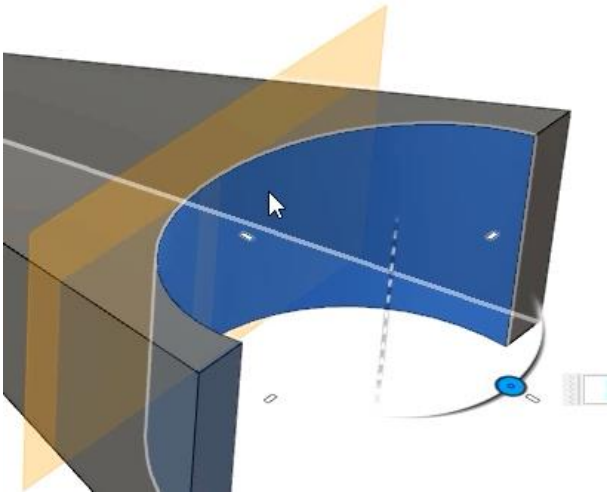


Figure 9. Create a Tangent Plane

10. The dialog's Reference Plane selection can be used to guide the new plane's position. In the image on the right, the body's side face was selected and the Tangent Plane is created parallel to the selected face. Cancel the dialog to avoid creating the new plane.

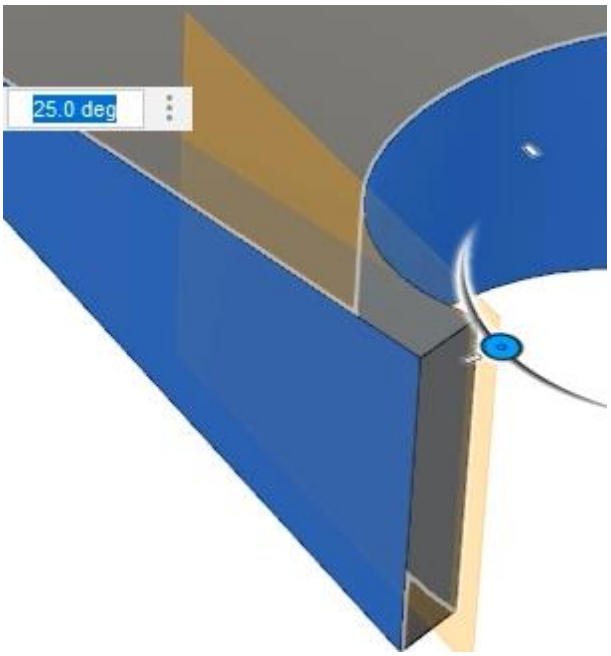


Figure 10. Explore the Reference Plane option

11. Click Construct> Midplane.

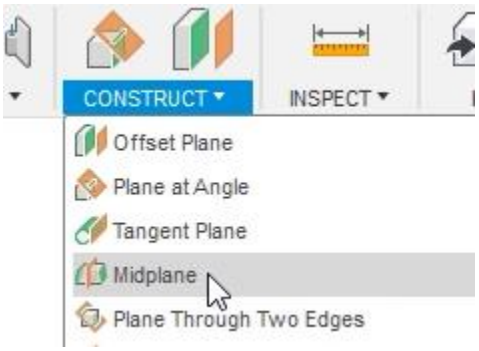


Figure 11. Open the Midplane tool

12. Select two faces and notice that a plane is created halfway between them. Clear the selected planes and select two different planes on the same body. Notice that a new plane is created halfway between the two selected faces. Cancel the dialog to avoid creating a new plane.

