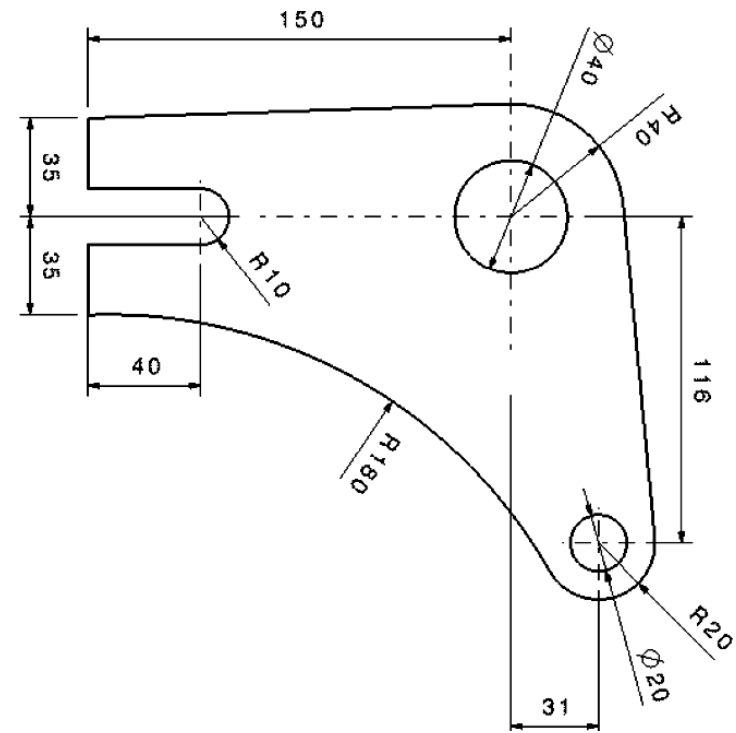
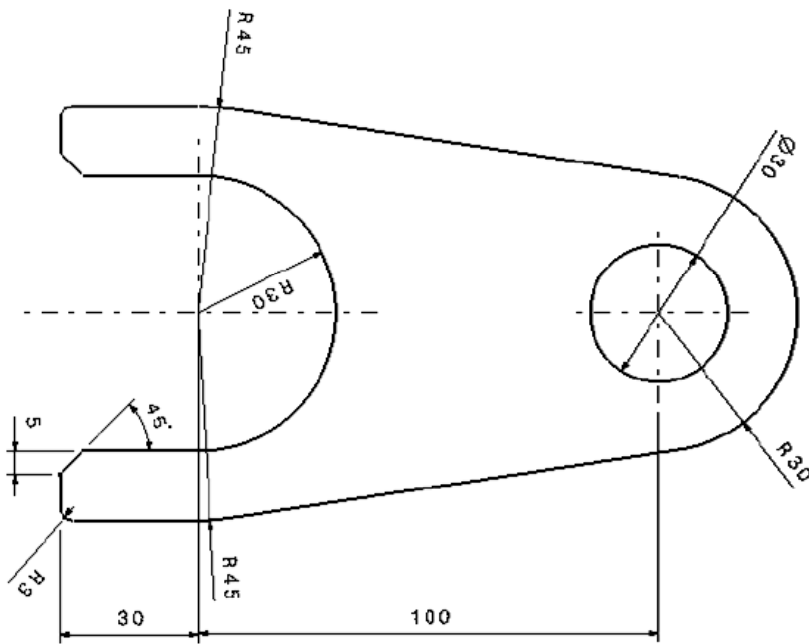
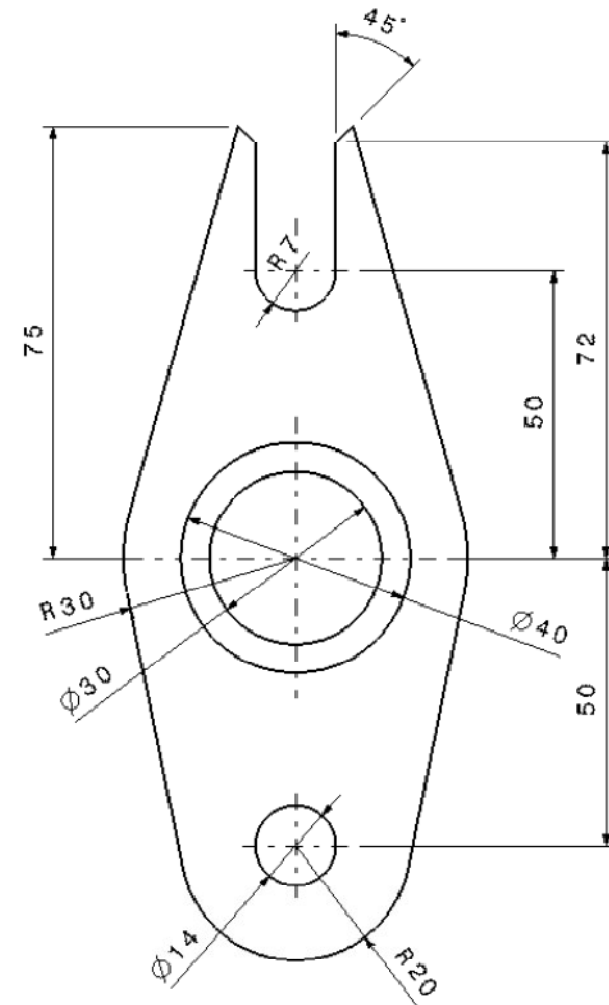
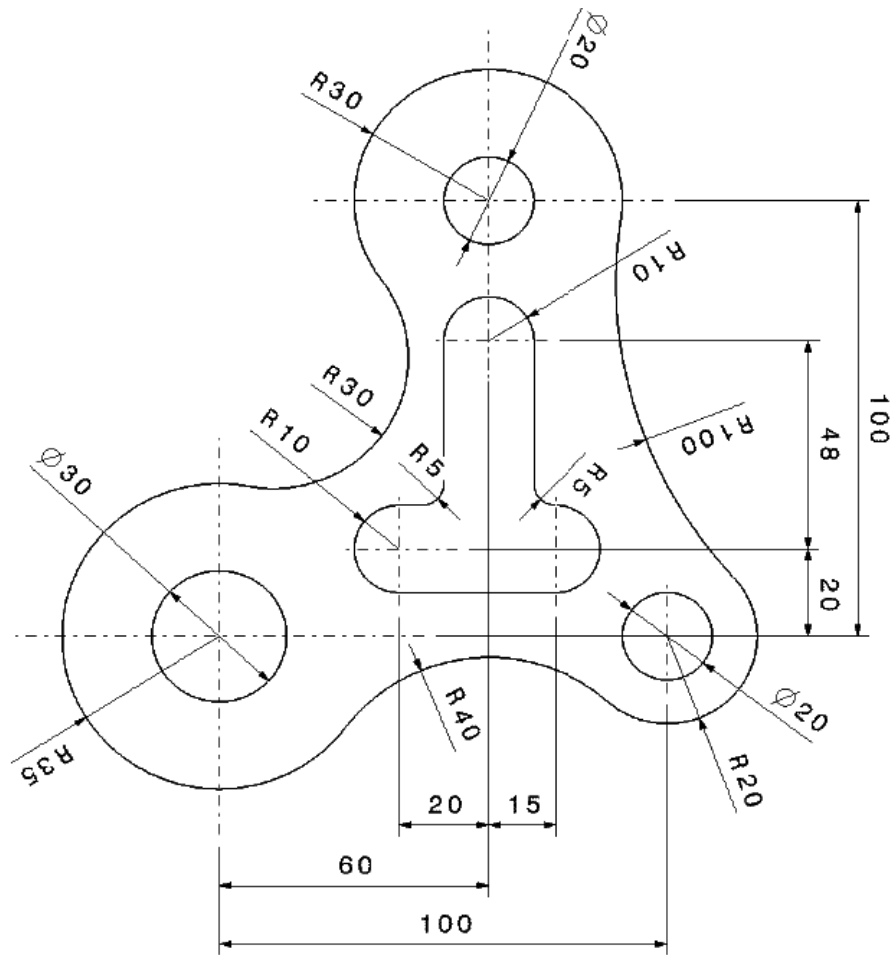


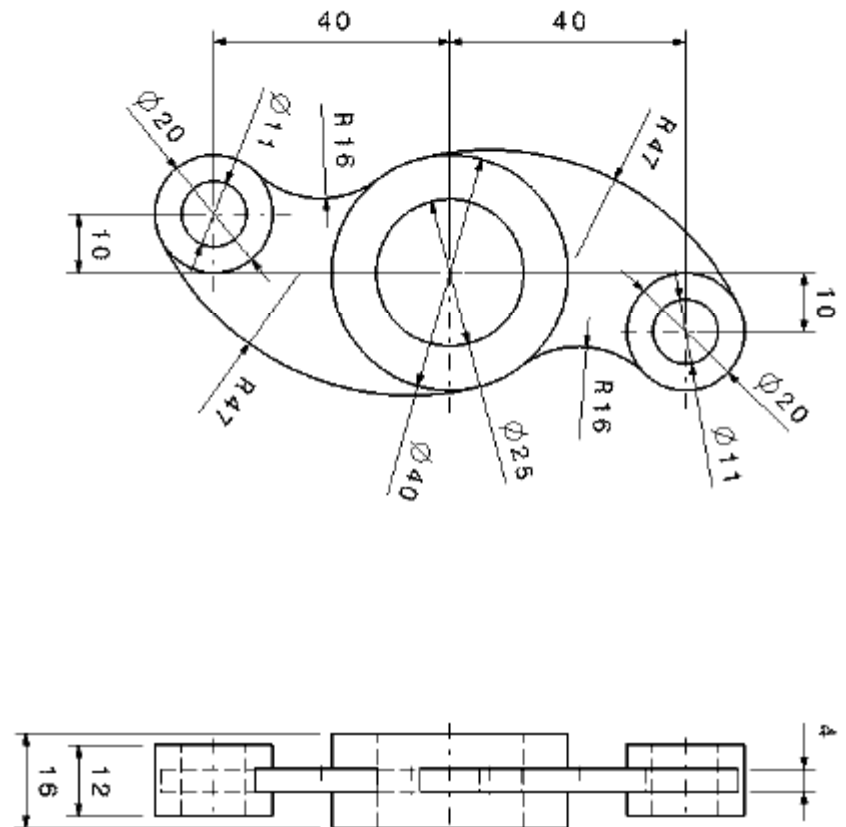
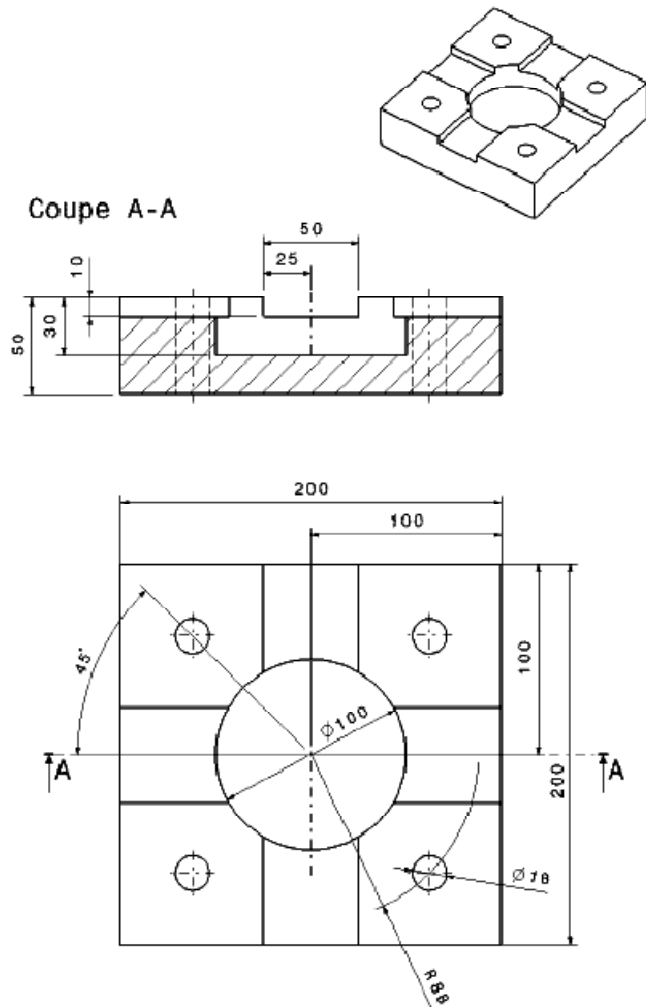


