VV 250 Computational Lab Sessions Lab #2

Additional 3D Features and Assembly

Prepared by TA Group

3D Sketch

Sketching skills for drawing a bearing

3D Features

- Cage for the ball
  - ➤ Extrusion, revolved cut
  - ➤ Temporary axis, circular pattern, shell
- Assembly
  - ➤ Mate relationship

Sketching Skills for a Cage
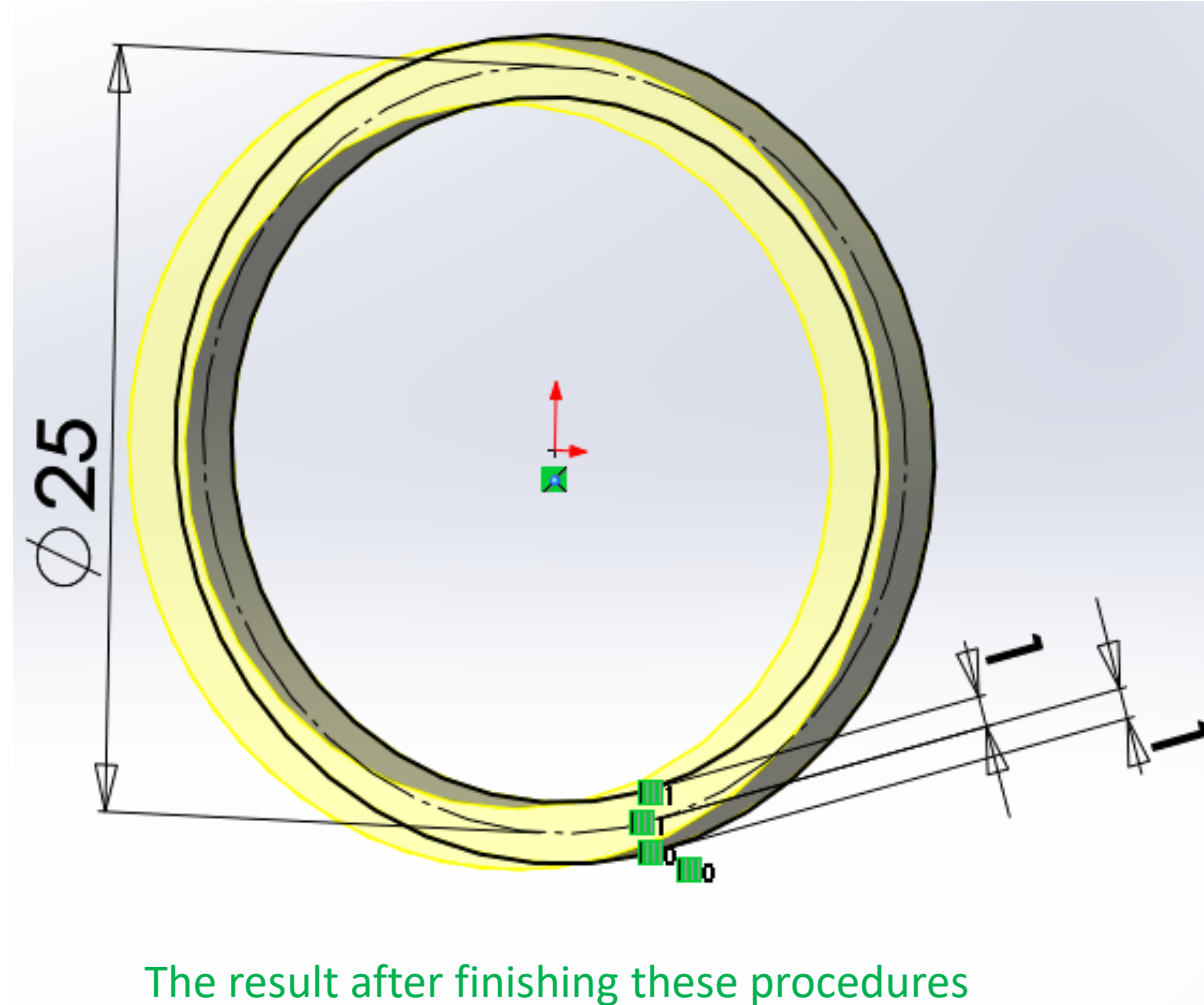
- # Extrusion

  1. ## Sketch
     - A circle with a diameter of 25mm.
     - Offset entities bidirectional with 1mm.
     - Choose the previous circle as
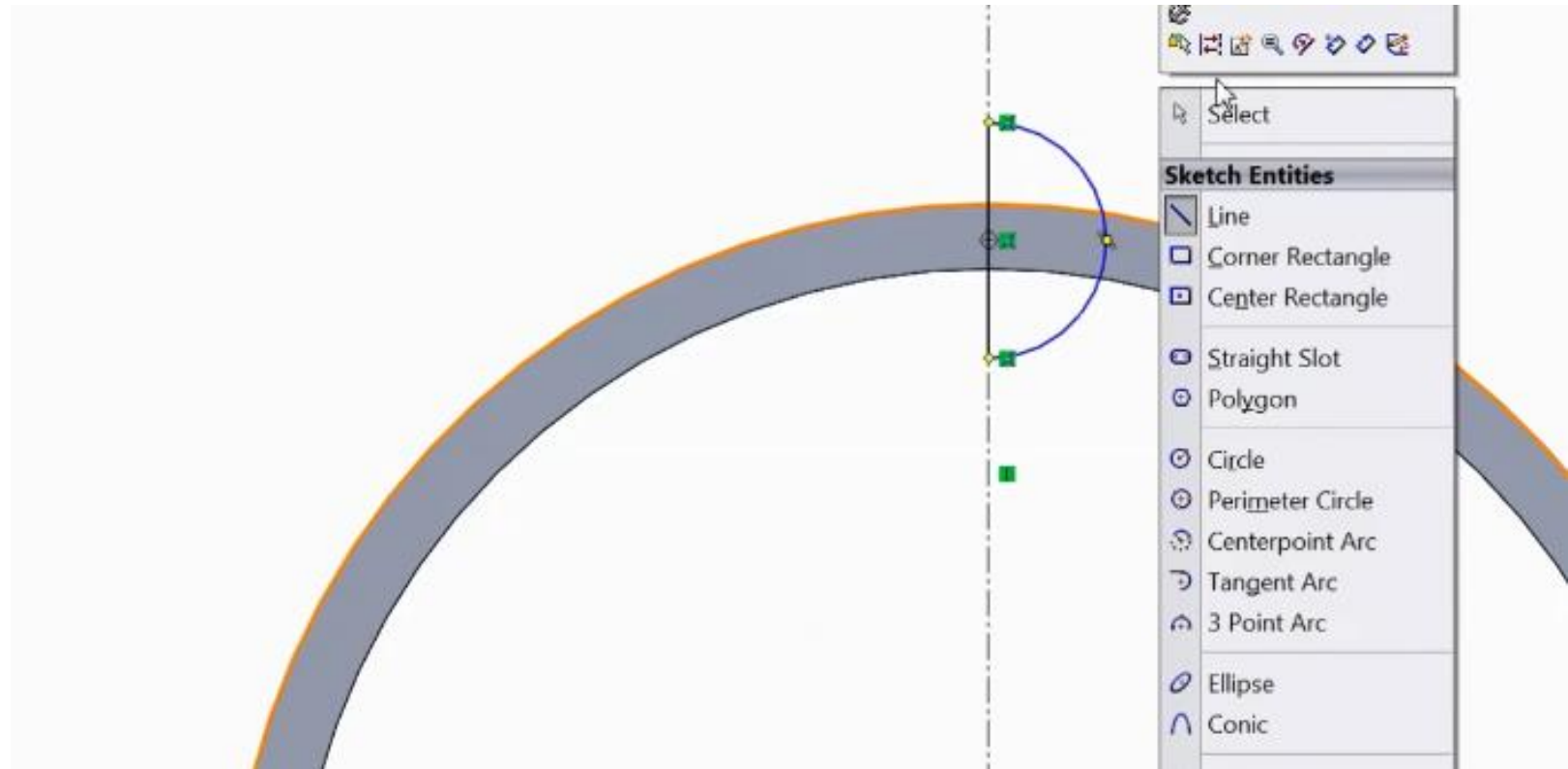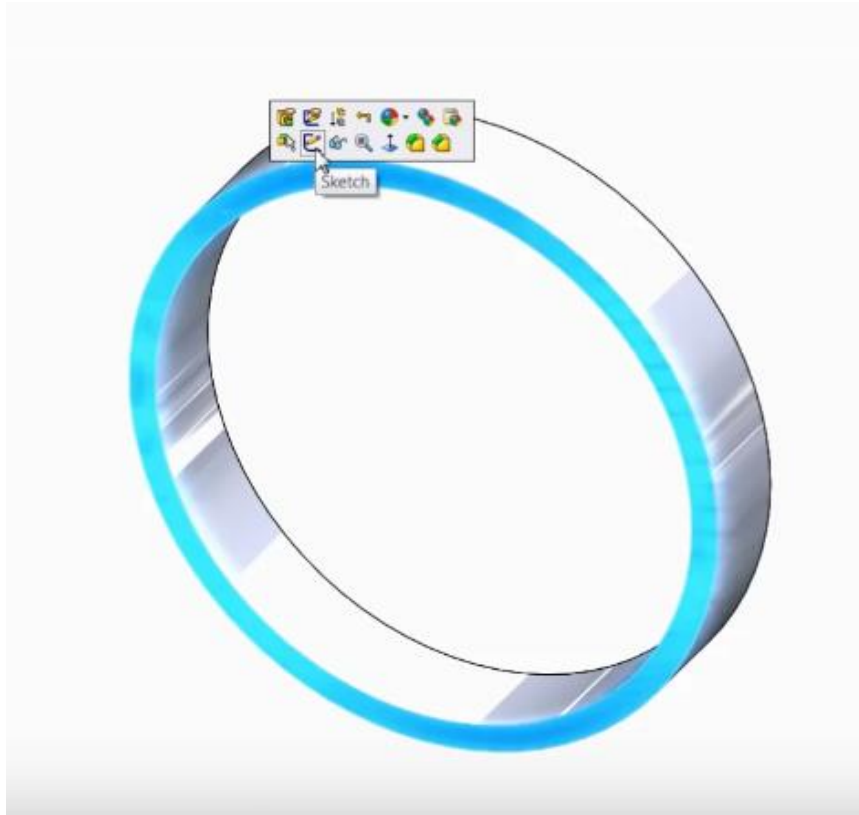   a construction circle.
  2. ## Extruded length is 3.75mm

