SolidWorks Part 1

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Starting The Tutorials

- Launch SolidWorks
- Select Resources to open the Task Pane.
- Select Tutorials
Select Getting Started Exercises

These tutorials present SOLIDWORKS functionality in an example-based learning format. For details about typographical conventions and how to navigate through these tutorials, see Conventions.

If you are new to the SOLIDWORKS software, familiarize yourself with the tutorials in Getting Started first. For examples of What’s New in SOLIDWORKS for this release, see What’s New Examples. All other tutorials can be completed in any order.
Choose “Intro to Solid Works”
Select the Top Plane for Sketch
Sketch a Circle at the origin

**Sketching the Circle**

The first feature in the part is a cylinder extruded from a sketched circular profile.

1. Click **Extruded Boss/Base** on the Features toolbar.
2. Move the pointer over the **Top** plane to highlight it, then click to select it. The display changes so that the **Top** plane is facing you. A sketch opens on the **Top** plane.
3. Click **Circle** on the Sketch toolbar. The Circle PropertyManager opens in the left pane.
4. Move the pointer over the origin. The pointer changes to \( \bigcirc \). This indicates a coincident relation between the center of the circle and the origin.
5. Click to place the center point on the origin.
6. Move the mouse and notice a preview of the circle dynamically follows the pointer.
7. Click to finish the circle and click in the PropertyManager. The size of your sketch entities does not need to be exact. For example, this circle does not need to be 61.3 mm. You later add dimensions to specify the size of sketch entities.
Specify Dimension
Boss–Extrude Feature

Extruding the Base Feature

1. Click Exit Sketch on the Sketch toolbar.
   You exit the sketch when you are done with the 2D profile and are ready to create the 3D cylinder.
   The settings for the extrusion appear in the PropertyManager in the left panel.

2. In the PropertyManager, under Direction 1:
   a. Select Blind in End Condition.
   b. Set Depth to 1.
   Notice the shaded preview of the extrusion.

3. Click .
   The first feature is complete. Boss-Extrude 1 appears in the FeatureManager design tree in the left panel.
Extruded Plate Feature

1. Click Save on the Standard toolbar.
2. In the dialog box, type Pressure Plate for file name.
3. Click Save.

The extension .sldprt is added to the file name, and the file is saved.
Select Top and Sketch Circle
Offset Entities from Circle

1. Click Offset Entities in the Sketch toolbar.
2. In the PropertyManager, under Parameters:
   a. Set Offset Distance to 75 mm.
   b. Select Reverse to offset the circle to the inside.
3. Select the sketched circle.
4. Click.
Finished Offset Sketch

Extruding the Ring Boss

Now that the sketch is complete, extrude the sketch to make the ring boss.

1. Click Exit Sketch on the Sketch toolbar.
2. Click Trimetric on the Standard Views toolbar for a better view of the model.
3. In the PropertyManager, under Direction 1, set Depth to 75.
4. Click .
Extruding the Boss Ring

1. Click EXTENDED on the Sketch toolbar.
2. Click References on the Standard views toolbar for a better view of the model.
3. In the PropertyManager, under Direction 1, set Depth to 12.
4. Click .

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The Extruded Boss Ring

Extruding the Ring Boss

Now that the sketch is complete, extrude the sketch to make the ring boss.

1. Click Exit Sketch on the Sketch toolbar.
2. Click Trimetric on the Standard Views toolbar for a better view of the model.
3. In the PropertyManager, under Direction 1, set Depth to 12.
4. Click .
Dimensioning the Hole Sketch

1. Click Insert Dimension (Dimensions/Dimension toolbar).
2. Select the circle.
3. Move the pointer and click to place the dimension.
4. In the Modify box, type \( r \), then click \( yes \) and click in the graphics area.
Creating the Hole

1. Click Exit Sketch (Sketch toolbar).
2. Click Trimen (Standard Views toolbar).
3. In the PropertyManager, under Direction 1, select Through All for End Condition.
4. Click .

You can use the Hole Wizard to add customized holes to the model.
- Learn how to create Hole Wizard holes.
- Skip the Hole Wizard lesson and work on files.
The Hole

Creating a Hole

1. Click Exit Sketch (Sketch toolbar).
2. Click Trimming (Standard Views toolbar).
3. In the PropertyManager, under Direction 1, select Through All for End Condition.
4. Click .

You can use the Hole Wizard to add customized holes to the model.
- Learn how to create hole wizard holes.
- Skip the Hole Wizard lesson and work on fillets.
Selecting Fillets

1. Click Fillet on the Features toolbar.
2. Click Triangular on the Standard View toolbar for a better view of the model.
3. In the PropertyManager:
   - Under FillType, select Constant size.
   - Under Fill Parameters, set Radii to 2.
4. Select the top face of the ring boss and the outside face of the boss.
Fillets Shown
Draw a Center Line

Sketching the Tall Cylinder Extrusion

1. Click Extruded Boss/Block on the Features toolbar.
2. Select the top face of the base cylinder.
3. Click Top on the Standard Views toolbar.
4. Expand the Line/Point menu on the Sketch CommandManager and click Centerline.

The centerline acts as a construction line for the next circle. It keeps the center of the circle vertical with respect to the origin.