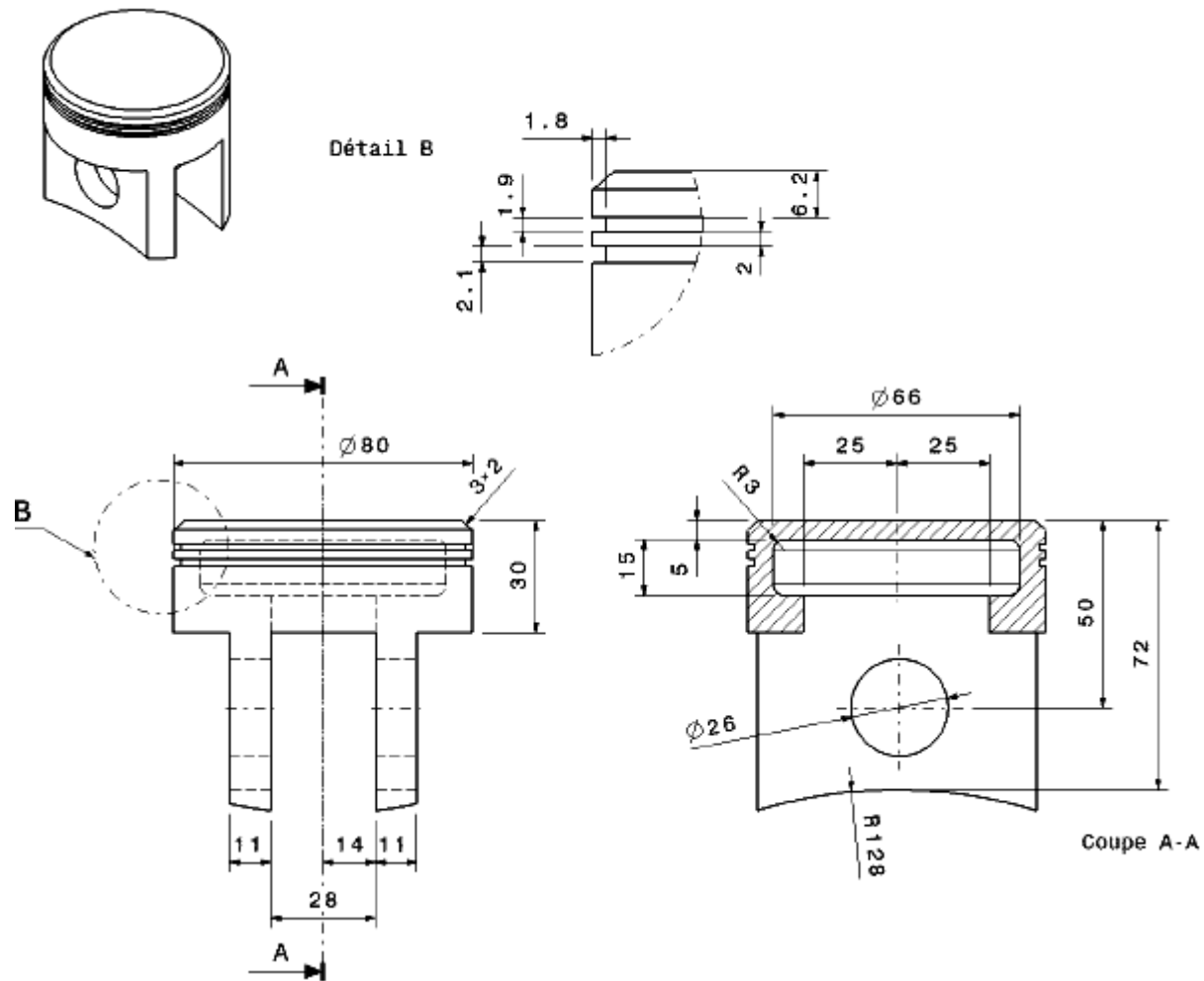
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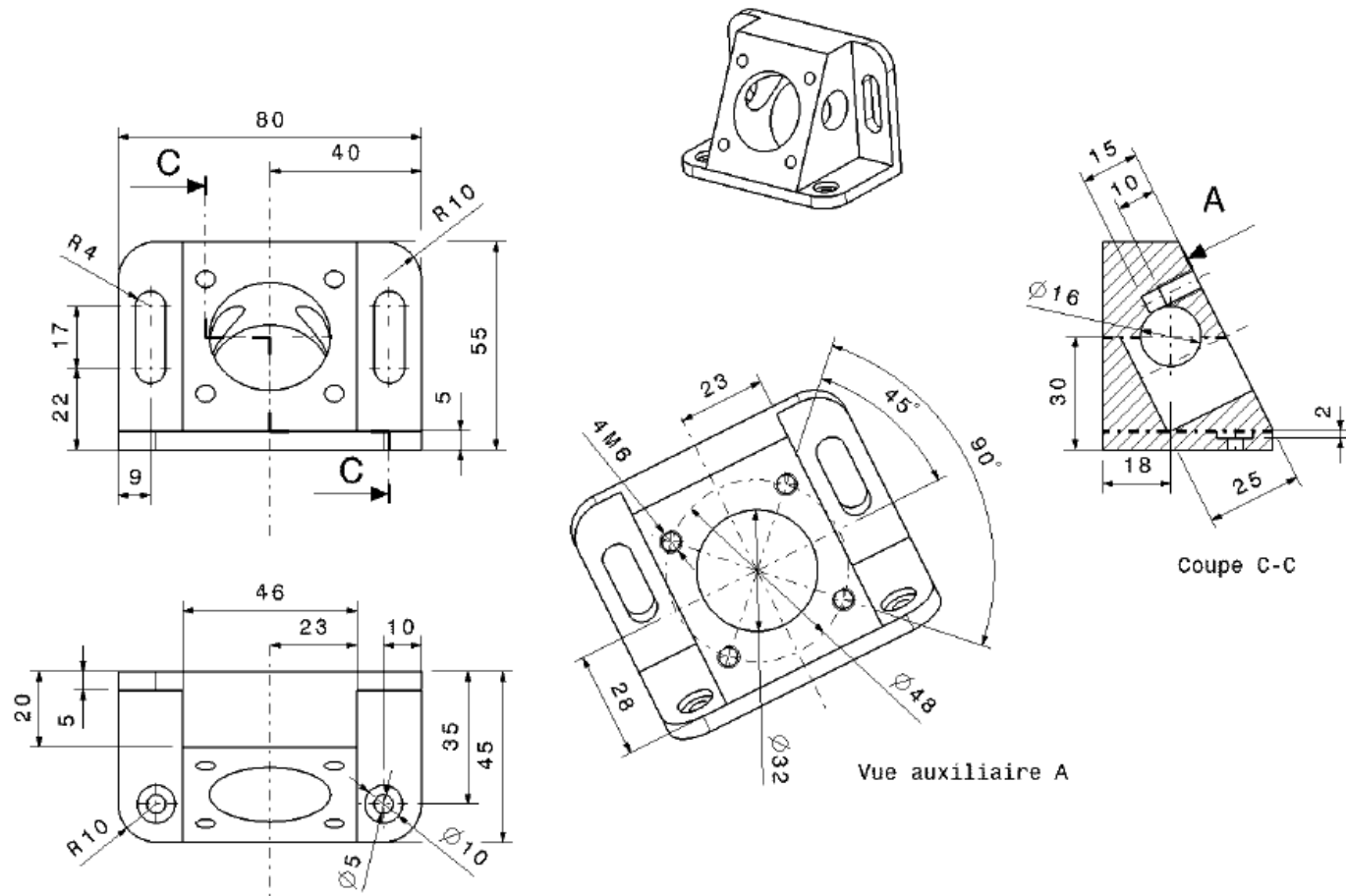
March 13, 2014

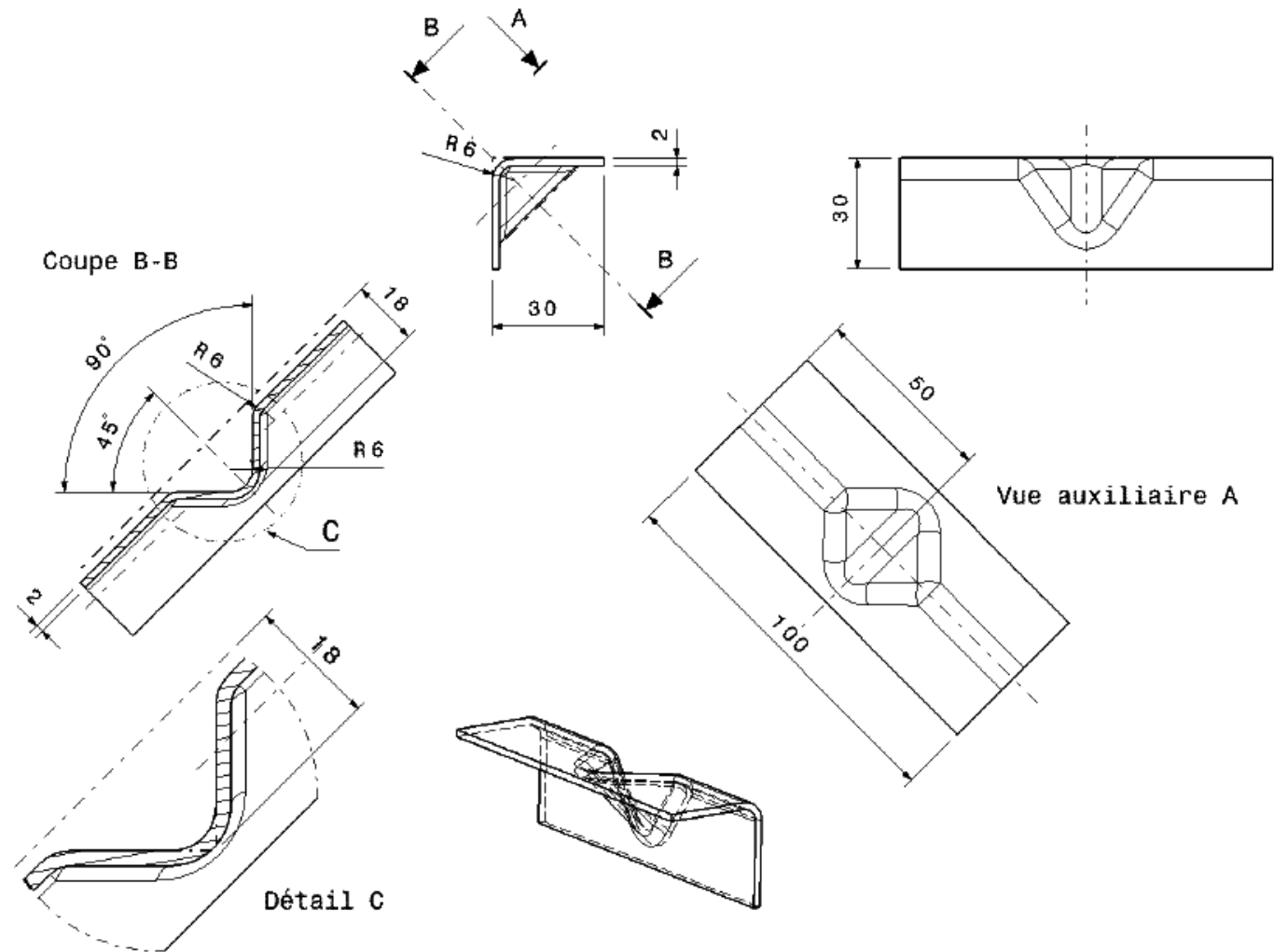


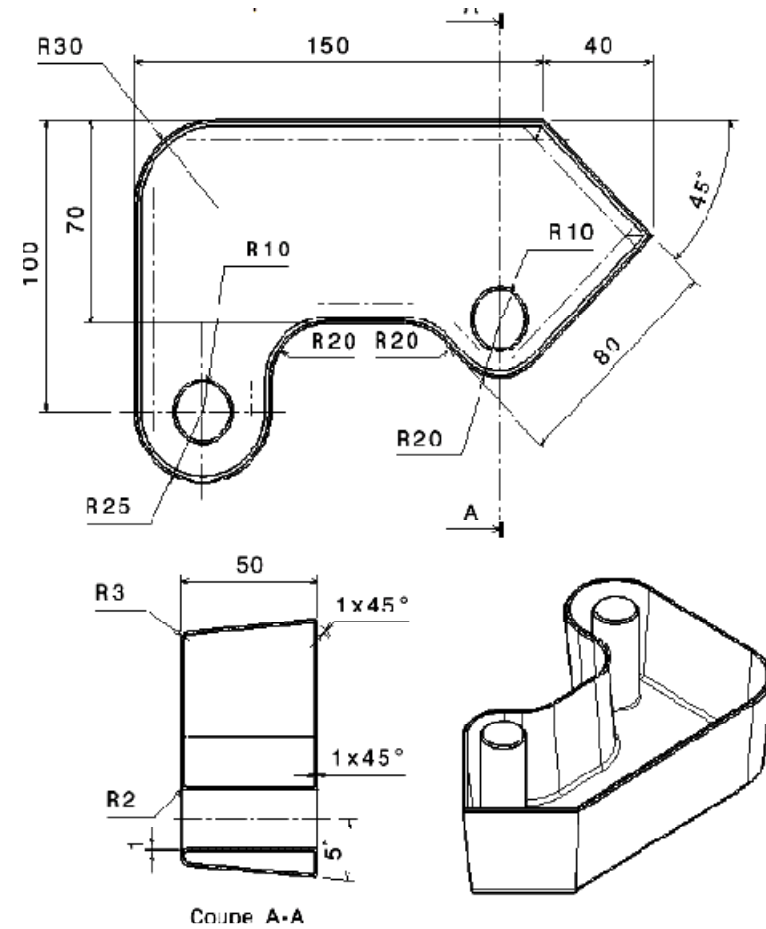
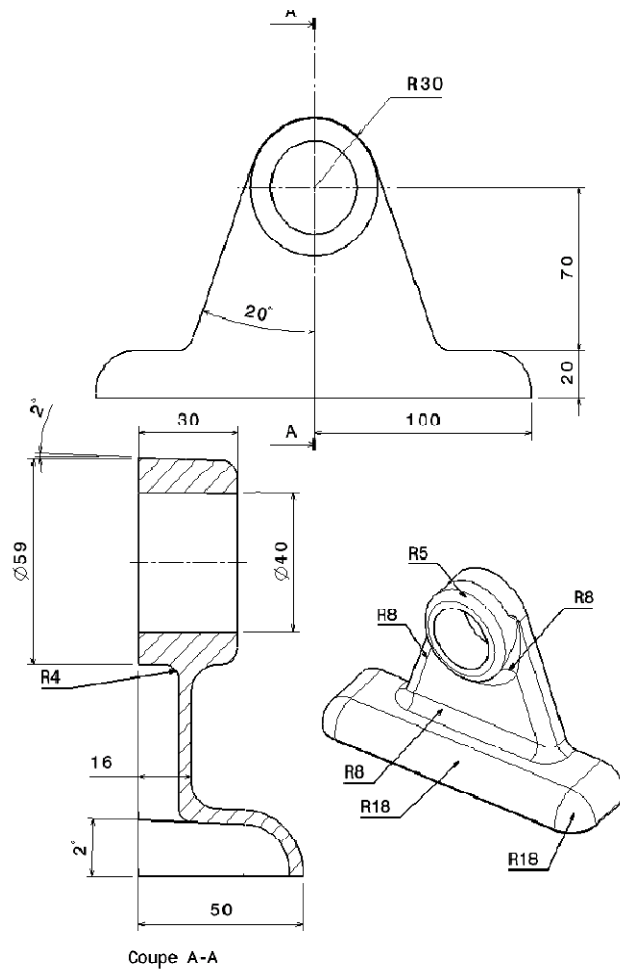