The result after finishing these procedures
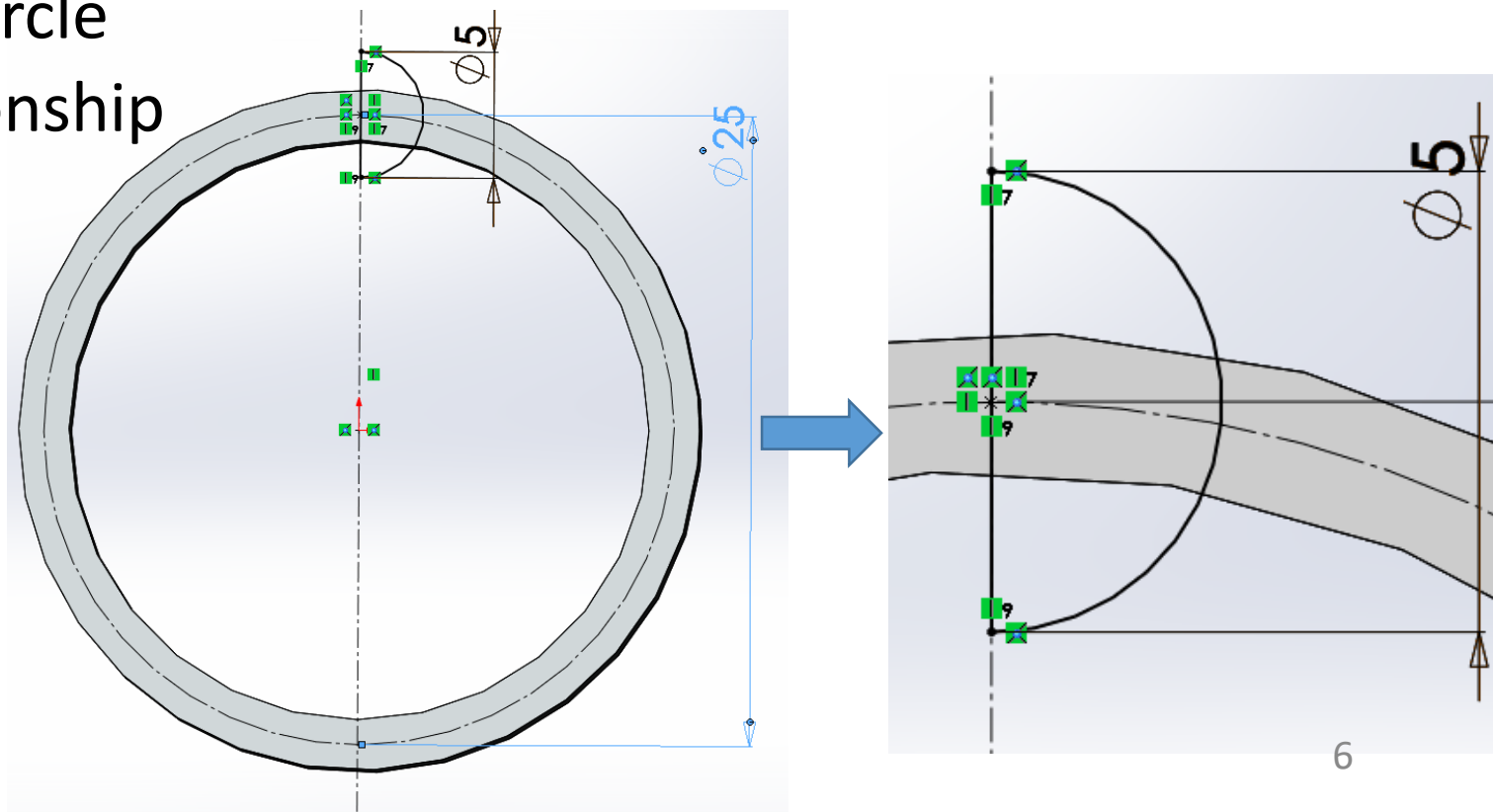
Sketching Skills for a Cage

- Sketch an arc on the extruded face

Directly sketch in the extruded face

Sketching Skills for a Cage

- Sketch an arc on the extruded face
  - ➢ Use the coincide relationship to coincide the center point of the arc and the construction circle
    - ○ (hold "ctrl")Select the center point and the construction circle
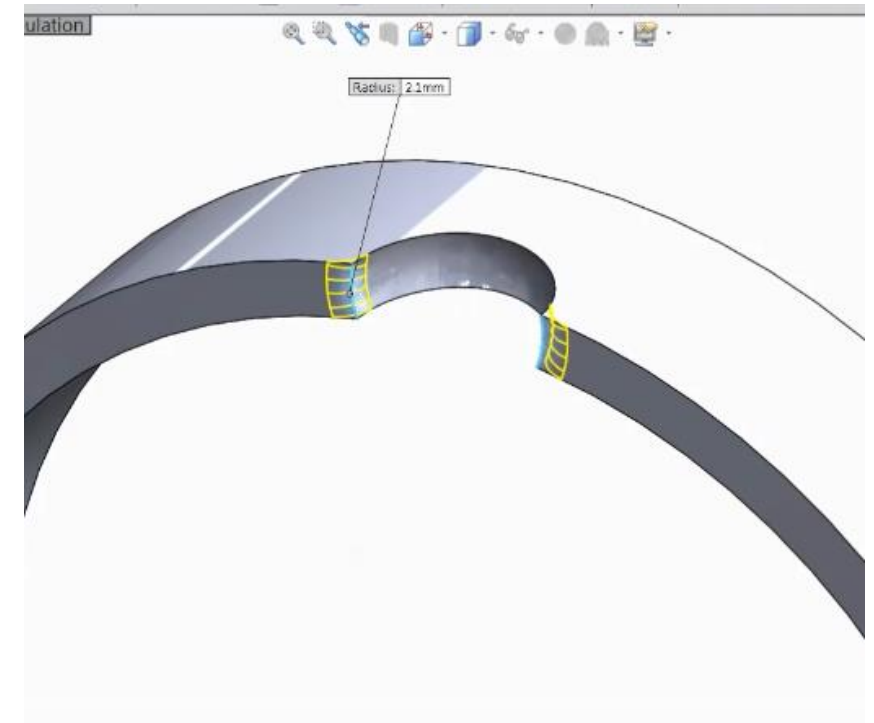   - ○ Choose the add relationship
    - ○ Choose the coincide