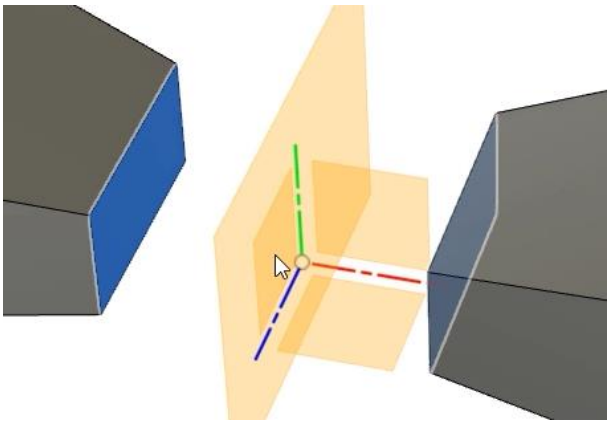


Figure 12. Explore the Midplane tool

13. Click Construct> Plane Through Two Edges.

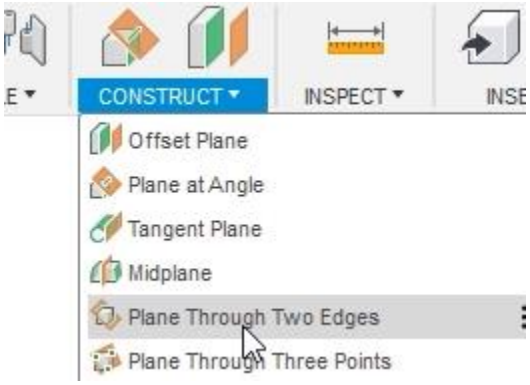


Figure 13. Open the Plane through Two Edges tool

14. Select two edges and notice that a plane is created between them. Cancel the dialog to avoid creating a new plane.

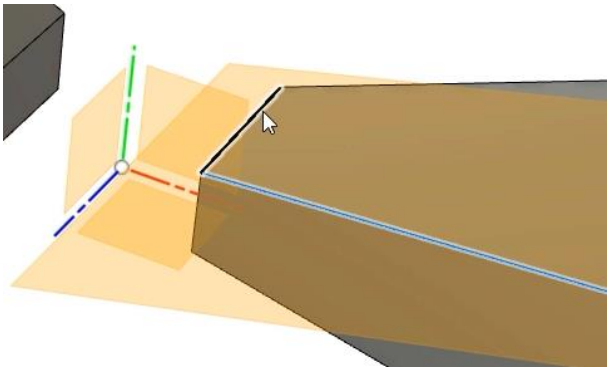


Figure 14. Explore the Plane Through Two Edges tool

15. Click Construct> Plane Through Three Points. Select three points and notice that a plane is created between them. Click the dialog's Cancel to avoid creating the new plane.

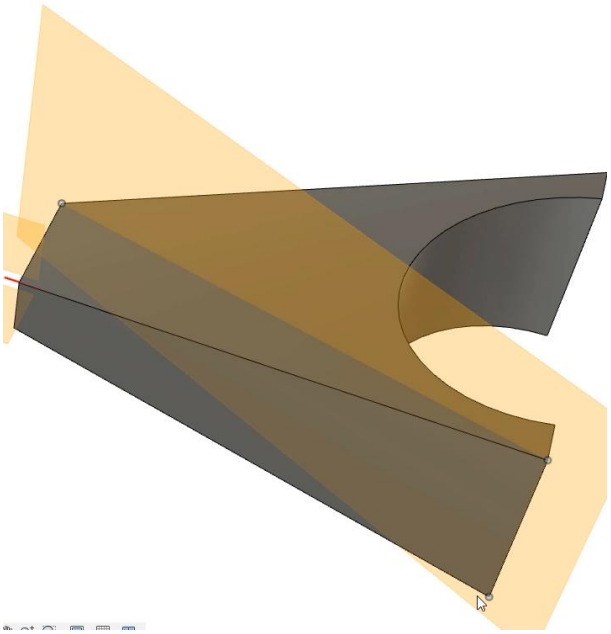


Figure 15. Explore the Plane Through Three Points tool.

16. Click Construct> Plane Tangent to Face at Point. Select the body's cylindrical face, then select one of the points on the top edge. Notice that a plane is created tangent to the cylindrical face and coincident with the point you selected. Click the dialog's Cancel to avoid creating the new plane.