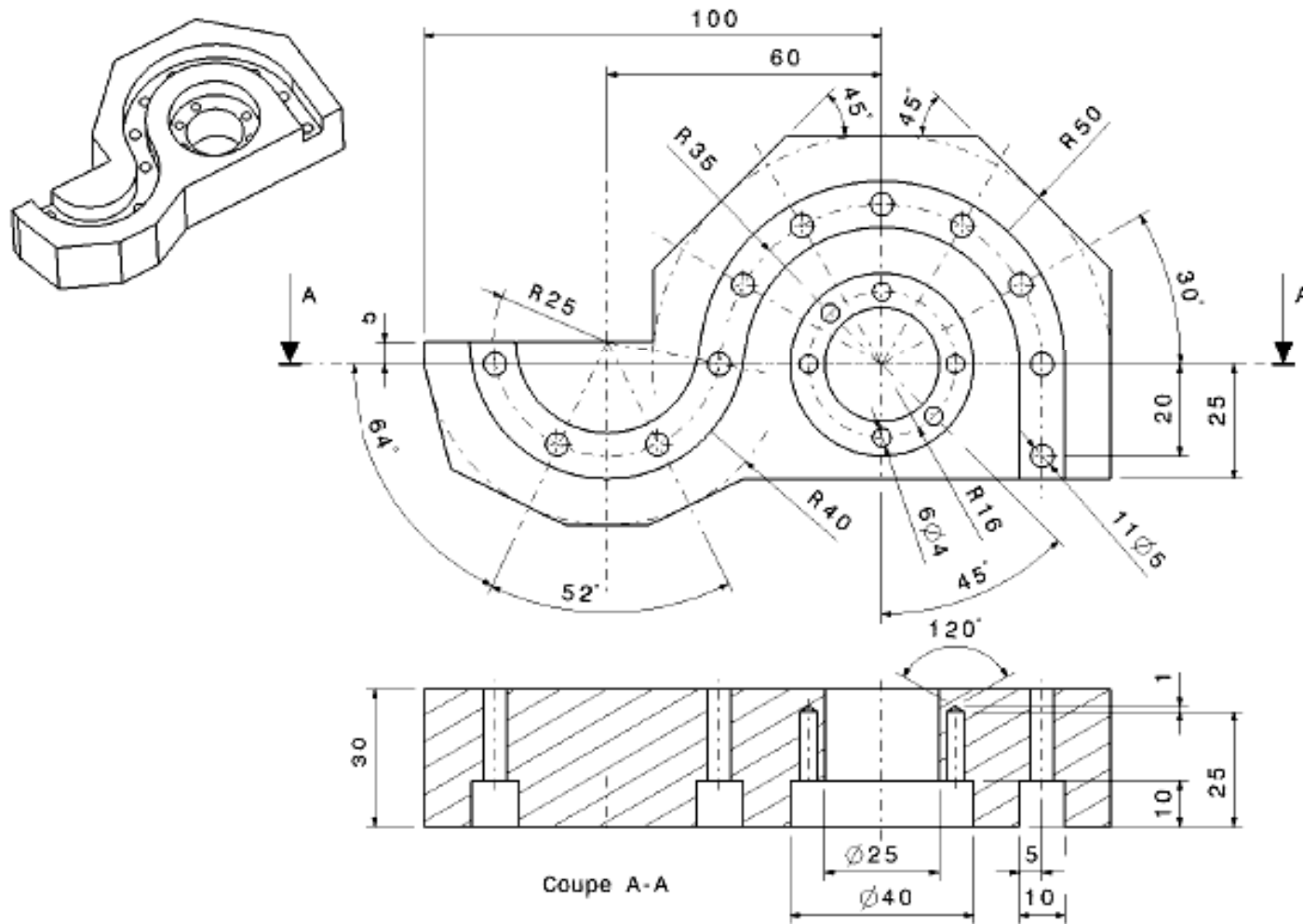


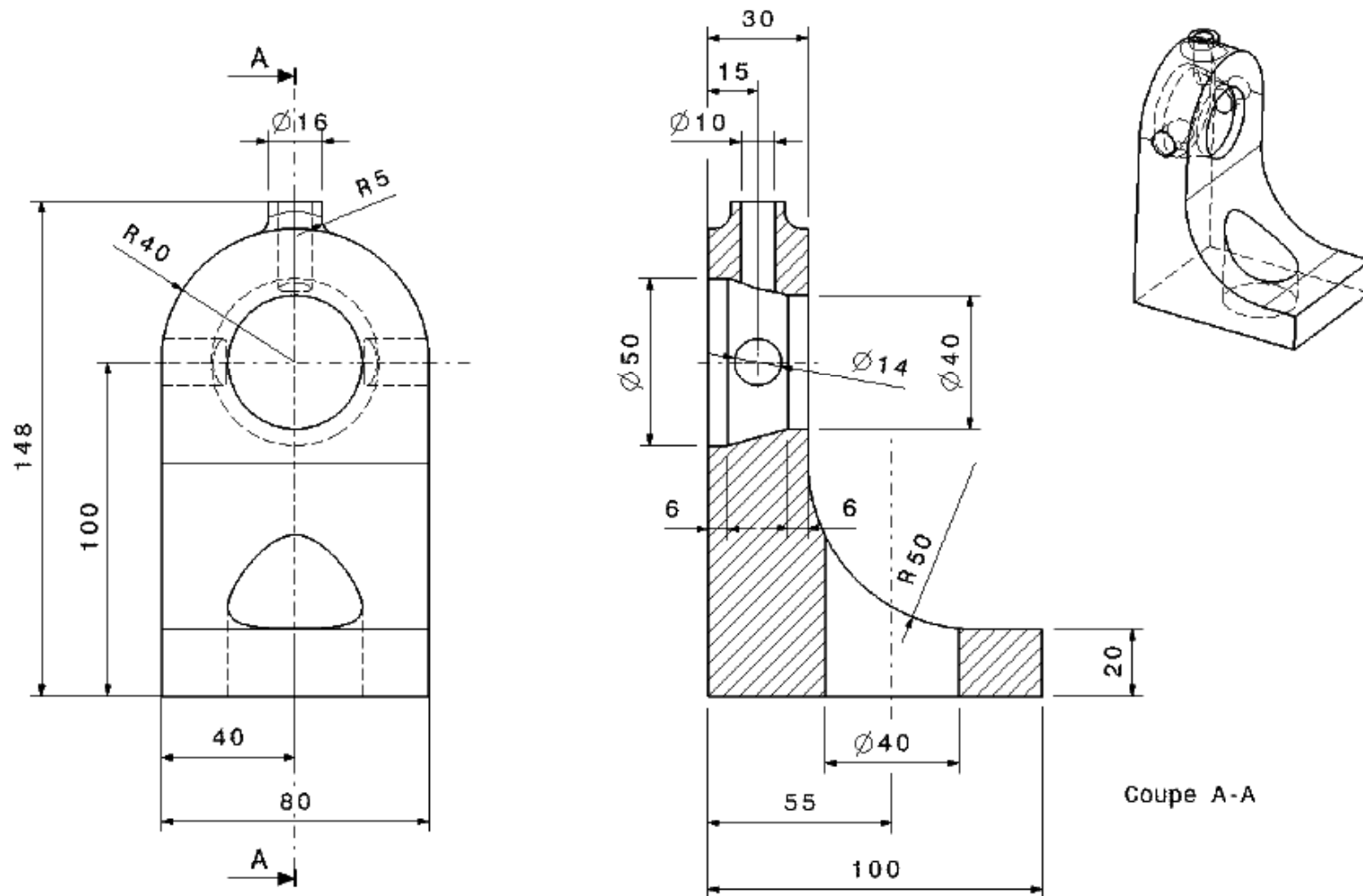


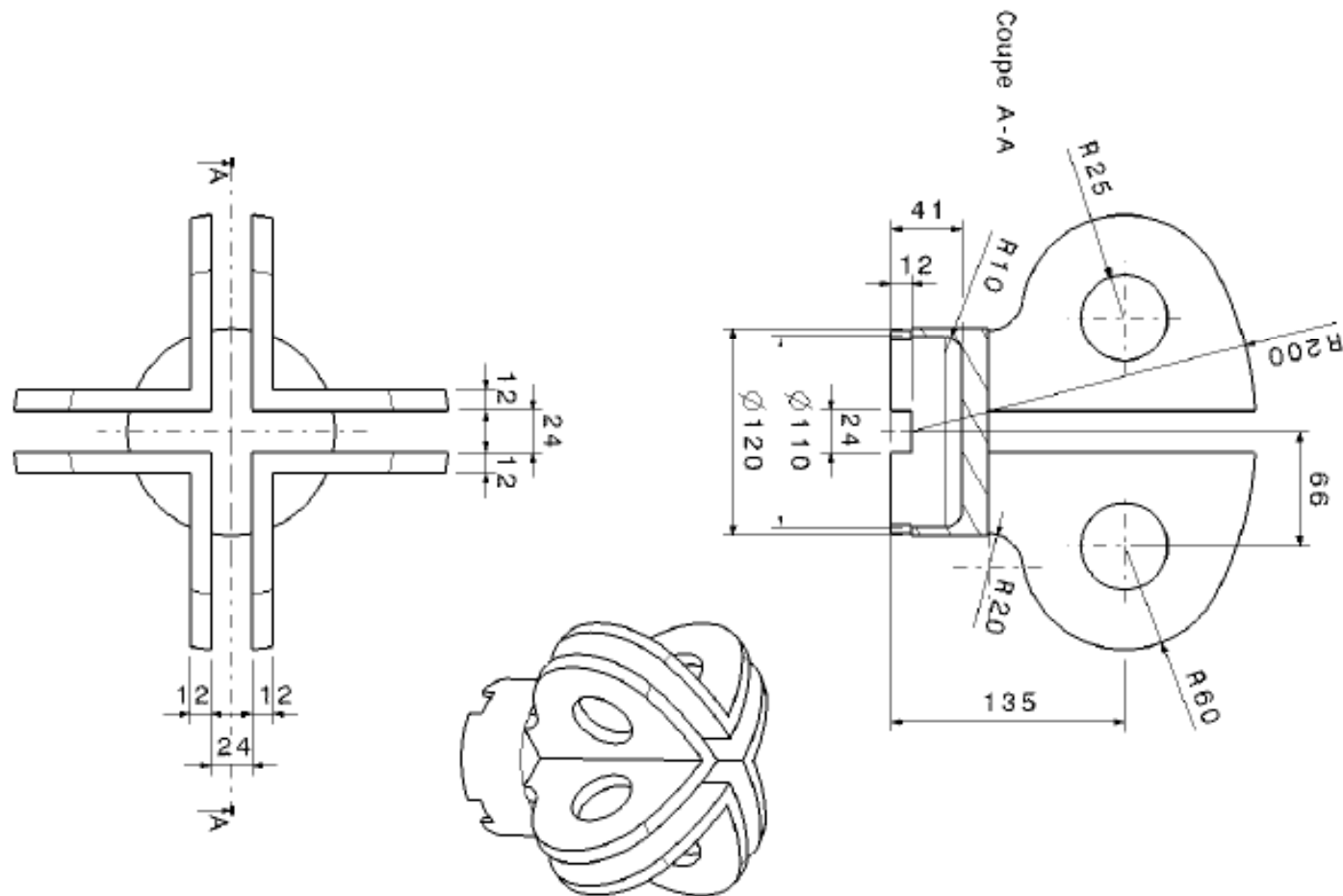


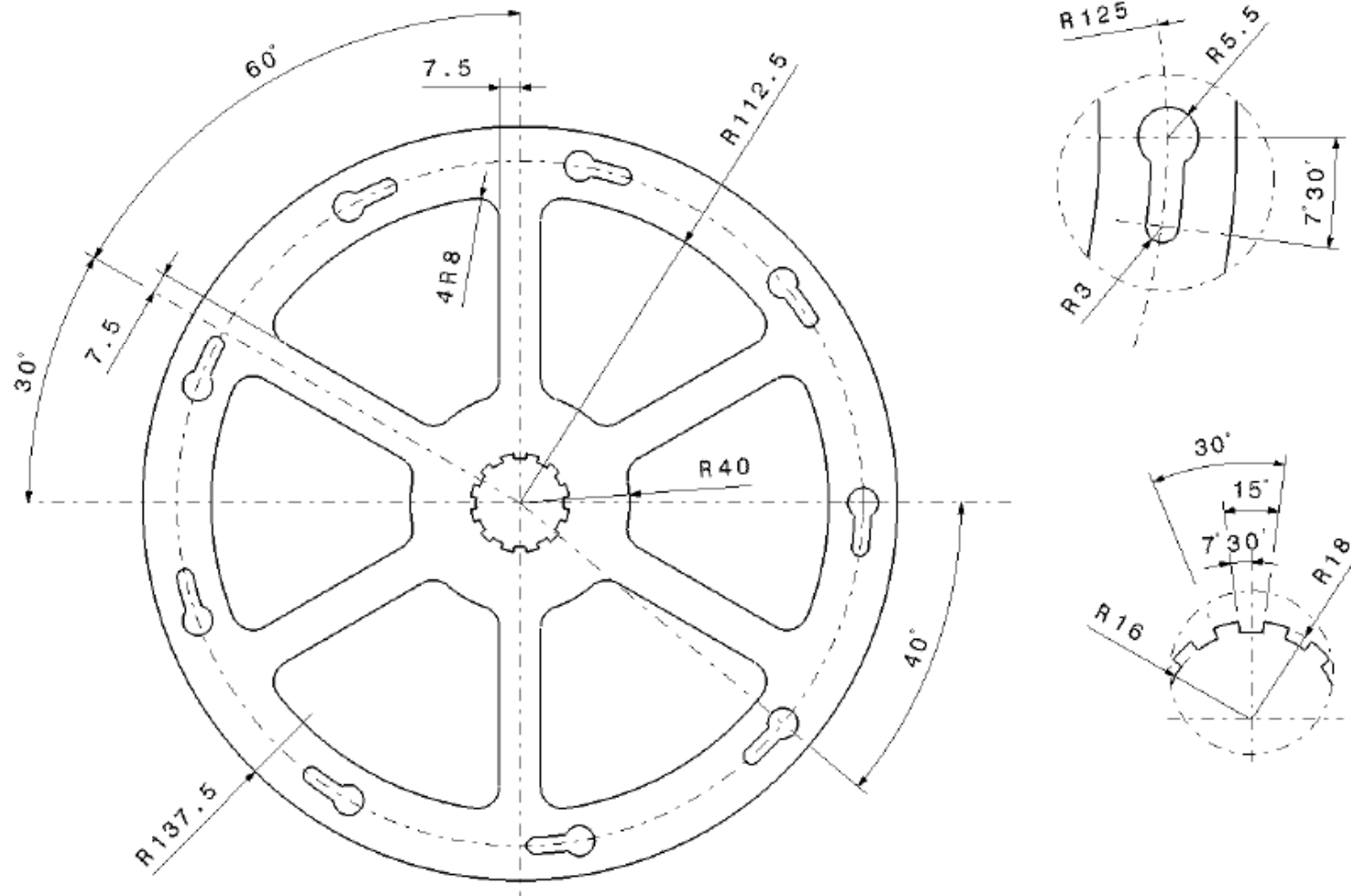


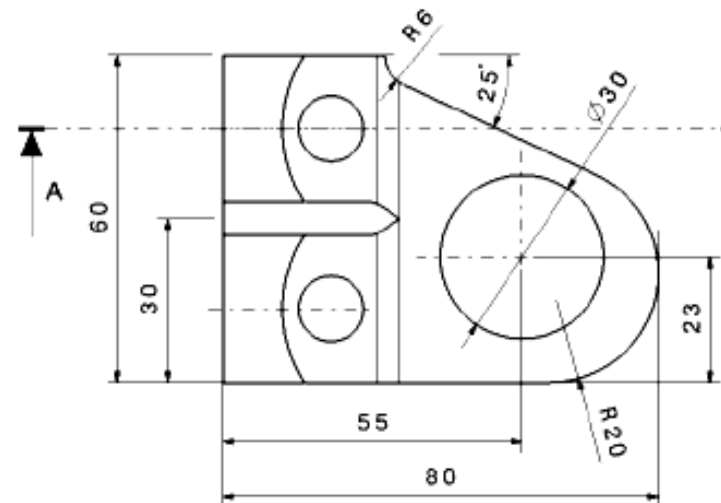
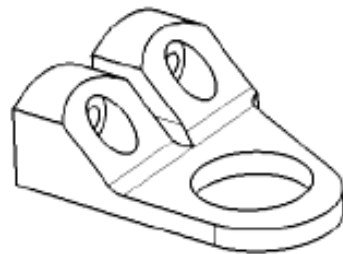
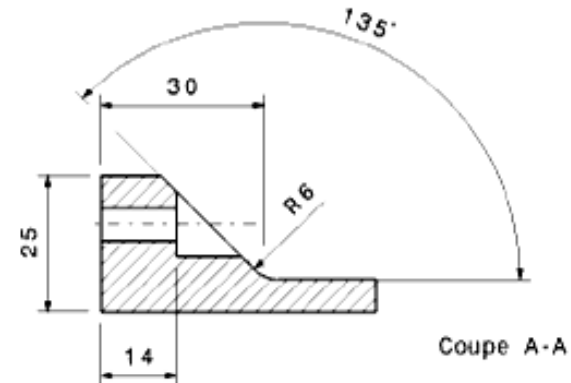
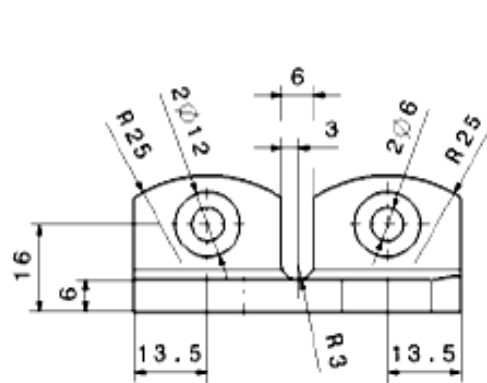