Sketching Skills for a Cage

- ## Revolved Cut
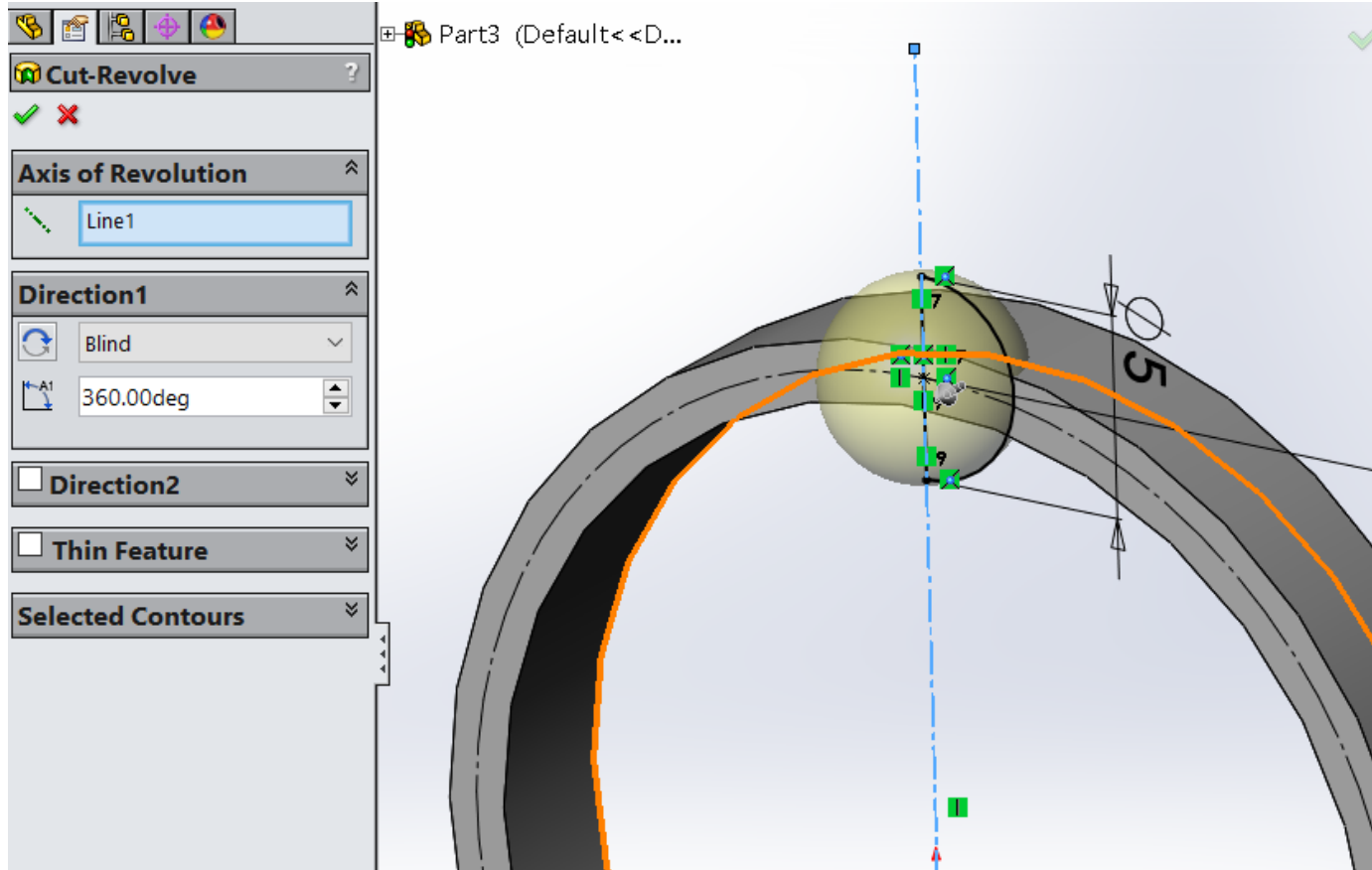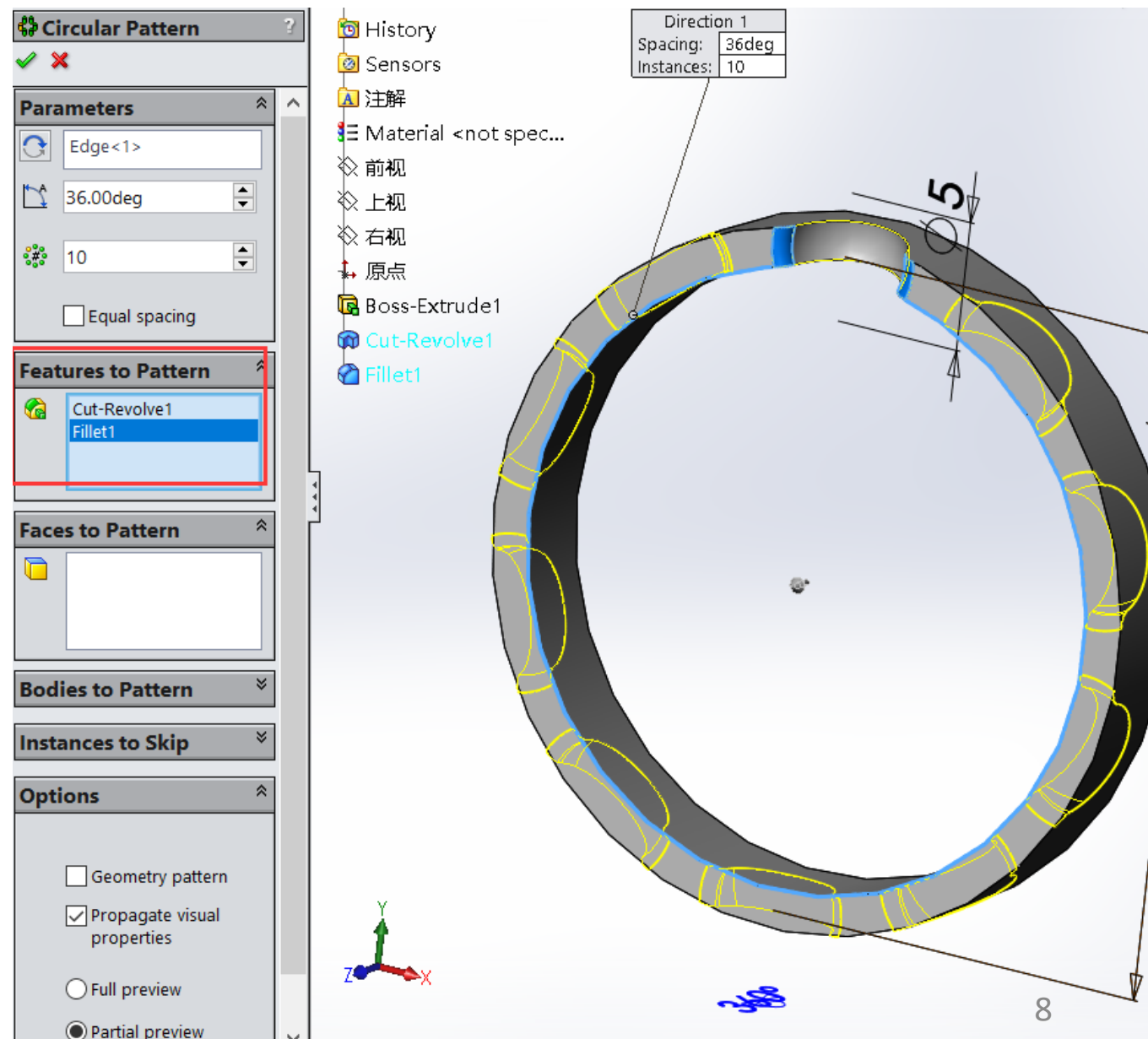

Fillet the corner

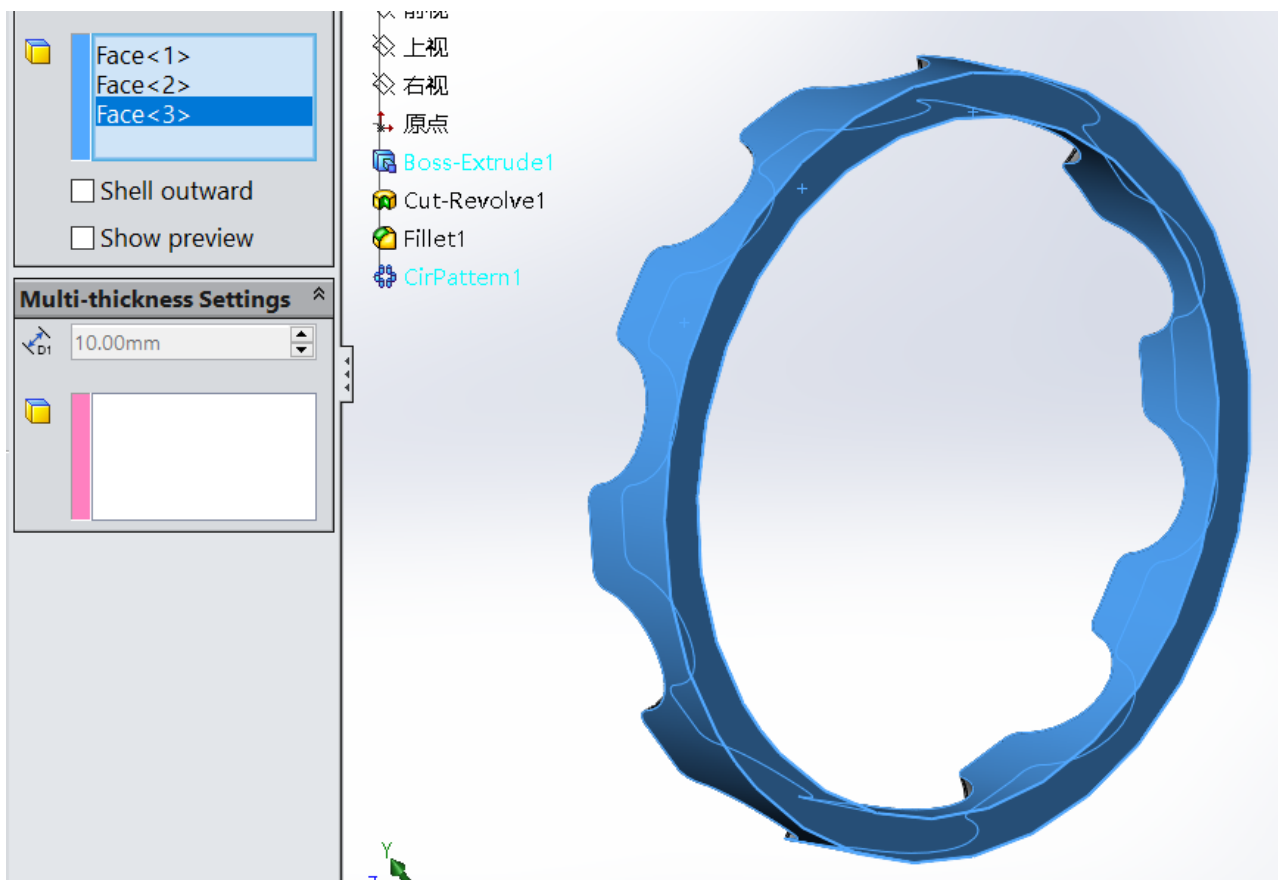# Sketching Skills for a Cage

- ## Circular Patterns
  - ➢Set the number for circular patterns
  - ➢Choose the "Cut-revolve" and "fillet" feature for this pattern
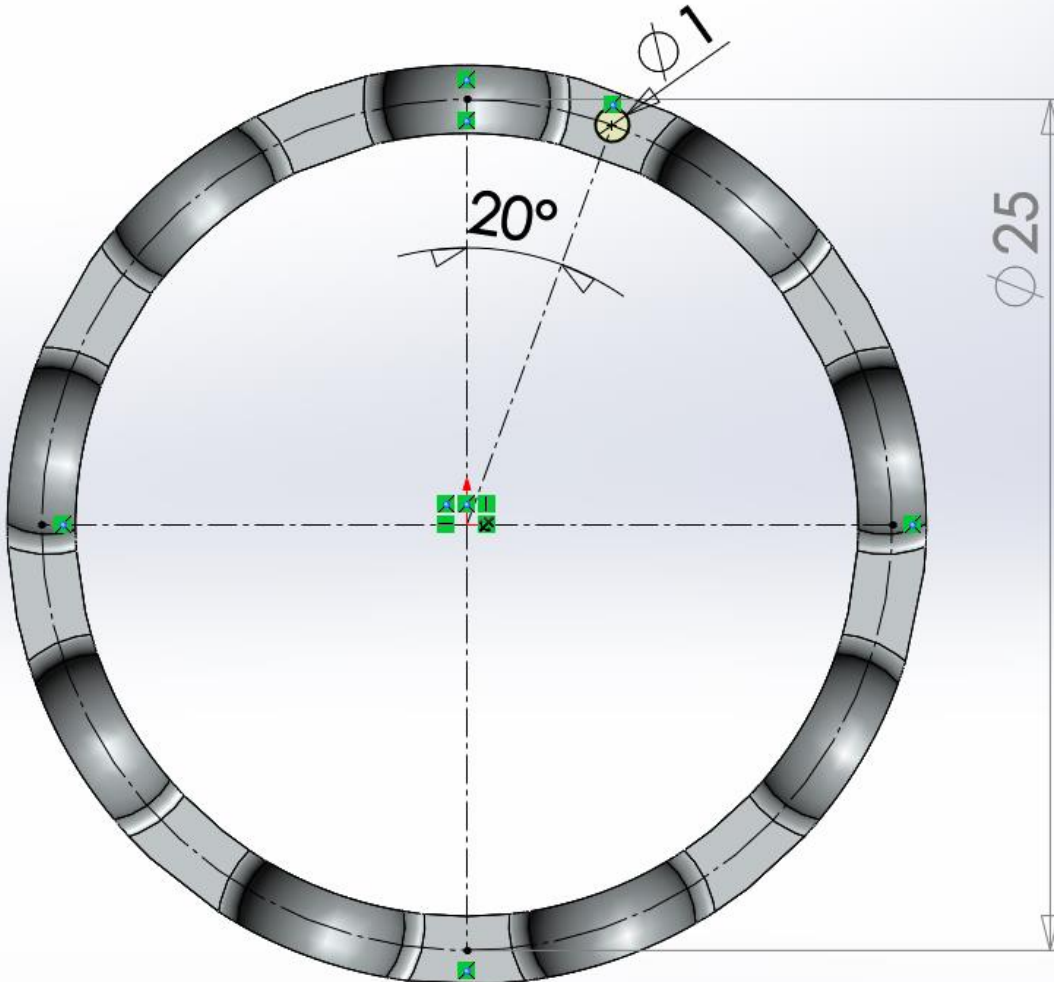
Sketching Skills for a Cage