5. Move the pointer over the origin until the pointer changes to the centerline.
6. Move the mouse above the start of the centerline.
7. Click to start the point. Make the line about 30mm long.
Draw a Circle at End of Center Line
Re-dimension the Center Line

Dimensioning the Tall Cylinder Sketch
1. Click Smart Dimension (Dimensions/Relations toolbar).
2. Select the circle.
3. Move the pointer and click to place the dimension.
4. In the Modify box, enter 21 for the circle dimension, click \(\checkmark\), and click in the graphics area.
5. Select the vertical centerline.
6. Move the pointer and click to place the dimension.
7. In the Modify box, type 3.5 to position the circle, click \(\checkmark\), and click in the graphics area.
Add the Tall Cylinder Extrusion

1. Click \textit{Fillet Sketch} on the Sketch toolbar.
2. In the PropertyManager, under Direction 1, set Depth to 30.
3. If the sketch area is not highlighted in yellow, select the circle to define the Selected Contours.
4. Click \textit{OK}.
5. Click \textit{Finish Sketch} on the standard views toolbar for a better view of the model.
Cylinder Boss Trimetric View

Adding the Tall Cylinder Extrusion

1. Click Tall Sketch on the Sketch toolbar.
2. In the PropertyManager, under Direction 1, set Depth to 10.
3. If the circle's area is not highlighted in yellow, select the circle to define the Selected Contours.
4. Click .
5. Click Trimetric on the Standard Views toolbar for a better view of the model.
Sketching the Extended Cut

1. Click Extended Cut on the Features toolbar.
2. Select the top face of the tall cylinder extrusion.
3. Click Sketch on the Sketch toolbar.
4. Move the pointer to the edge of the tall cylinder and leave it there until the center point of the tall cylinder appears as shown.
5. Move the pointer over the new center point.
6. Click to place the center of the circle.
7. Move the pointer and click to finish the circle.
8. Click.
Dimensioning the Cut

1. Click "Smart Dimension" (Dimensions/Relations toolbar).
2. Select the circle.
3. Move the pointer and click to place the dimension.
4. In the Modify box, type 10, click , and click in the graphics area.
Extruding the Cylinder Hole

1. Click Exit Sketch on the Sketch toolbar.
2. In the PropertyManager, under Direction 4, select Through All for end condition.
3. Click .
Adding Fillets to the Cylinder

1. Click "Hidden Lines Visible" on the View toolbar.
2. Click Fillet on the Features toolbar.
3. Select four items for the fillet as shown:
   - The box face of the tall cylinder extrusion.
   - One edge on each side of the tall cylinder where it intersects the ring extrusion.
   - The edge of the hole that cuts through the tall cylinder on the bottom of the first extrusion.
4. Click.
5. Click "Shaded with Edges" on the View toolbar.
Shaded View of Fillets

1. Click hidden lines visible on the view toolbar.
2. Click Fill on the Features toolbar.
   The radius is already set to 2mm to match the last fillet you added to the model.
3. Select four sides for the Fill as shown.
   - The top face of the tall cylinder extension.
   - One edge on each side of the tall cylinder where it intersects the ring extension.
   - The edge of the hole that cuts through the tall cylinder on the bottom of the first extension.
4. Click.
5. Click Shaded with Edges on the View toolbar.
This should be Fillet3 and not Fillet2.
Finished Circular Pattern

Creating a Circular Pattern

1. Click View > Temporary Axes. This shows all of the system-generated axes in the part. Select one as the central axis of the pattern.

2. On the Features toolbar, expand the Linear Pattern Syntax toolbar and click Circular Pattern.

3. In the PropertyManager, under Parameters:
   a. Select the temporary axis in the center of the part for Pattern Axis.
   b. Select Equal spacing to perform the number of instances uniformly around the axis within 100°.
   c. Set Number of Instances to 6.

4. Click in Features to Pattern.

5. In the Select FeatureManager design tree in the graphics area, select the last three features (Hole2, Cut Extrude2, and Cut Extrude3).

6. Click .
Adding Last Fillets

1. Click View > Temporary Area to turn off the system area.
2. Click Fillet in the features toolbar.
3. Select two edges on the view. You need to select one edge on the inside of the ring and one edge on the outside of the ring.
4. Click to add a 2 mm fillet.
5. Click Apply on the Standard toolbar. The part is complete.
Finished part
Drawing with Section and Detail View

SECTION A-A
SCALE 1:1

D

DETAIL D
SCALE 1:1

PRESSURE PLATE

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Adding Isometric View

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Adding Center Marks & Center Lines

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Adding Dimensions & Modifying Text
Topics Covered in this exercise:

- Parts:
  - Sketches such as circles, lines and offsets.
  - Selecting a plane or surface for sketches.
  - Dimensioning.
  - Features such as extruded-boss and extruded cut.
  - Various views (perspectives), fill, and wire frame models.
  - Fillets.
  - Temporary axis.
  - Circular patterns.

- Drawings:
  - Making drawing, placing view and hidden line removal.
  - Section and detail views.
  - Adding isometric view with filled surfaces.
  - Center lines and center marks.
  - Dimensioning and adding text.