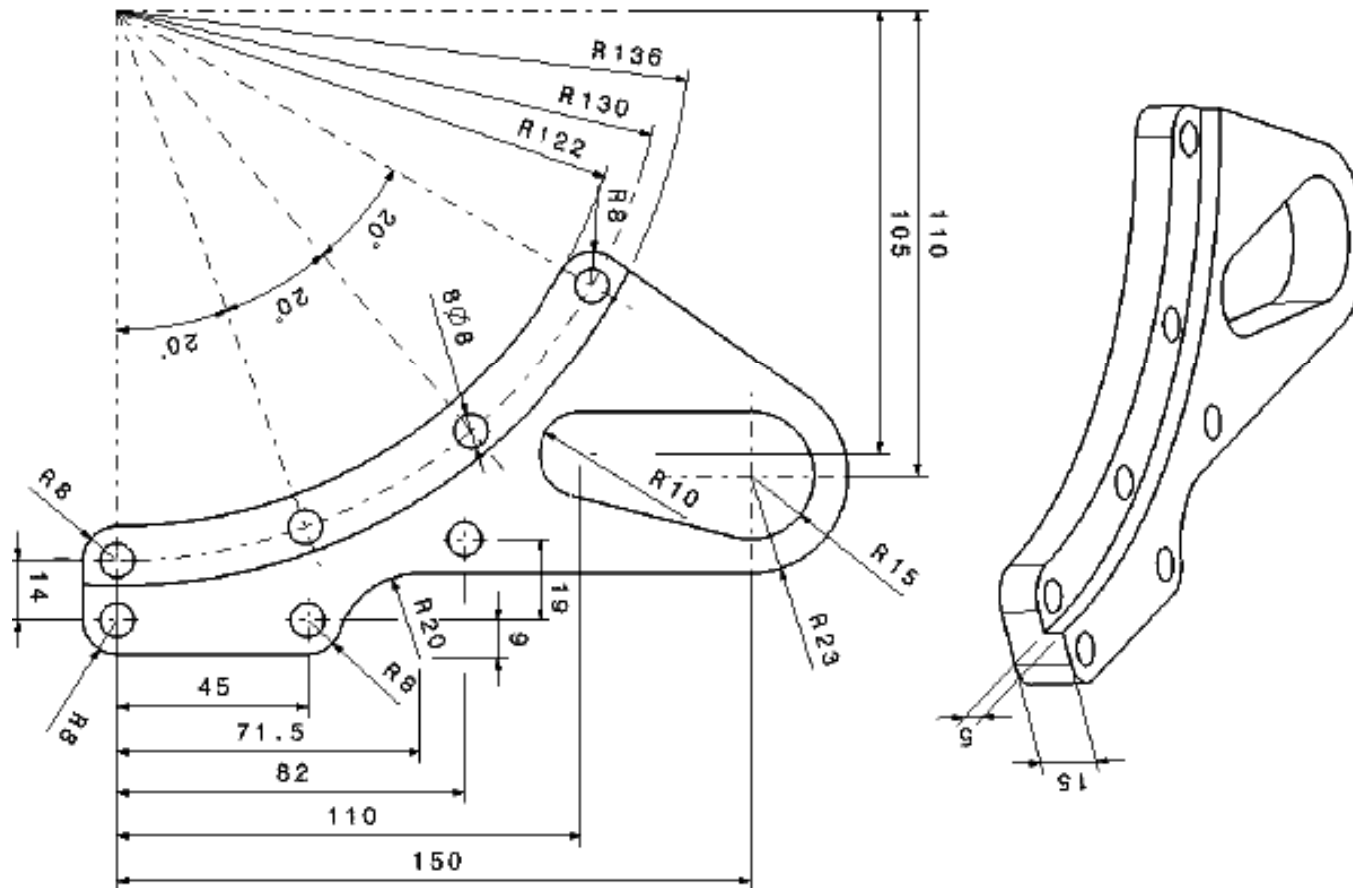


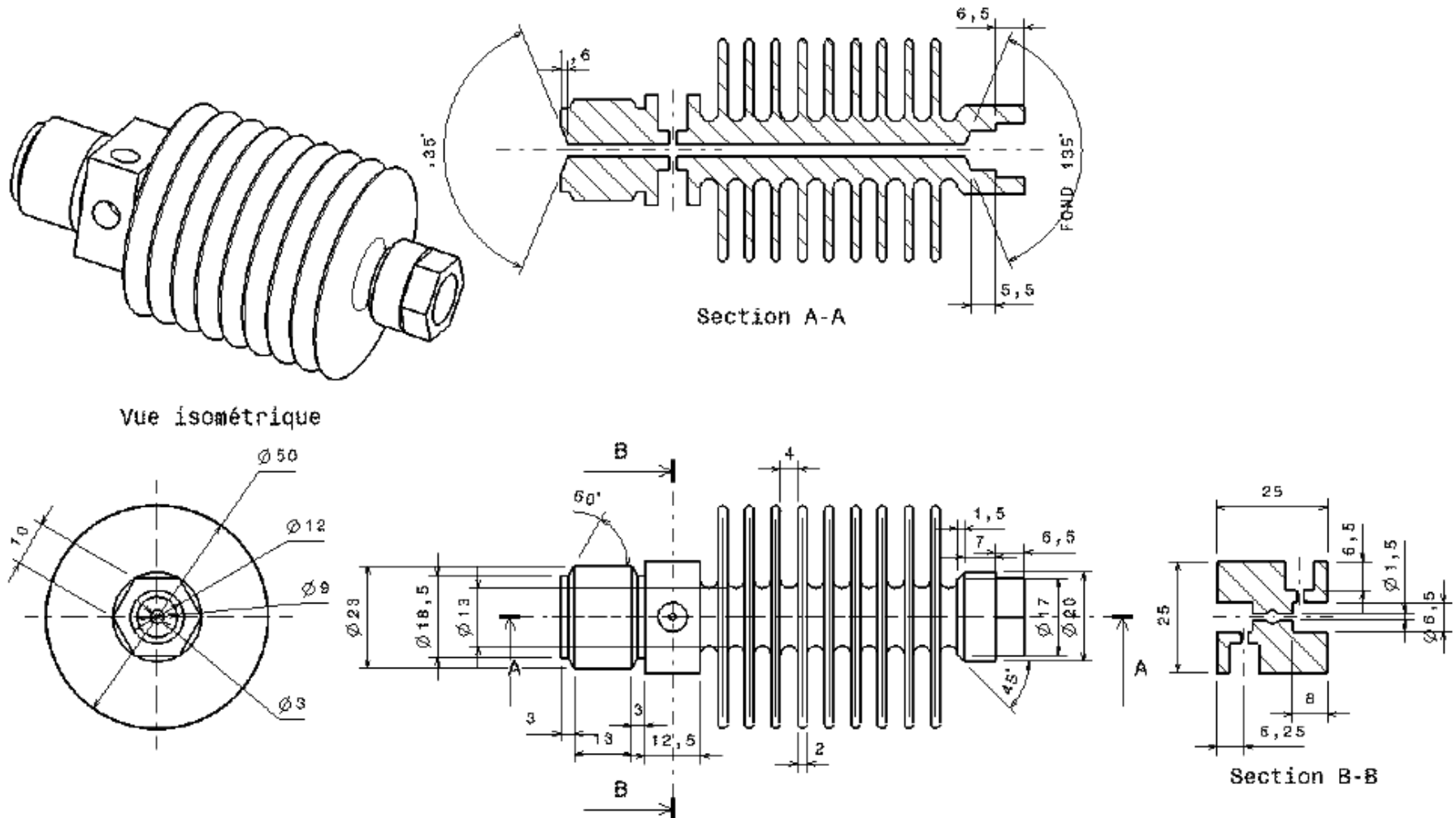


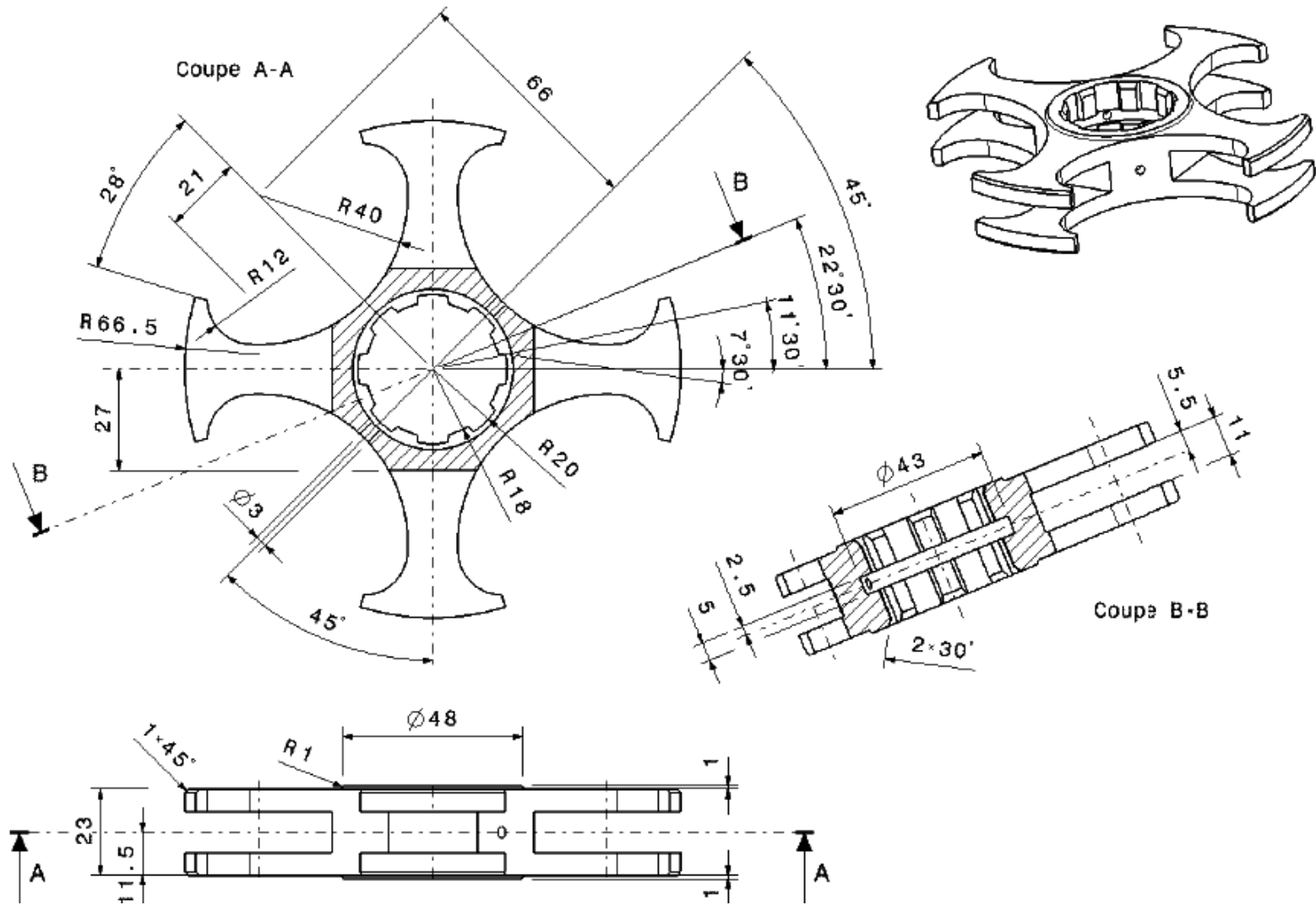


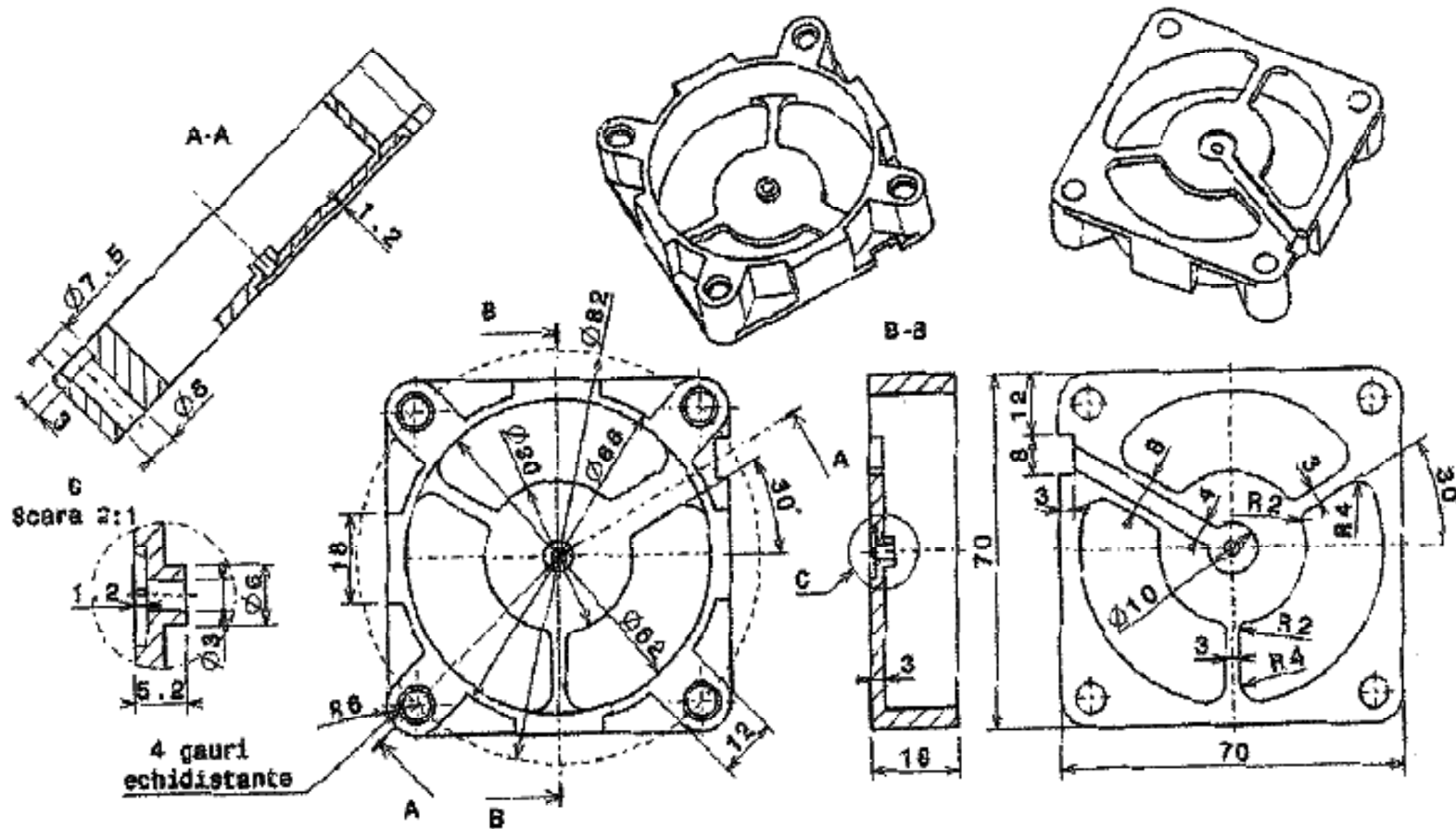


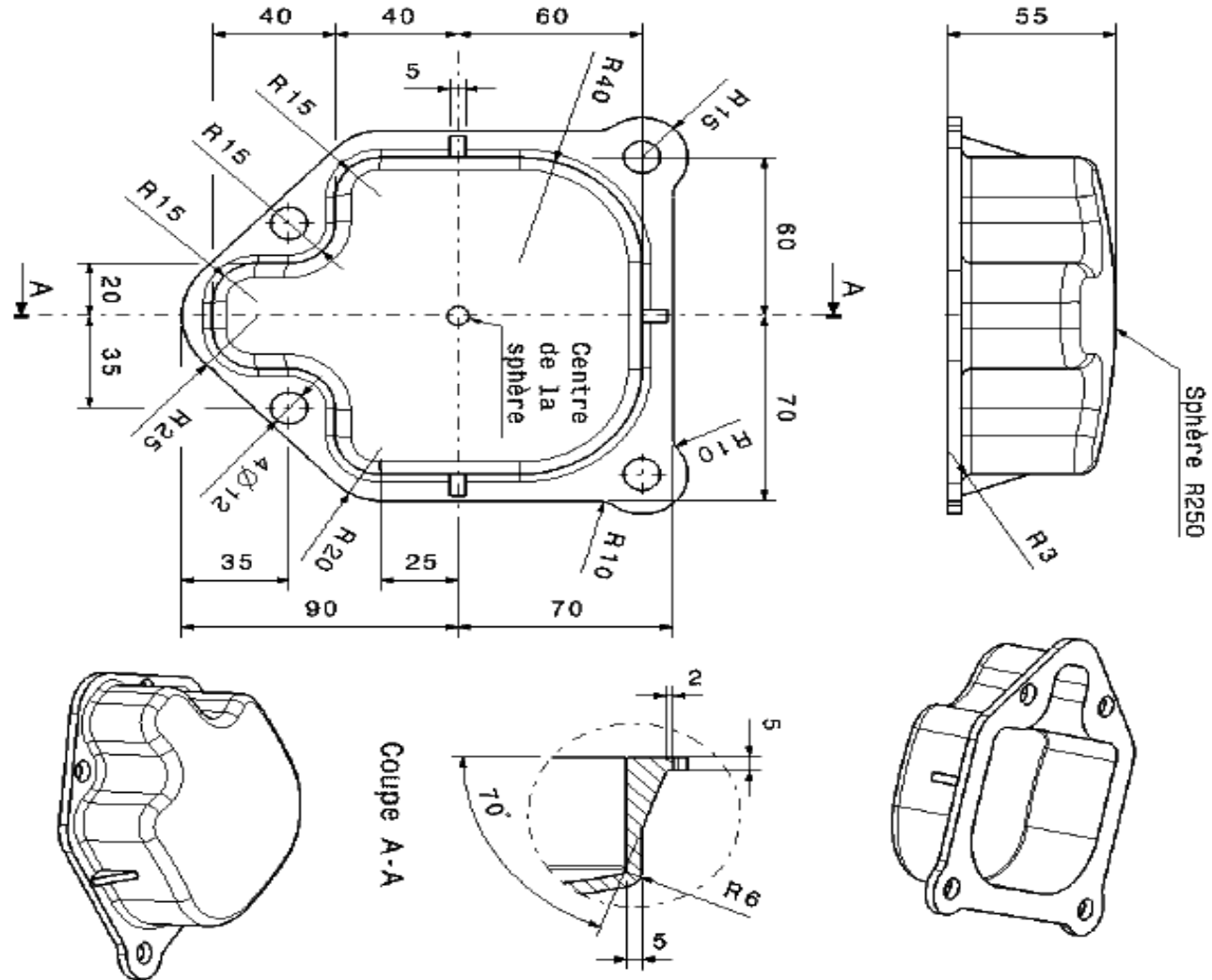