- Shell feature Shell

Select outer face, inner face and side face as the faces to remove; the shell thickness is 1mm.
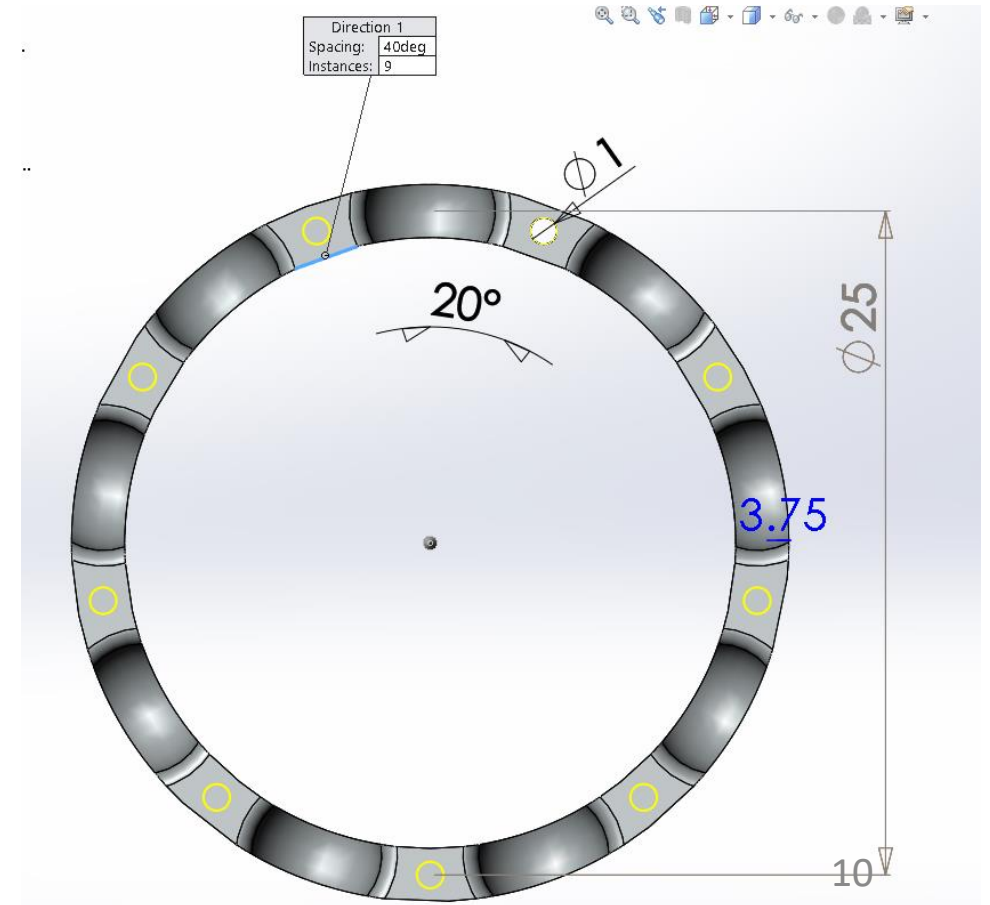
Remaining this outside face

Sketching Skills for Cage

- ## Sketch the hole to add a rivet

1. Choose a face for sketching.
2. Set the longitudinal and angular parameters for the reference line.
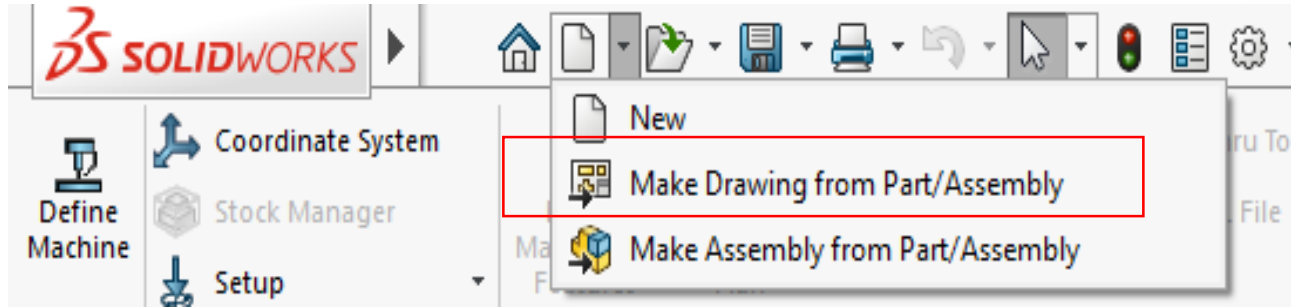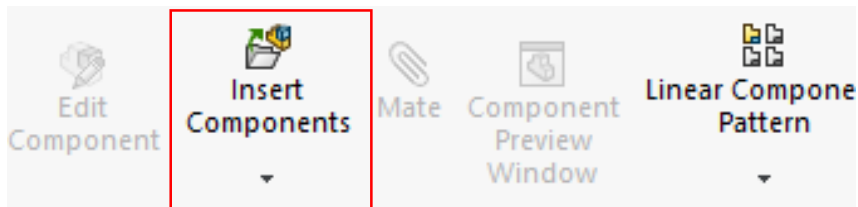3. Extruded cut
4. Circular pattern

Mate

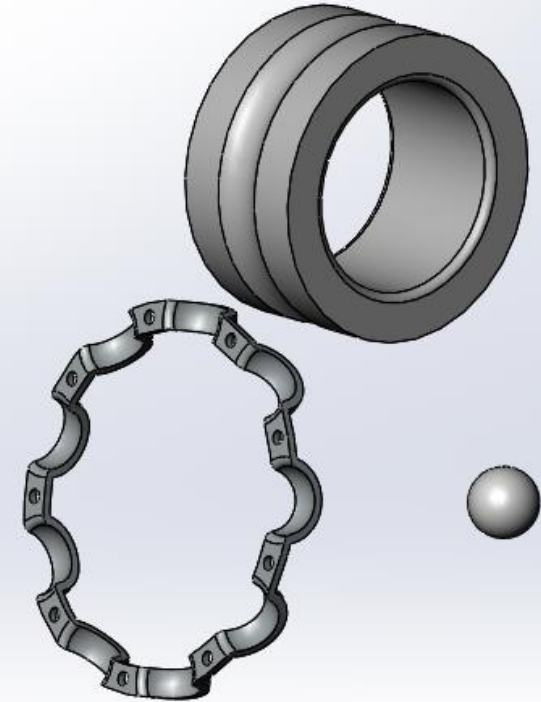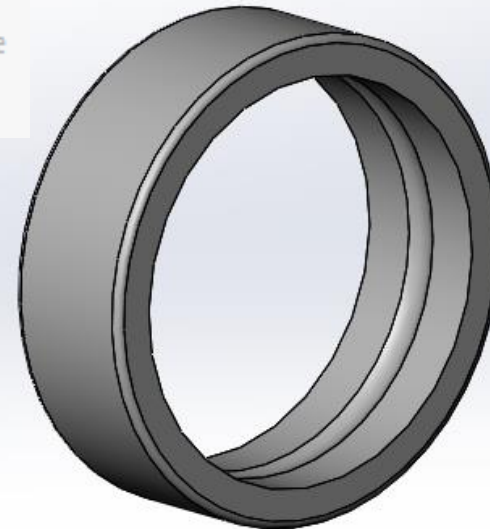# Sketching skills for drawing a bearing