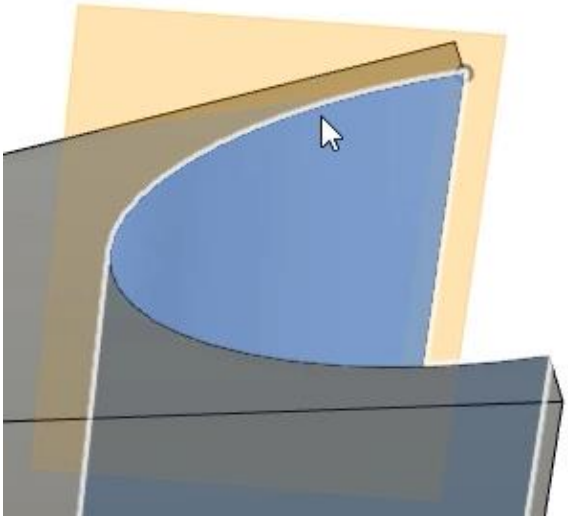


Figure 16. Explore the Plane Tangent to Face at Point tool

17. Click Construct> Plane Along Path. Select the cylindrical face's top edge and notice that you can reposition the plane along the edge using the on-screen manipulator arrow.

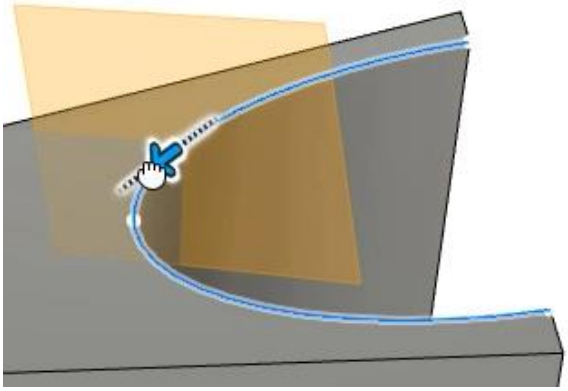


Figure 17. Explore the Plane Along Path tool

18. The dialog's Distance Type options can be used to control the plane's precise position. In the image on the right, the new plane will be roughly 25% of the way through the selected edge. The Physical option can be used to enter a specific measurement instead. Cancel the dialog to avoid creating the plane.

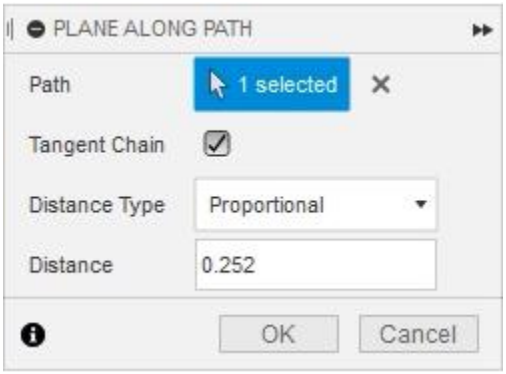


Figure 18. Control the new plane's position

19. Click Construct> Axis Through Cylinder/Cone/Torus.

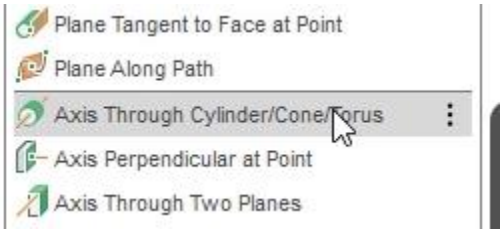


Figure 19. Open the Axis Through Cylinder/Cone/Torus tool

20. Select the body's cylindrical face and notice that an axis is placed at the center of the face's radius. Cancel the dialog to avoid creating the new axis.