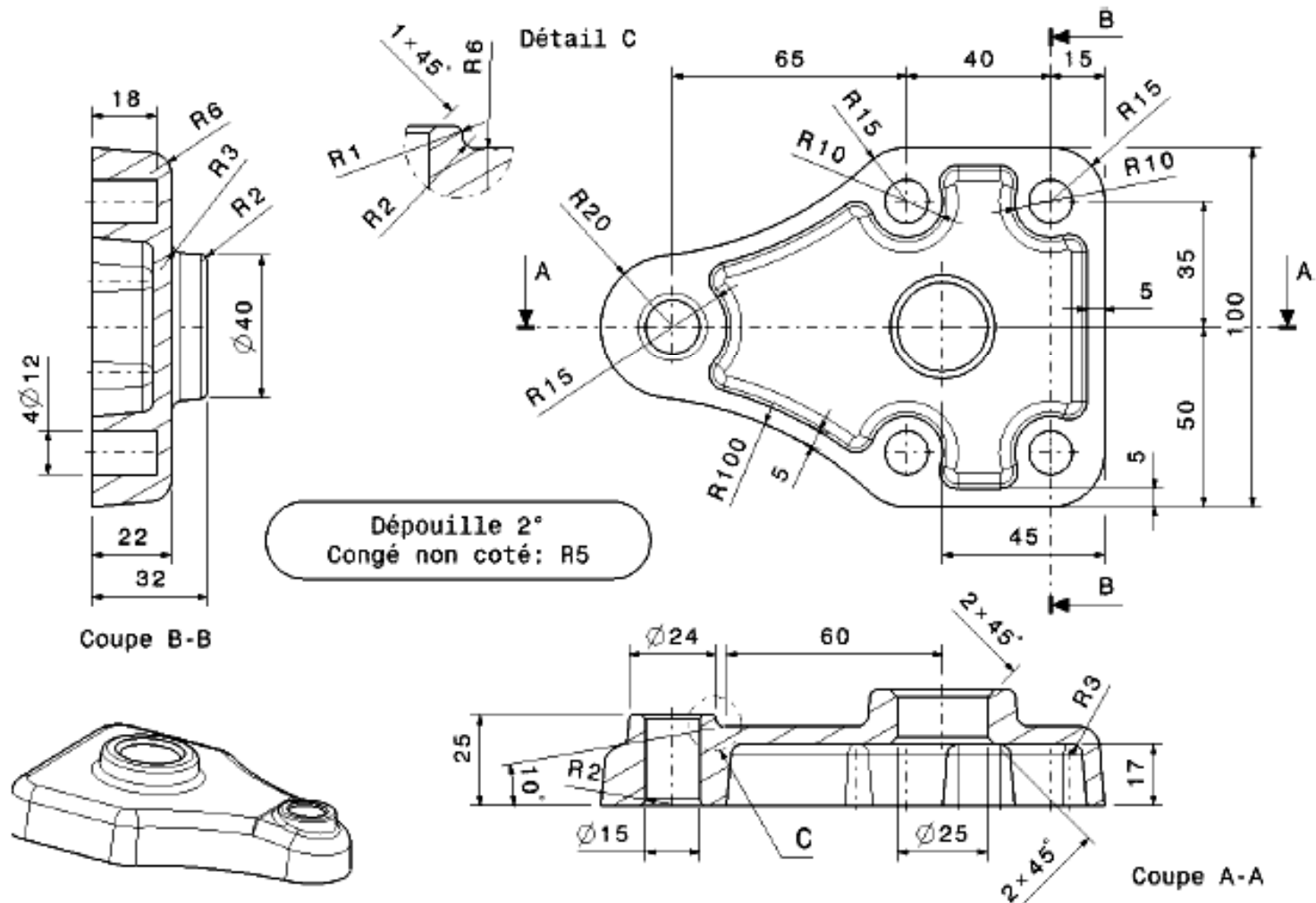


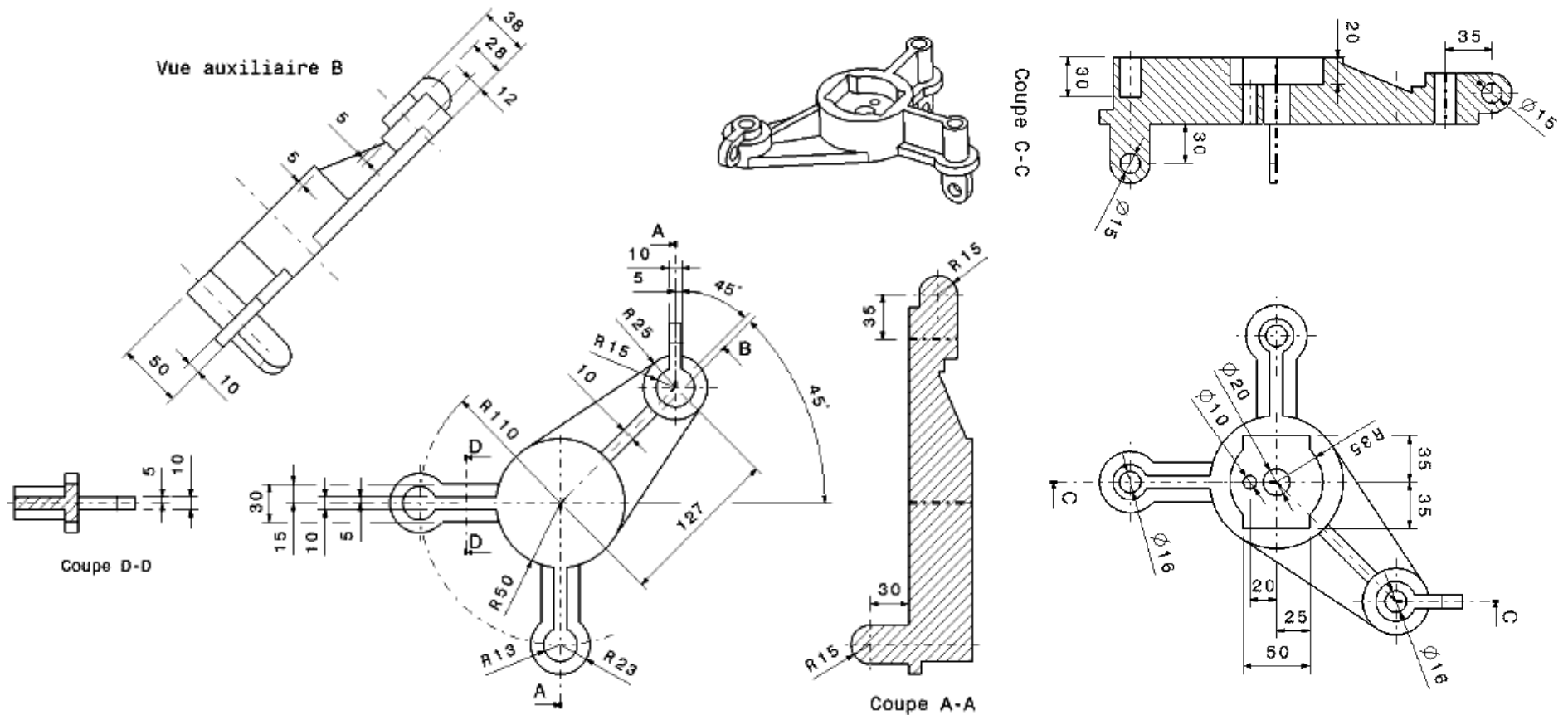


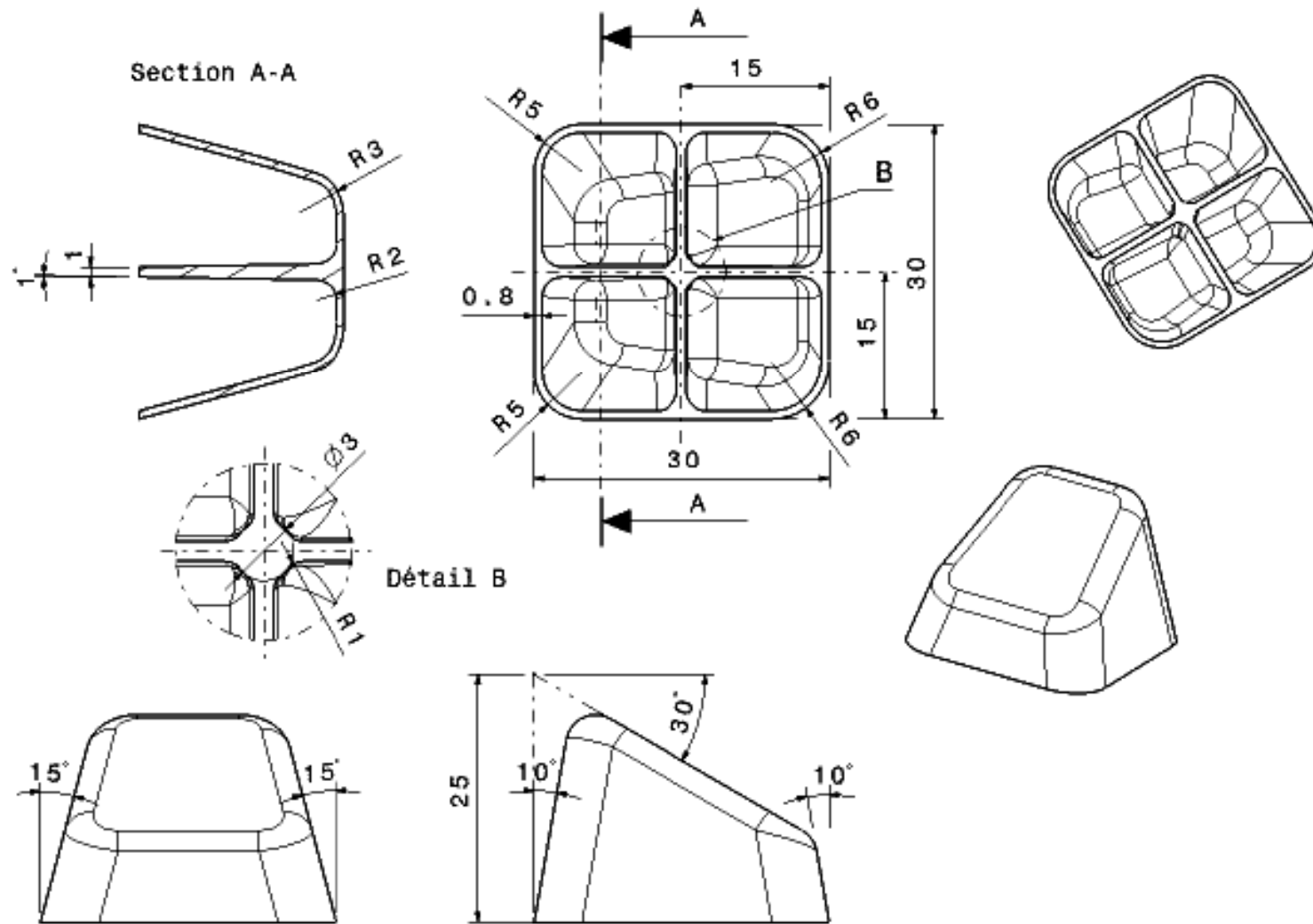


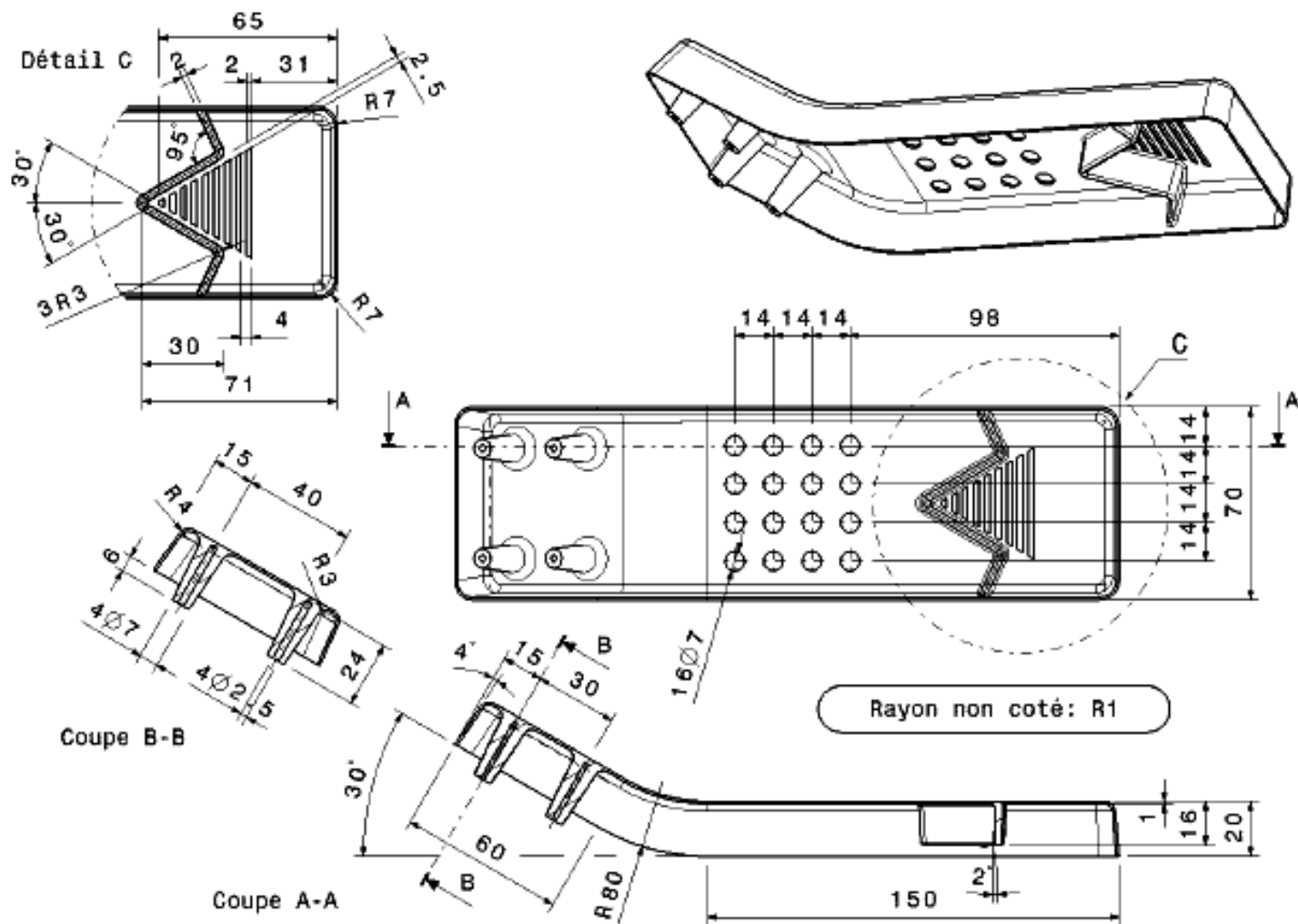