- Assembly
    1. Create a new assembly file
    2. Insert the all previous parts in this assembly file
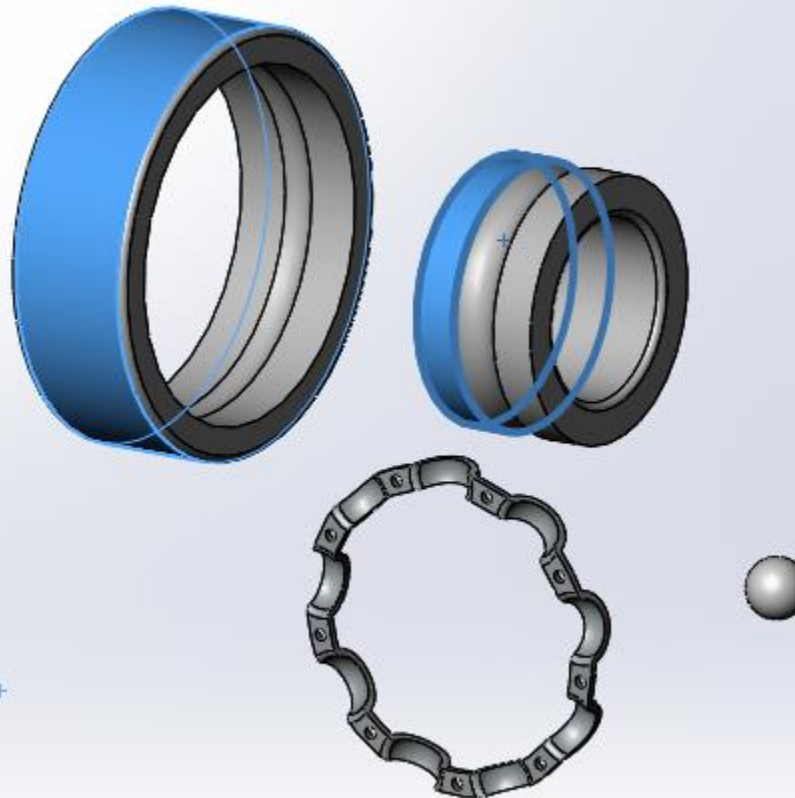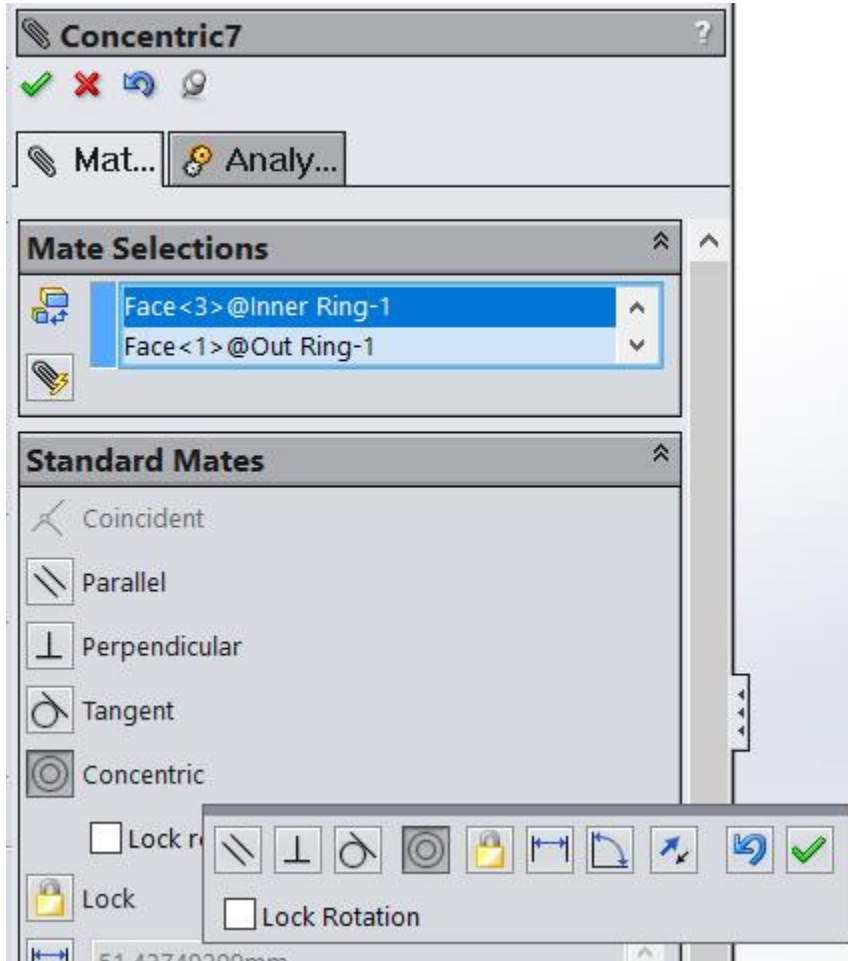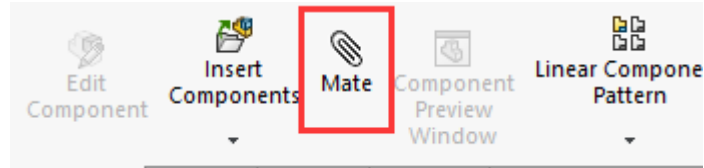

1. Make drawing from Part/Assembly

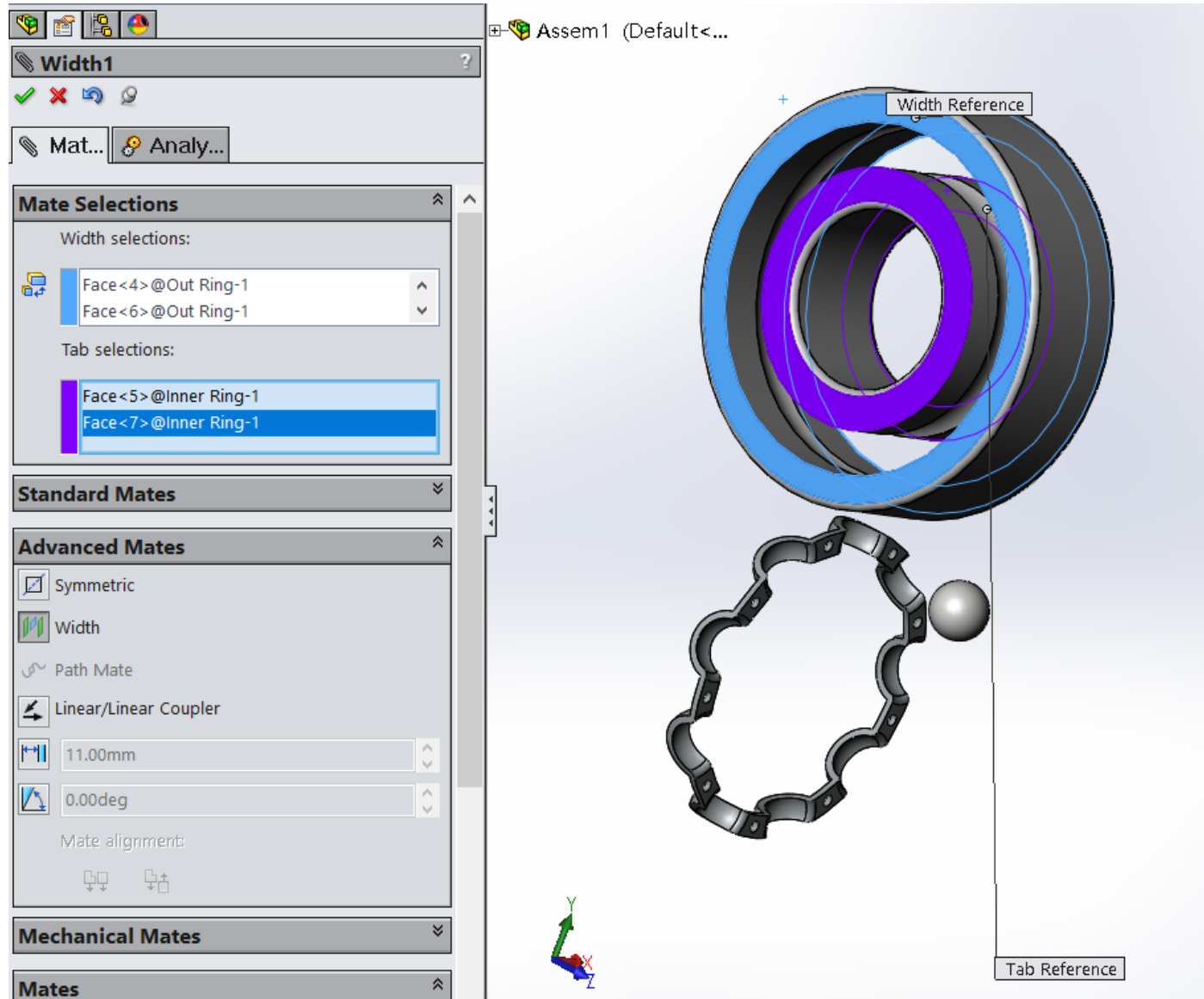2. Insert components

Sketching skills for drawing a bearing

- ## Standard mate

Choose standard mates for outer and inner rings by concentric mates.

Sketching skills for drawing a bearing
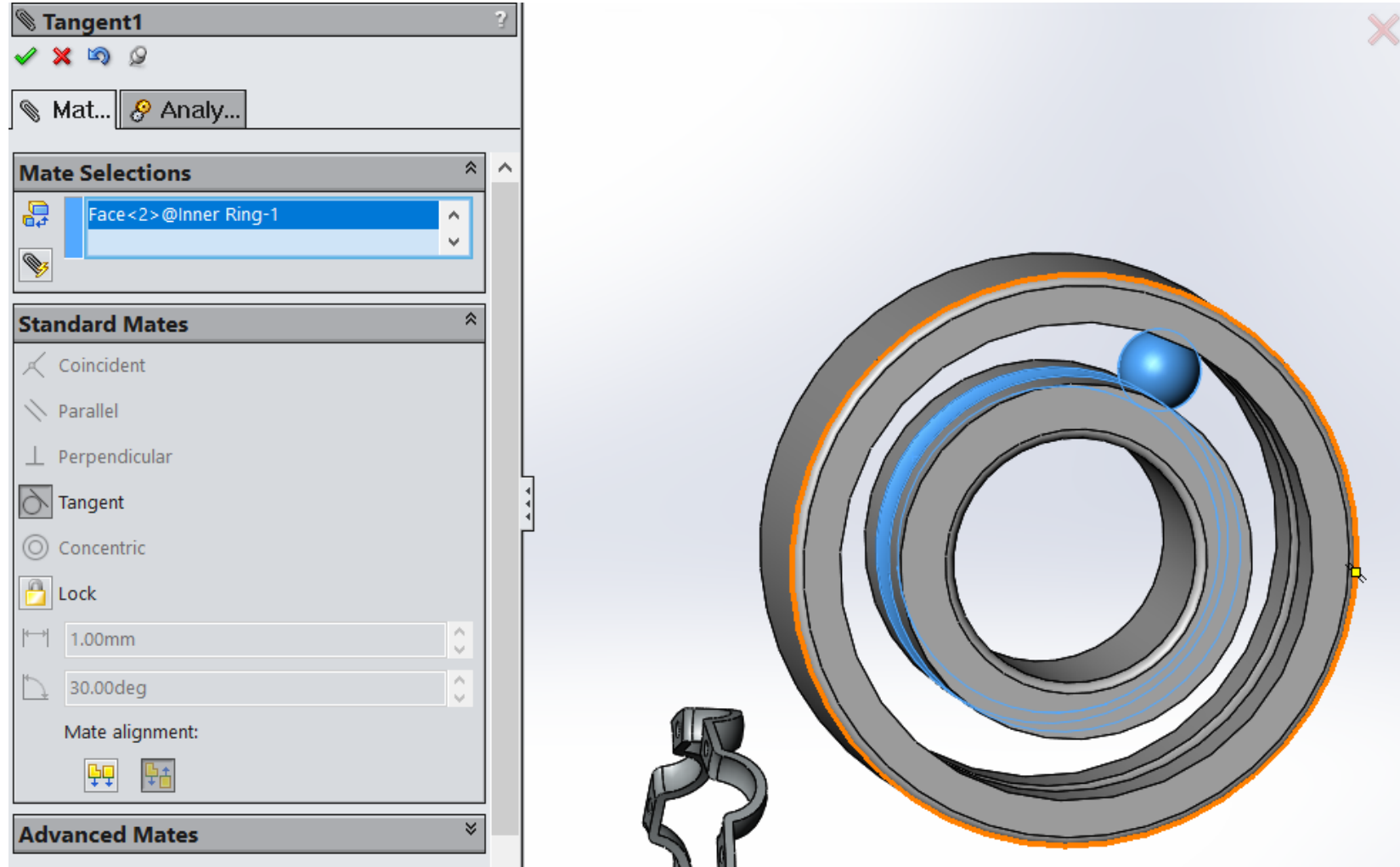
- Advanced mate

a. Select two planar faces for **Width** **selections**.