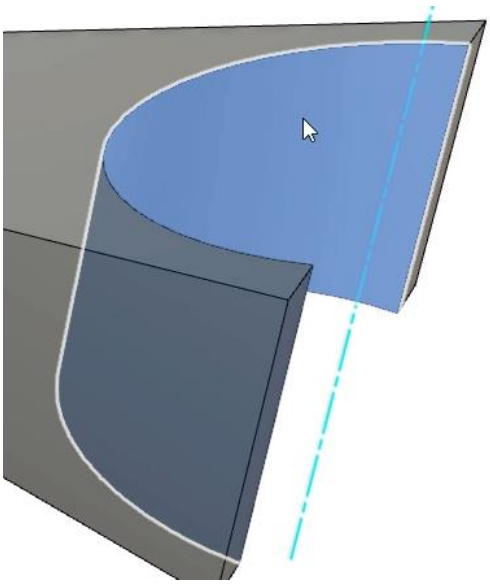


Figure 20. Explore the Axis Through Cylinder/Cone/Torus tool

21. Click Construct> Axis Perpendicular at Point.

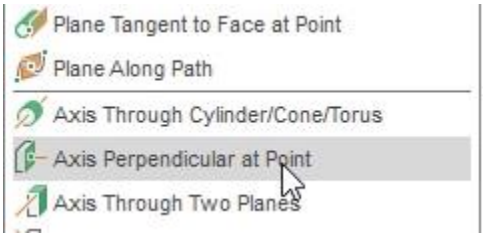


Figure 21. Open the Axis Perpendicular at Point tool

22. Select a face and notice that an axis is placed where you clicked the face. Clear the selection, click a different face, and notice that the axis is placed exactly where you clicked. These axes are always perpendicular to the selected face. Cancel the dialog to avoid creating the new axis. Explore the various options available in the Construct group's dropdown menu for creating axes.

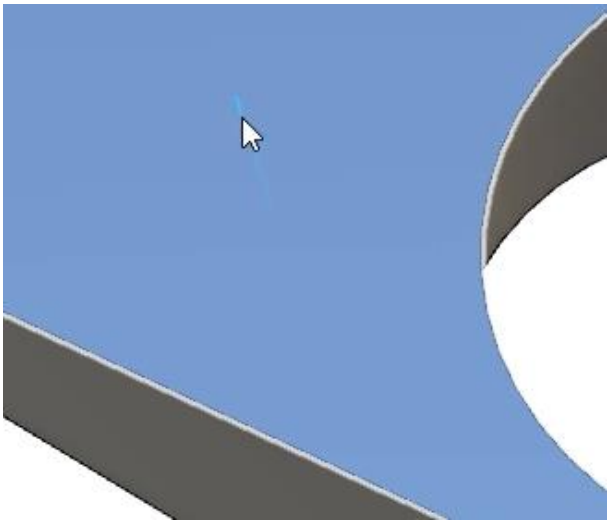


Figure 22. Explore the Axis Perpendicular at Point tool

23. Click Construct> Point at Vertex.

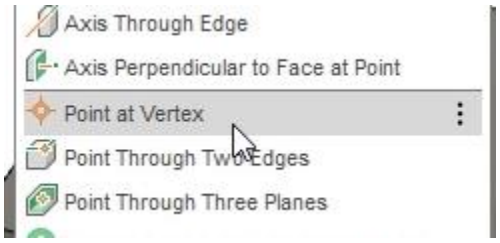


Figure 23. Open the Point at Vertex tool

24. Select a body's various points and notice that a new point is placed at your selection. Cancel the dialog to avoid creating the new points.

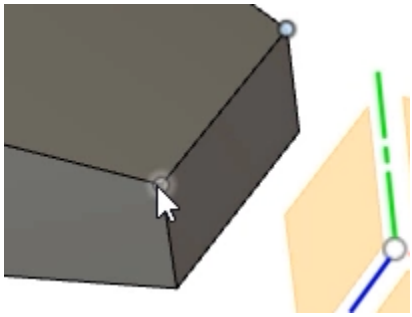


Figure 24. Explore the Point at Vertex tool

25. Click Construct> Point Through Two Edges.

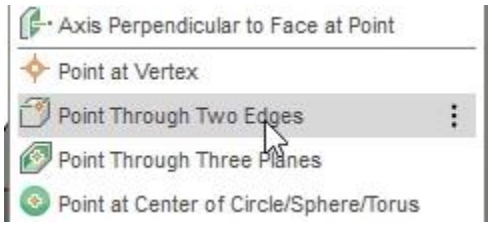


Figure 25. Open the Point Through Two Edges tool

26. Select two edges and notice that a point is created where the two lines would intersect. Cancel the dialog to avoid creating the new point.