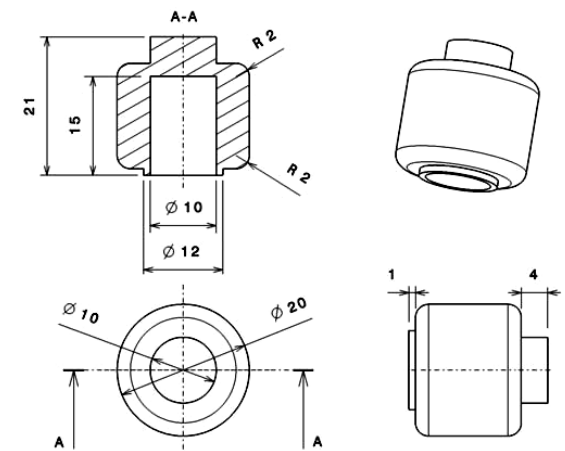
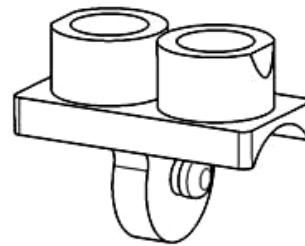
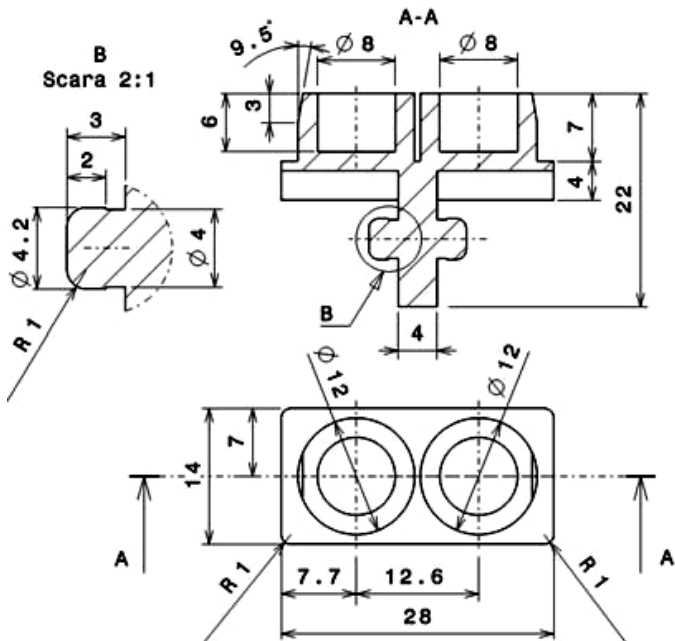
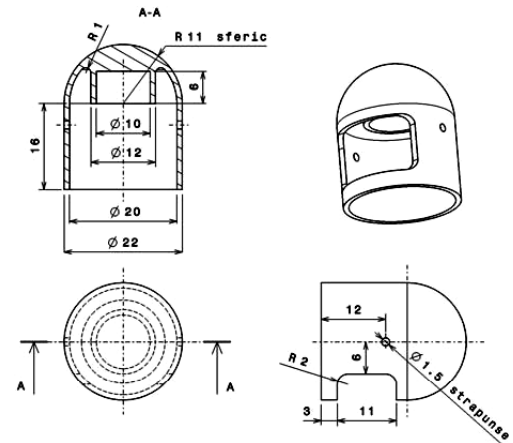
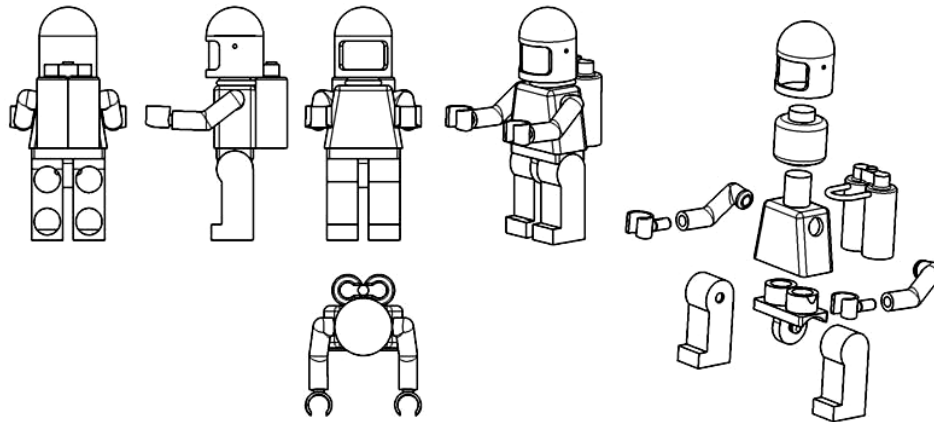