b. Select two planar faces, or one cylindrical face or axis, for **Tab selections**.
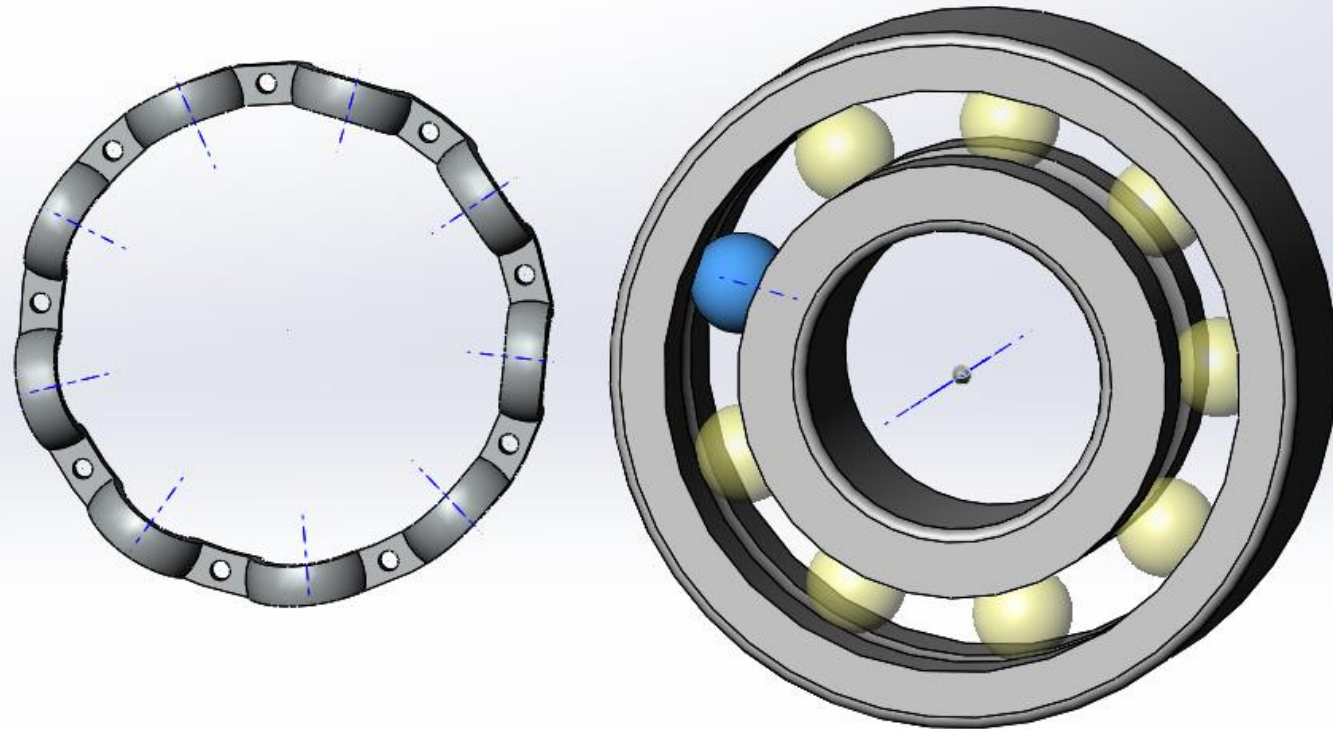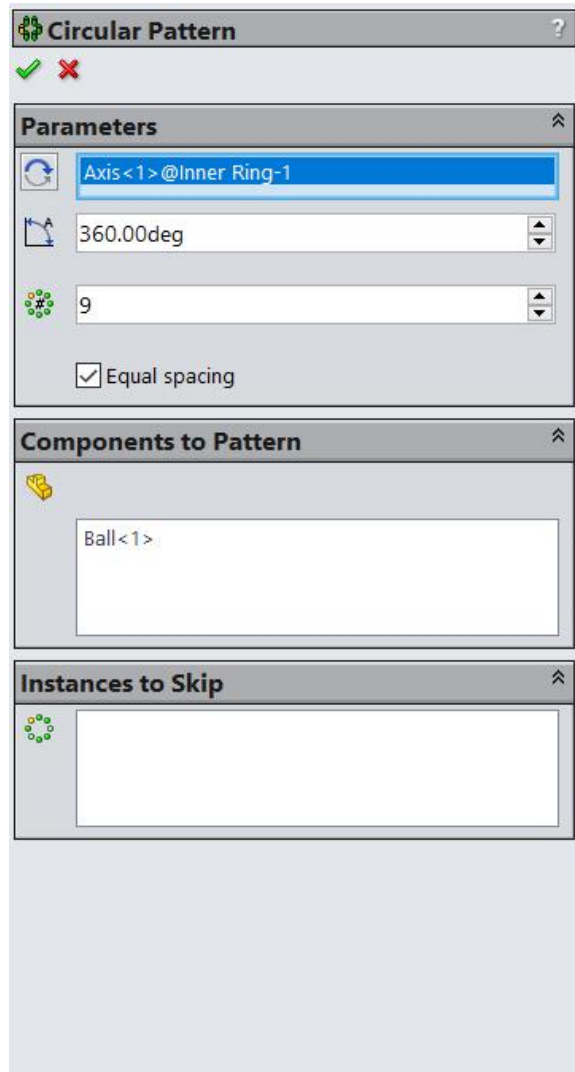
Sketching skills for drawing a bearing

- Another standard mate

Tangentially mate the surface of the inner ring and the ball.

Sketching skills for drawing a bearing

- Circular pattern for the component

Circular Pattern

Parameters

Axis<1>@Inner Ring-1

360.00deg

9

☑ Equal spacing

Components to Pattern

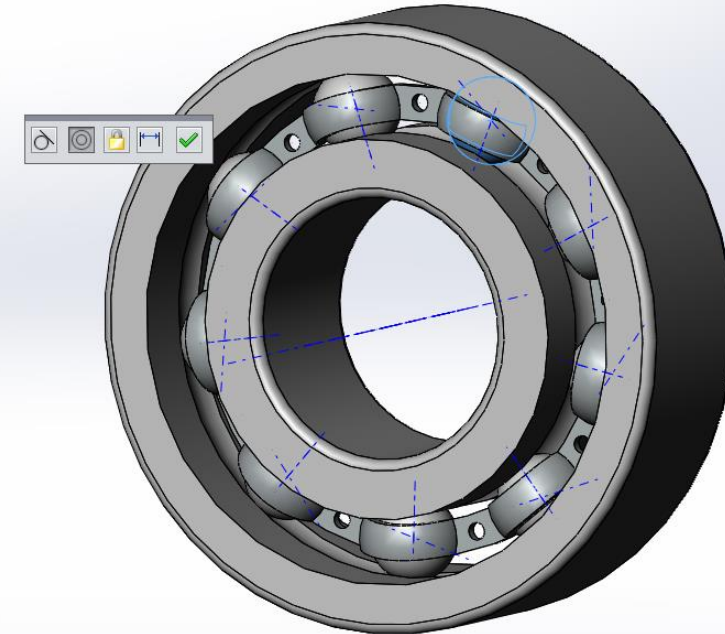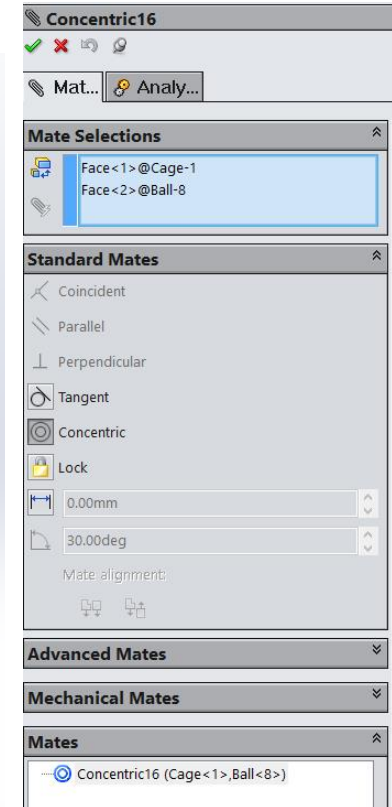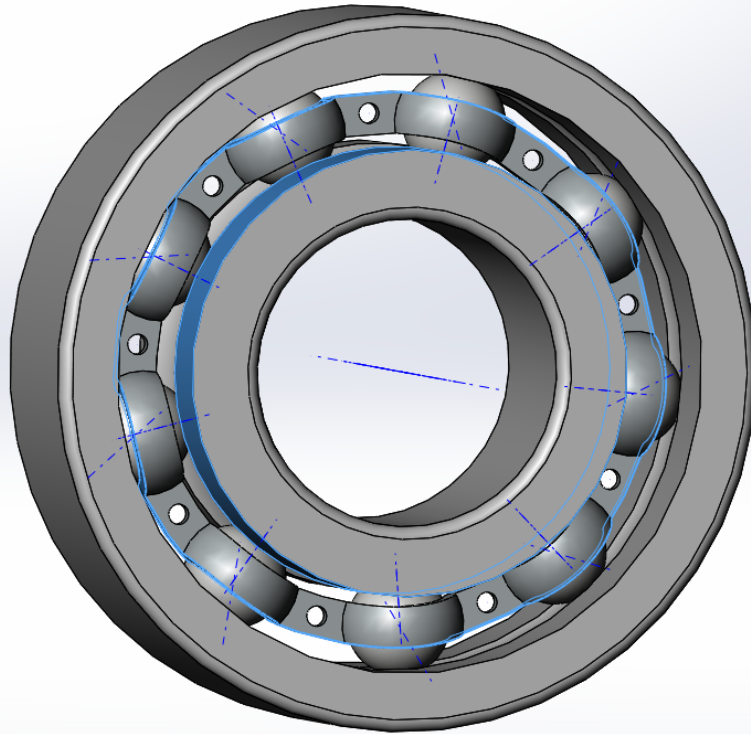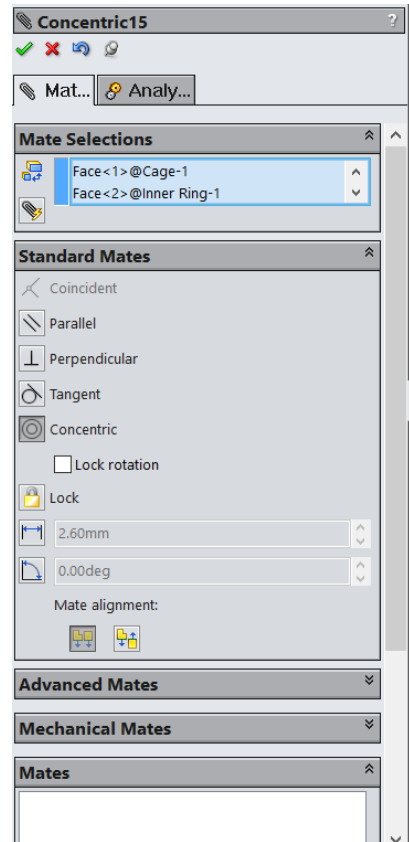Ball<1>