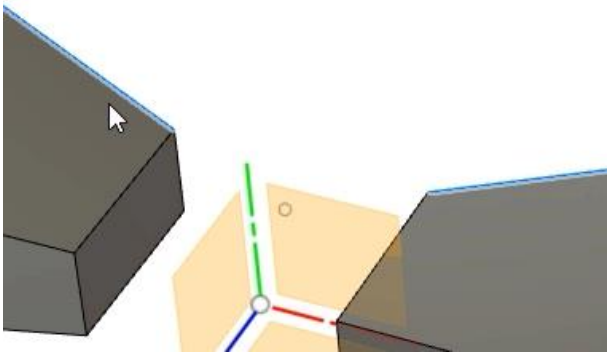


Figure 26. Explore the Point Through Two Edges tool

27. Click Construct> Point Through Three Planes.

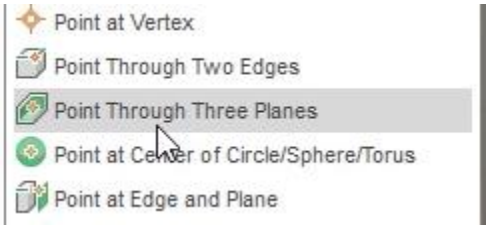


Figure 27. Open the Point Through Three Planes tool

28. Select three planar faces and notice that a point is created at the intersection of the three selected faces.

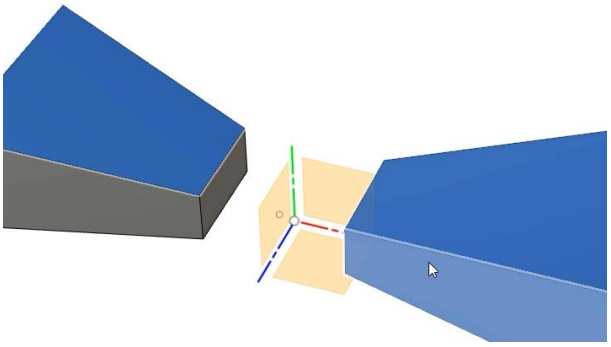


Figure 28. Explore the Point Through Three Planes tool

29. Click Construct> Point at Center of Circle/Sphere/Torus, then select the cylindrical face's bottom edge. Notice that a point is placed at the center of the edge's radius. Cancel the dialog to avoid creating the new point.

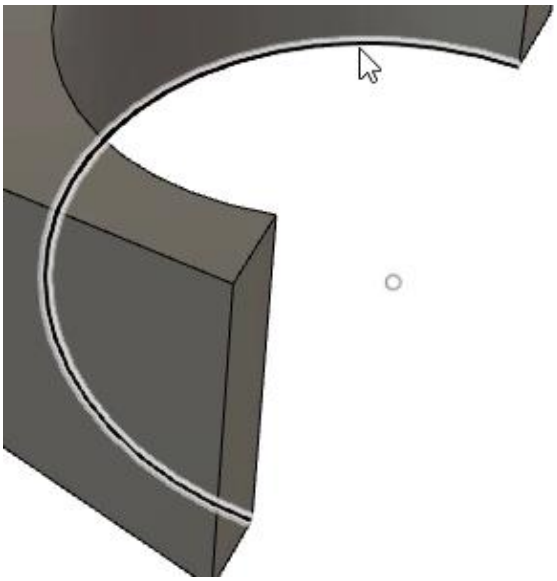


Figure 29. Explore the Point at Center of Circle/Sphere/Torus tool

30. Click Construct> Point Along Path. Select the cylindrical face's top edge and notice that you can adjust the point's position by dragging the on-screen manipulator. If you need to precisely position the point, you can enter the precise value into the dialog's Distance box. Cancel the dialog to avoid creating the new point. Save the file and continue to the next module.

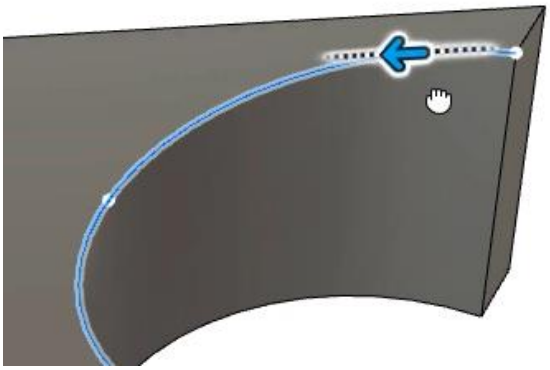


Figure 30. Explore the Point Along Path tool