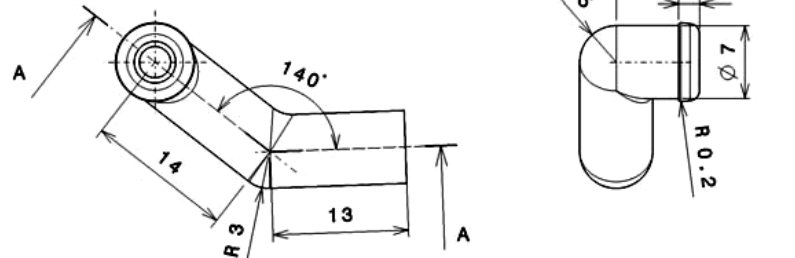
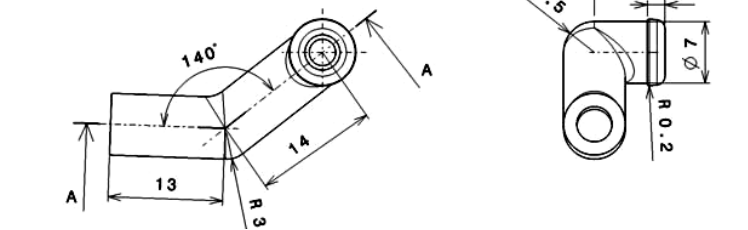
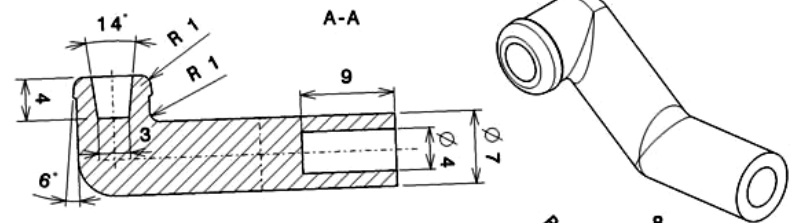
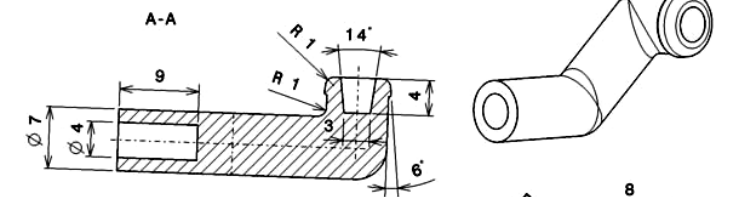
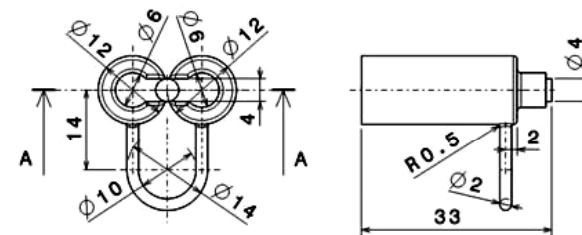
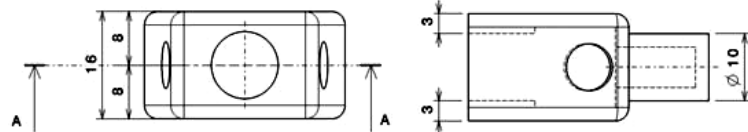
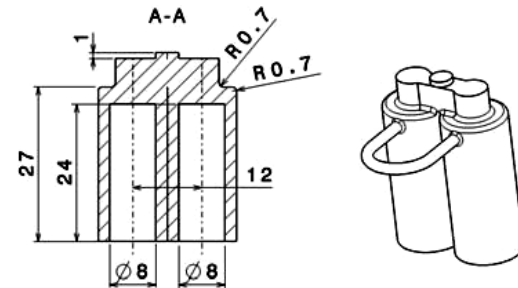
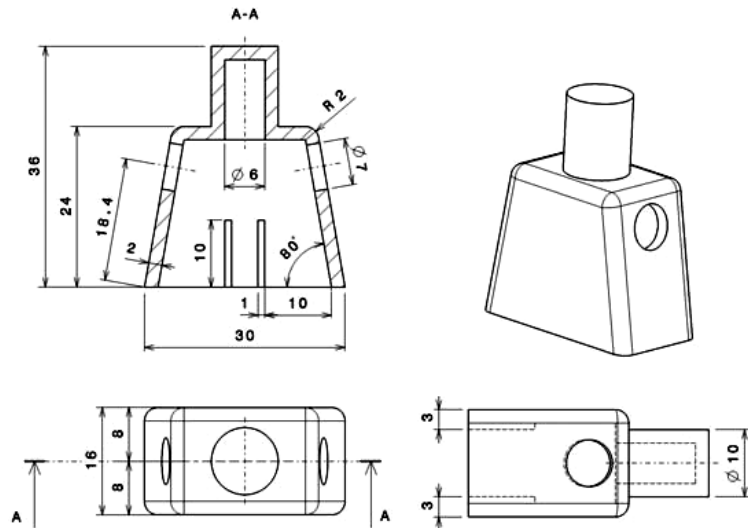


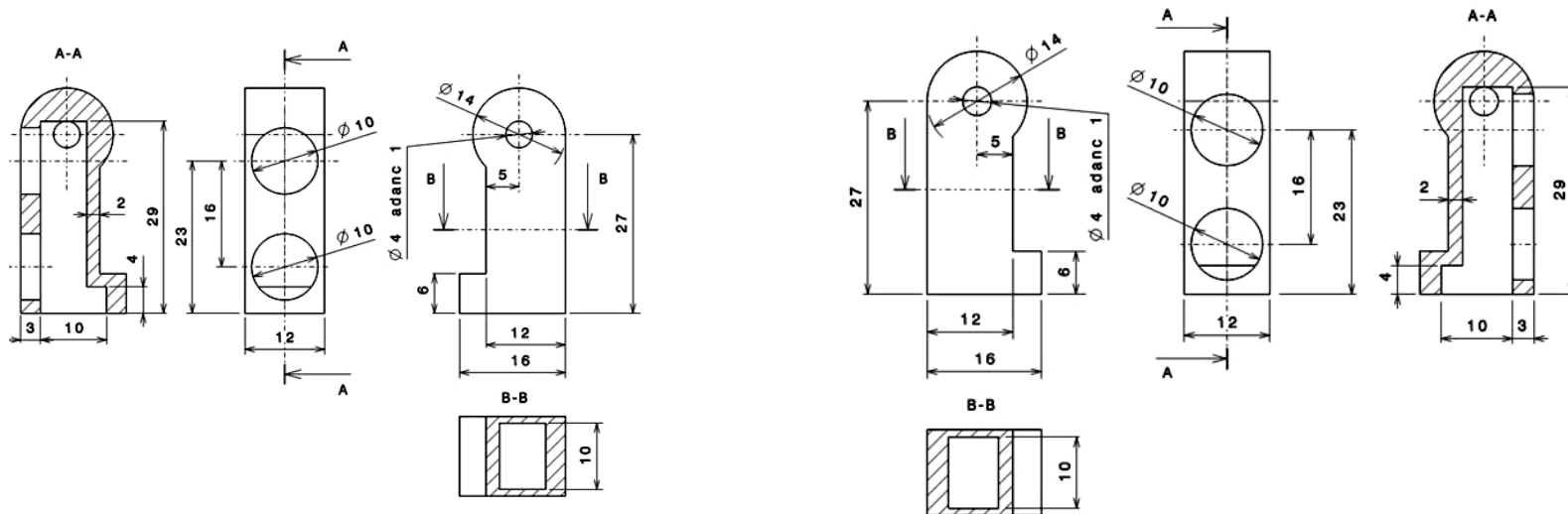
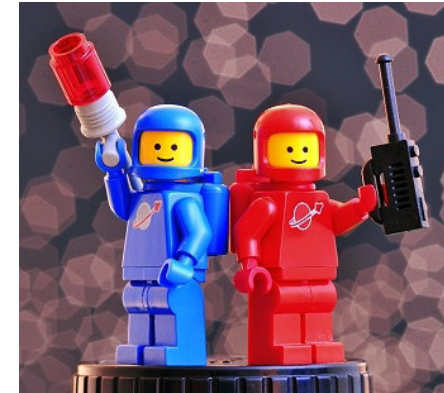
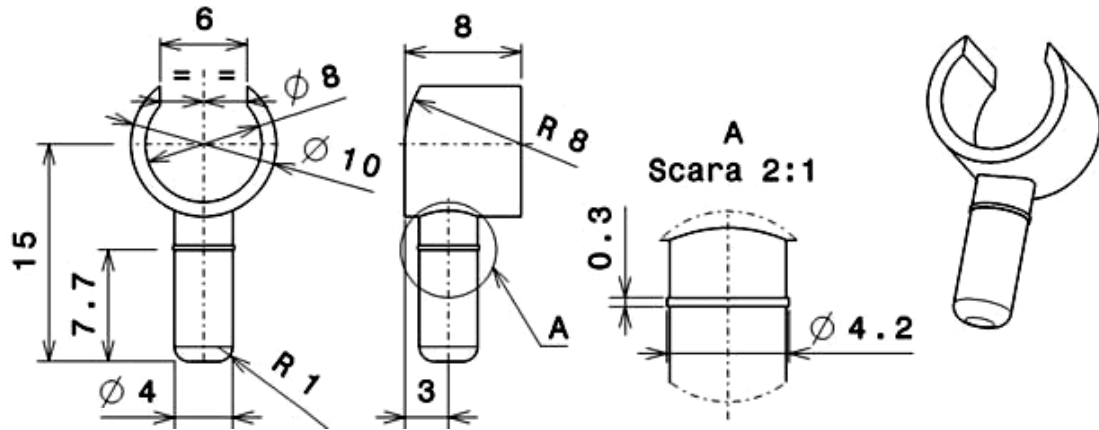


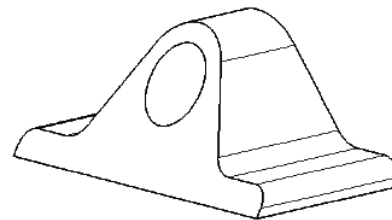
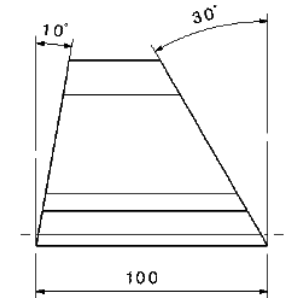
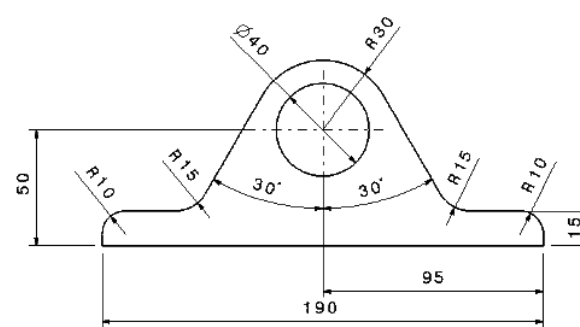
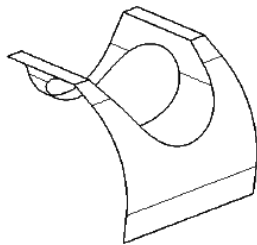
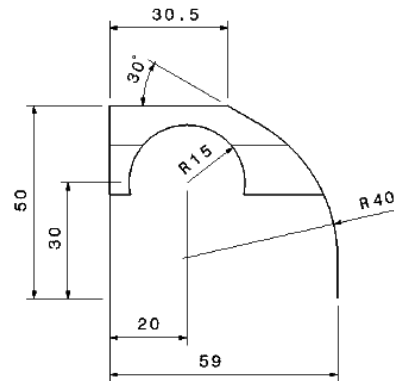
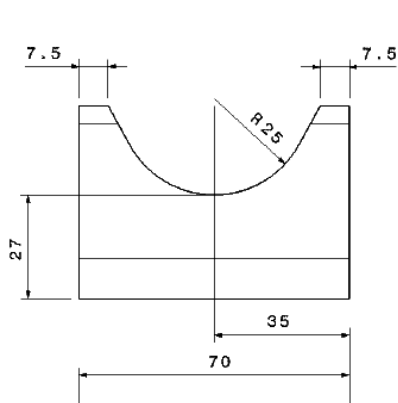


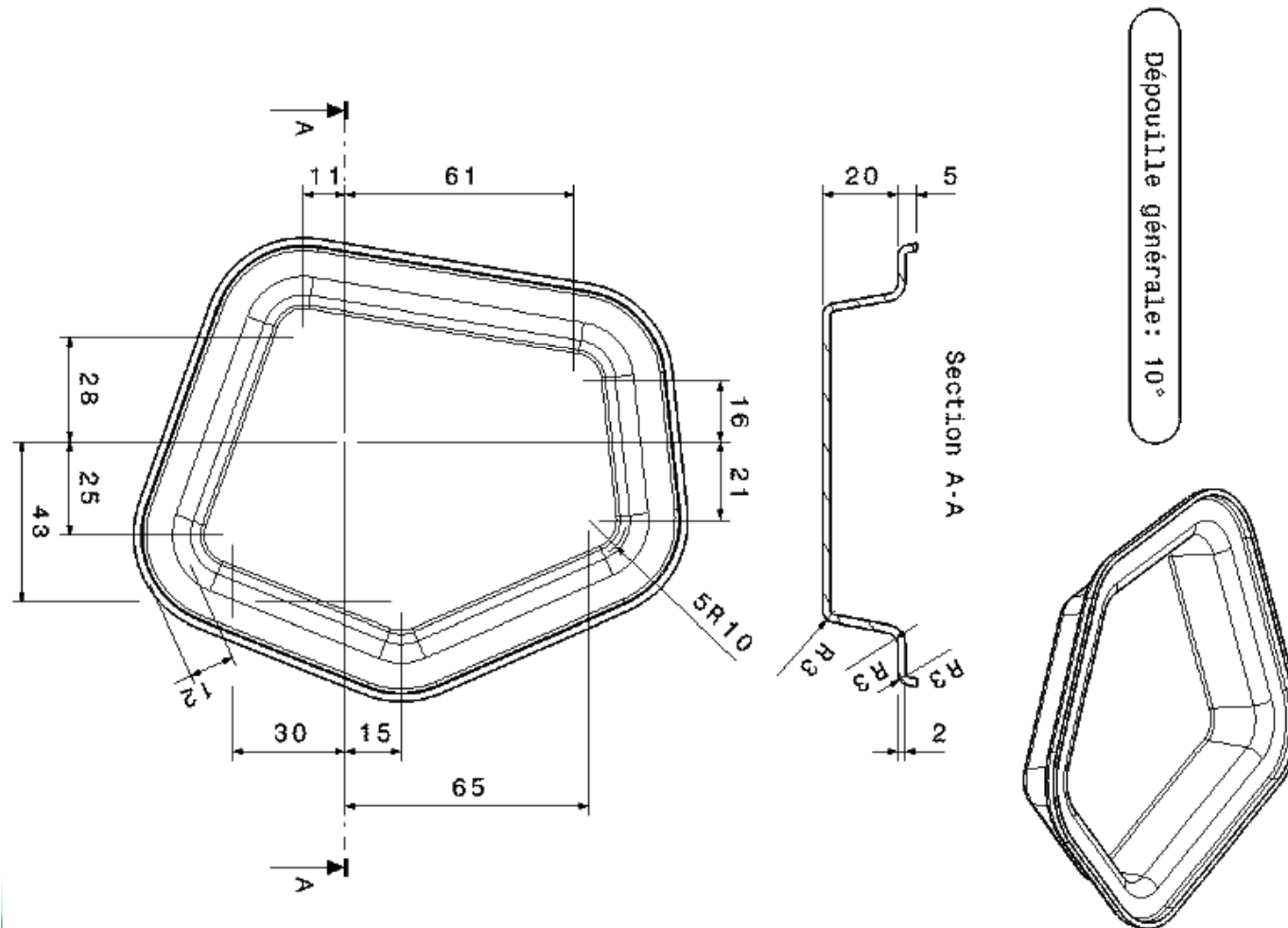




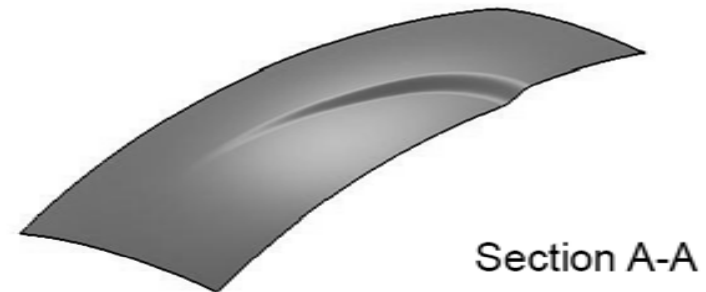
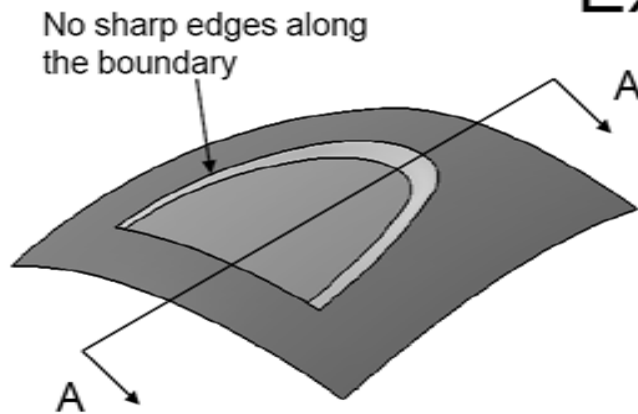