Instances to Skip

1. Choose the components to pattern.
2. Make the temporary axis visible.

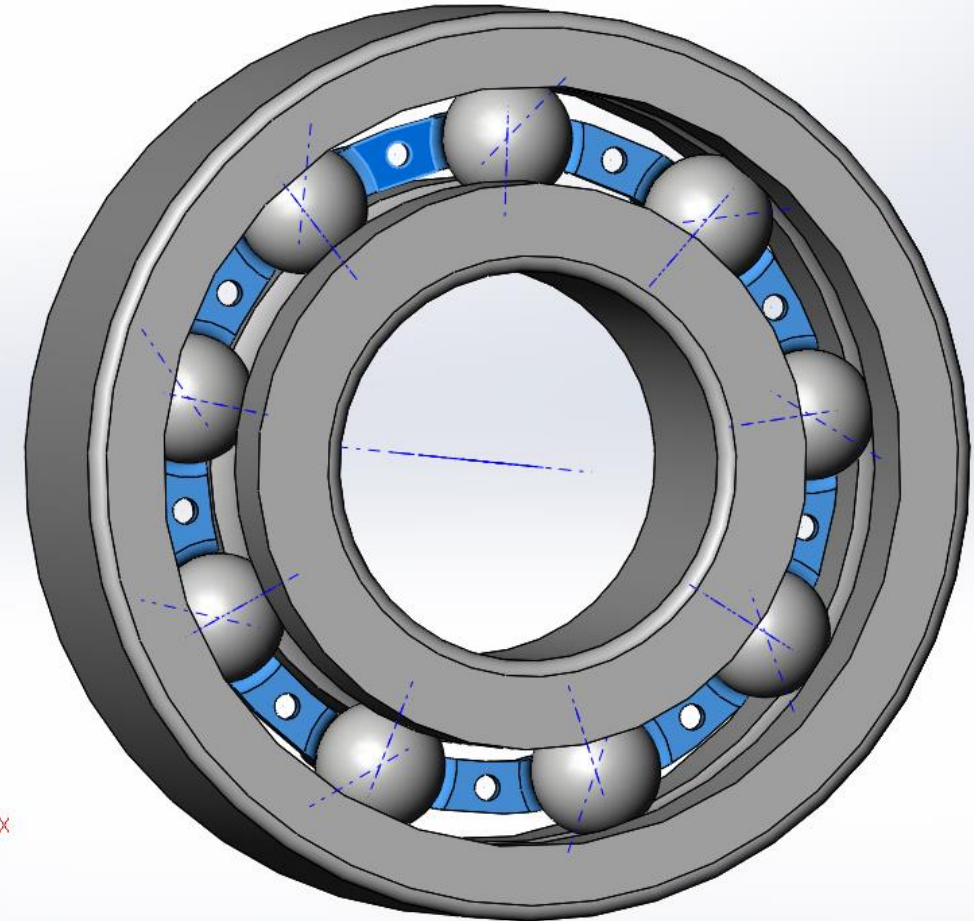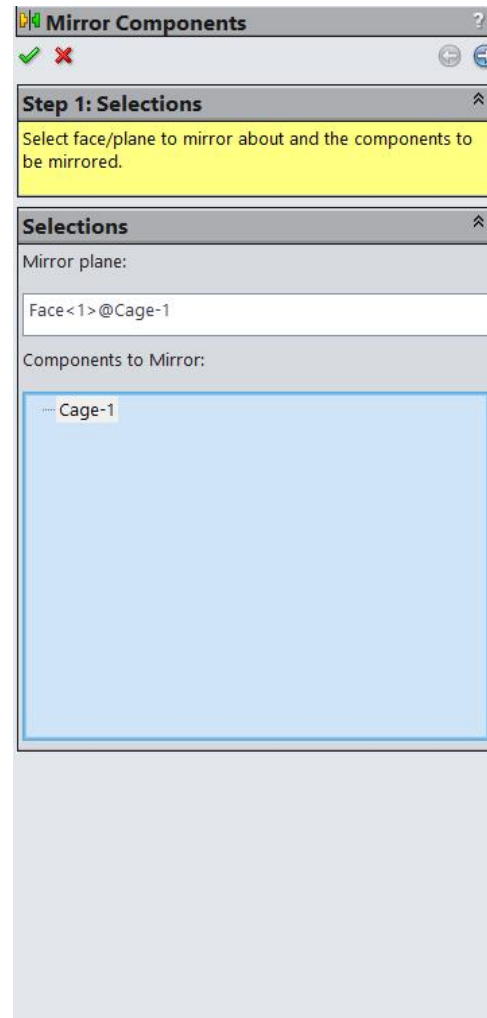# Sketching skills for drawing a bearing

- Another standard mate

Concentrically mate the surface of the cage and the ball

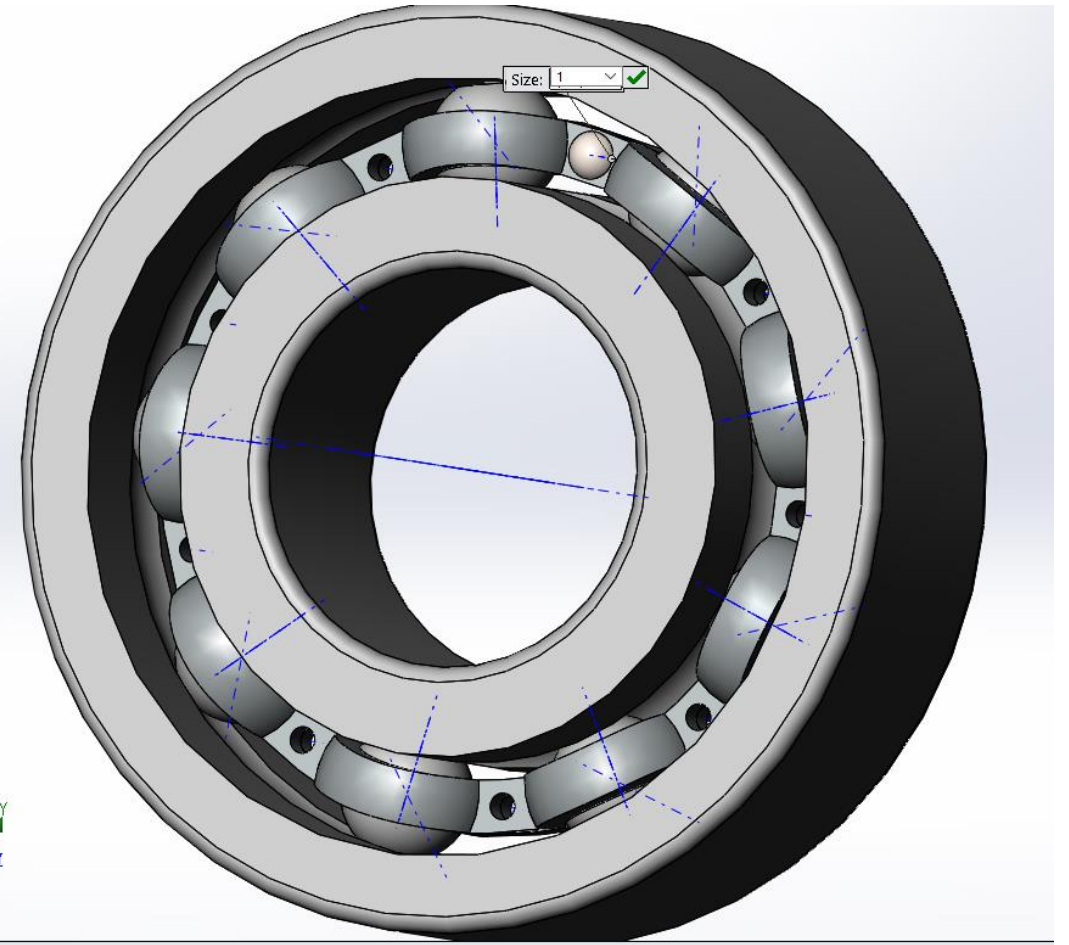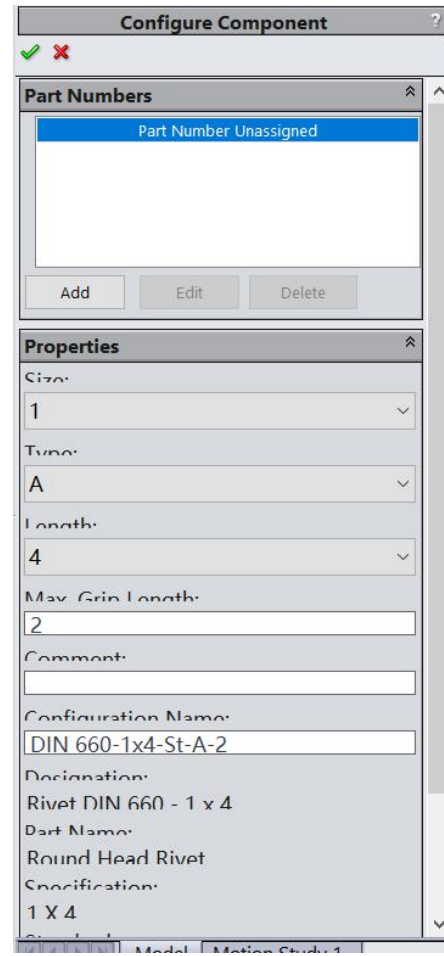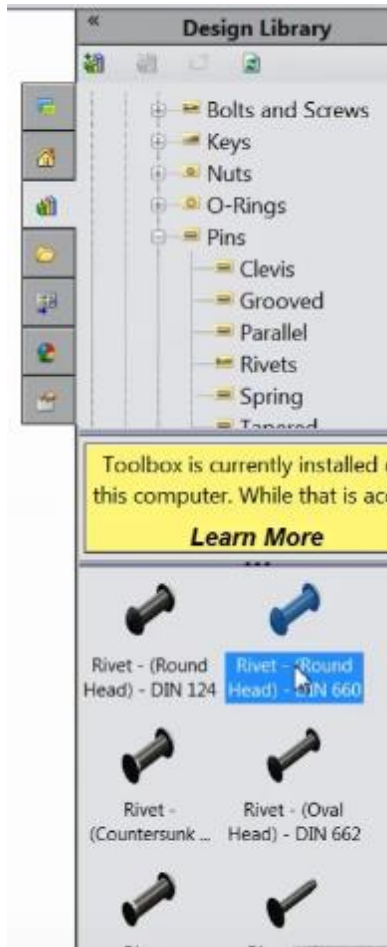Concentrically mate the surface of the cage and the inner ring

Sketching skills for drawing a bearing

- Mirror the cage
  - ➢ Choose the component to mirror.
  - ➢ Choose a plane for mirroring .

Mirror Components

Step 1: Selections

Select face/plane to mirror about and the components to be mirrored.

Selections

Mirror plane:

Face<1>@Cage-1

Components to Mirror:

Cage-1

Sketching skills for drawing a bearing

- Adding a rivet from the part library
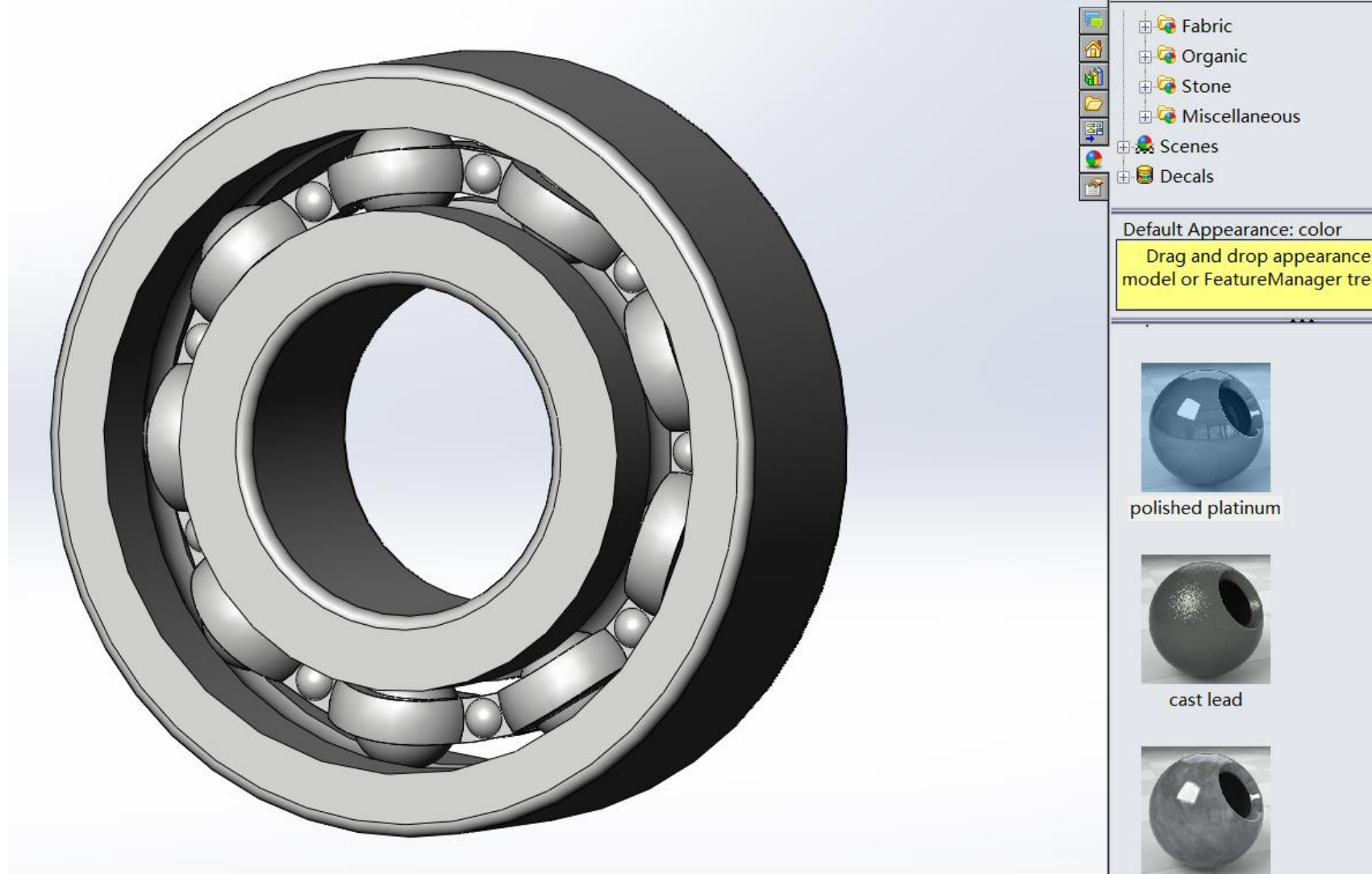

1. Choose the rivet from Design Library.

2. Drag the rivet in the hole of the cage.
3. Adding them with a circular pattern.
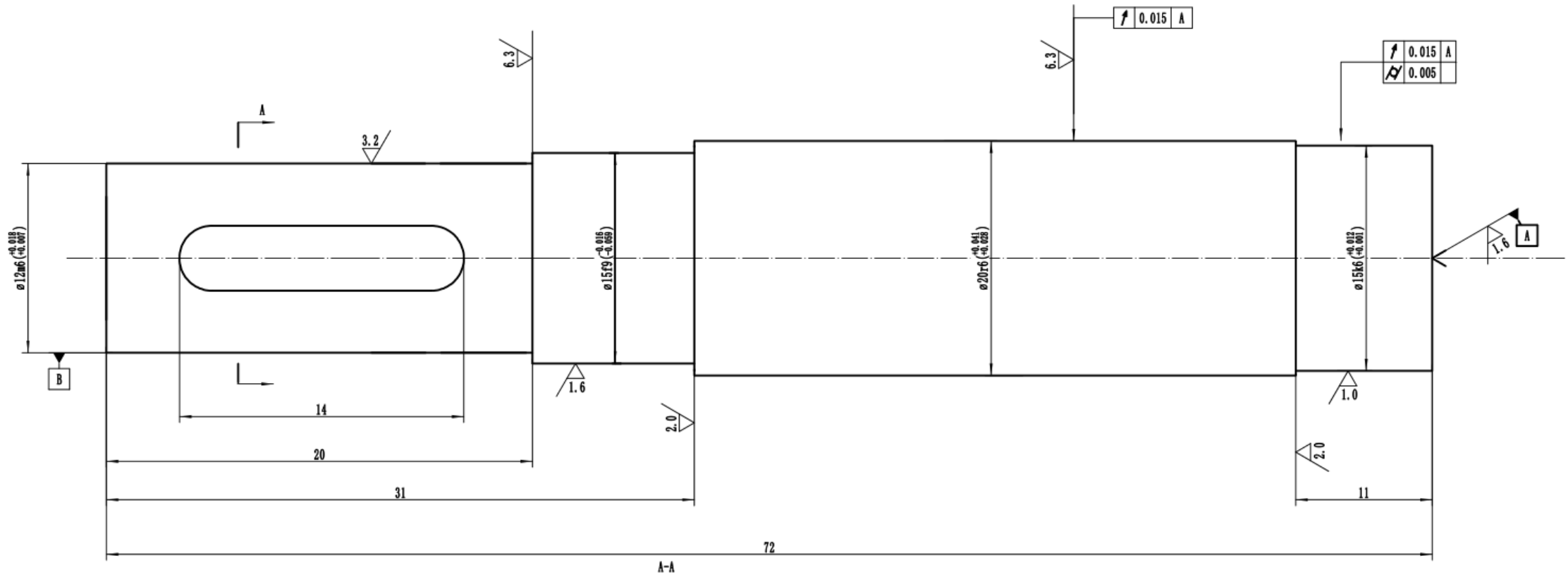
Sketching skills for drawing a bearing

- Enhance the visual standard after circular patterning of the rivet.

Lab assignments

• Draw this shaft with SolidWorks.

3D sketch #2

✓Draw this part with SolidWorks