Exercise 1



(1) Start/Shape/Generative Shape Design

(2) To make a Sweep surface:-

- Click **"Sketch"** icon and select **yz plane**
- Draw an **arc** (R500) with one end (0,0) as shown in Fig.1
- Click **"Exit"** to complete
- Deselect Sketch.1
- Click **"Sketch"** icon again and select **zx plane**
- Draw an **arc** (R400) with symmetric endpoints as shown in Fig.2
- Click **"Exit"** to complete

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Fig.1

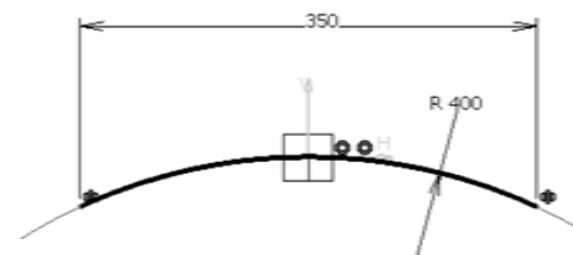


Fig.2

Exercise 1

(Con't)

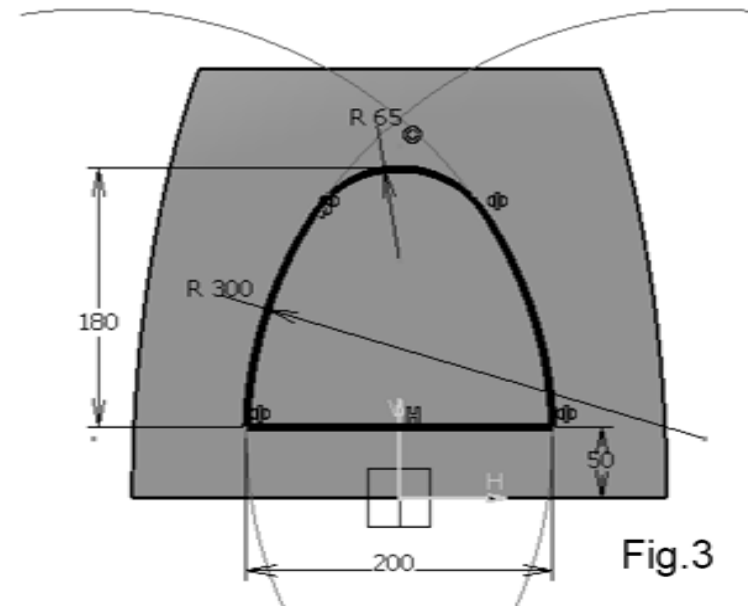
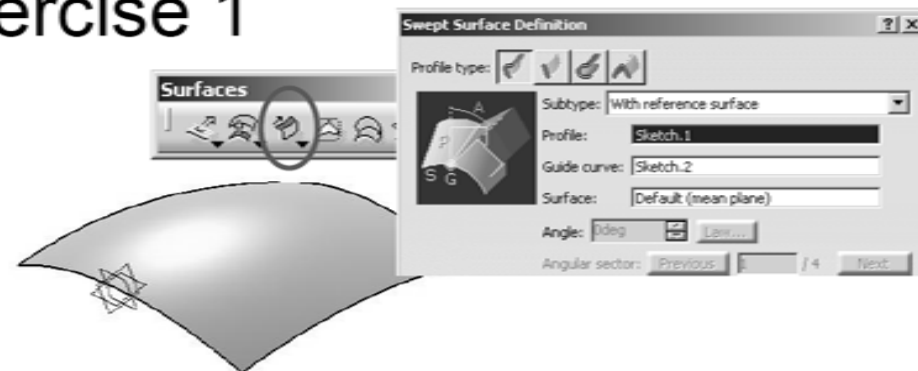
- Click **"Sweep"** icon
- Select **"Explicit"** as **Profile Type**
- Select **Sketch.1** as **Profile**
- Select **Sketch.2** as **Guide Curve**
- Click ok to complete
- **Hide Sketch.1 & Sketch.2**

(3) To make an Offset Plane:-

- Click **"Plane"** icon
- Select **xy plane** as **Reference**
- Enter **160mm** as **Offset** (*upward*)
- Click ok to complete

(4) To make a sketch on the offset plane:-

- Click **"Sketch"** icon and select **Plane.1**
- Draw the Profile as shown in Fig.3
- Click "Exit" to complete



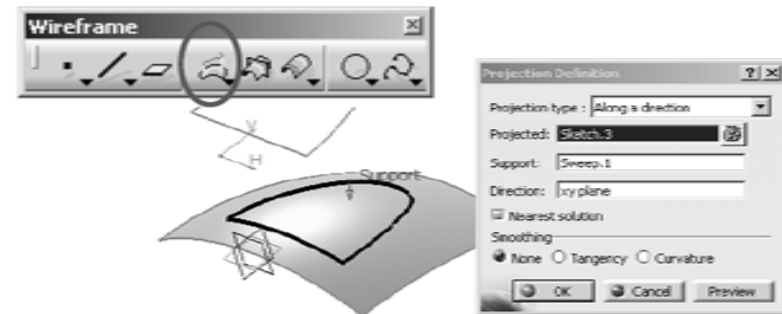
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Fig.3

Exercise 1

(5) To Project the sketch onto the surface:-

- Click "Projection" icon
- Select "Along a direction" as Projection type
- Select Sketch.3 as Projected
- Select Sweep.1 as Support
- Select xy plane as Direction
- Click ok to complete



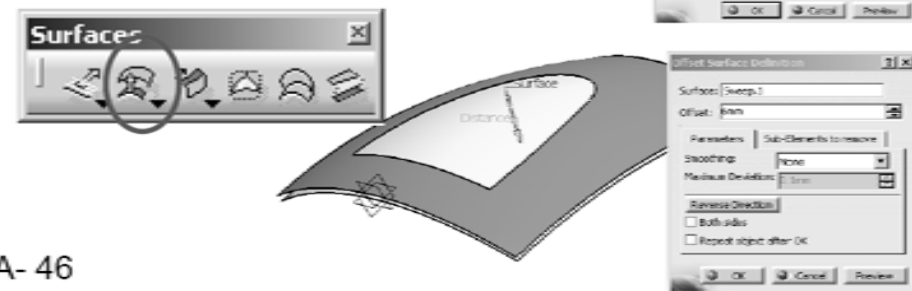
(6) To Split the surface:-

- Click "Split" icon
- Select Sweep.1 as Element to cut
- Select Project.1 as Cutting element
- (Click "Other Side" option to choose the outer portion)
- Click ok to complete
- Hide Sketch.3 & Project.1



(6b) To Offset the surface:-

- Click "Offset" icon
- Select Sweep.1 as Surface
- Enter 6mm as Offset (Downward)
- Click ok to complete

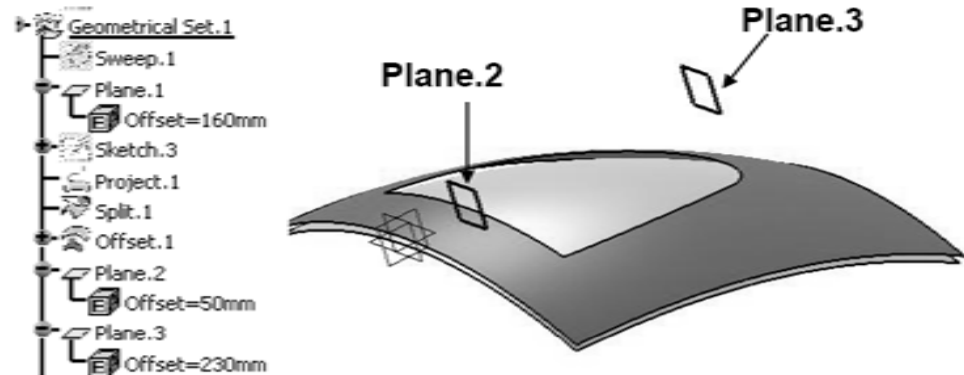


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Exercise 1

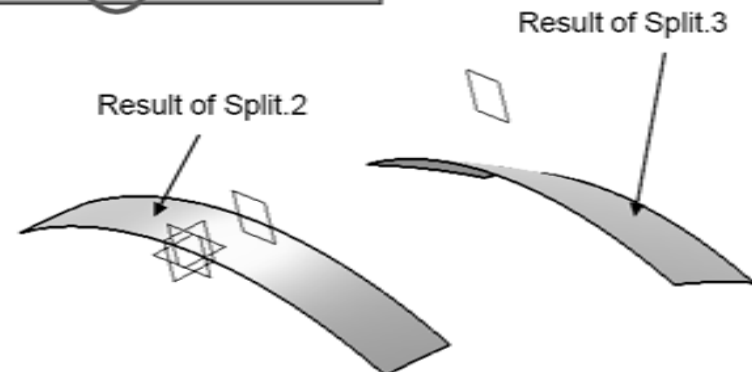
(7) To Create Two offset planes:-

- Click "**Plane**" icon
- Select **zx plane** as **Reference**
- Enter **50mm** as **Offset** (positive side)
- Click ok to complete
- Click "**Plane**" icon again
- Select **zx plane** as **Reference**
- Enter **230mm** as **Offset** (positive side)
- Click ok to complete



(8) To Split Surfaces:-



- **Hide Surface Split.1; Show Surface Sweep.1**
- Click "**Split**" icon
- Select **Sweep.1** as **Element to cut**
- Select **Plane.2** as **Cutting element**
- Click "**Other Side**" option to choose the smaller portion
- Click ok to complete
- Click "**Split**" icon again
- Select **Offset.1** as **Element to cut**
- Select **Plane.3** as **Cutting element**
- Click "**Other Side**" option to choose the smaller portion
- Click ok to complete

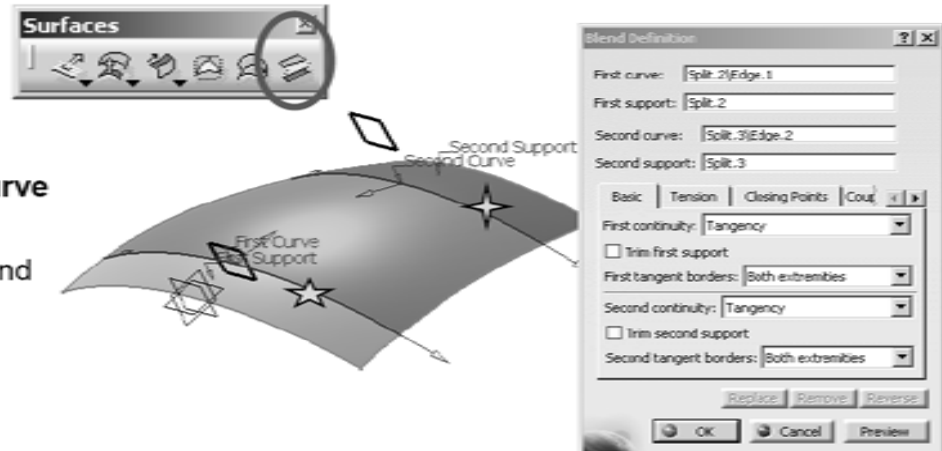


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Exercise 1

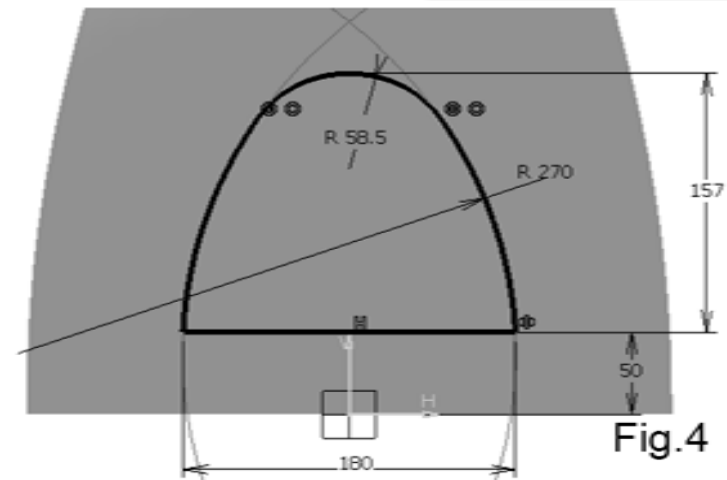
(9) To Create a Blend:-

- Click **"Blend"** icon
- Select the edge of Split.2  as **First Curve**
- Select **Split.2** as **First Support**
- Select the edge of Split.3  as **Second Curve**
- Select **Split.3** as **Second Support**
- Select **Tangency** for First continuity and Second continuity
- Click ok to complete



(10) To make a sketch on the offset plane:-

- Click **"Sketch"** icon and select **Plane.1**
- Draw the Profile as shown in Fig.4
- Click **"Exit"** to complete

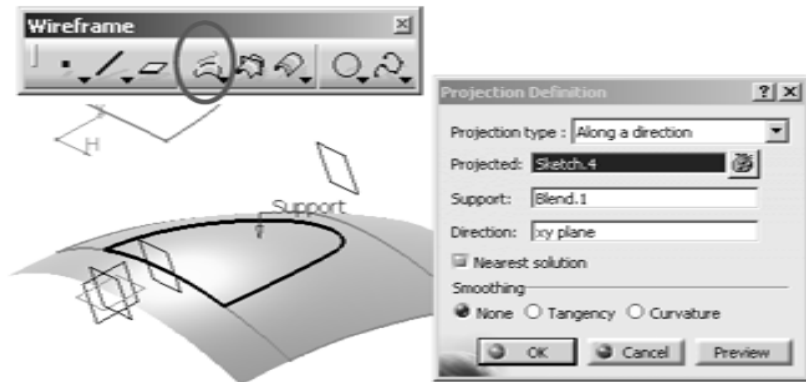


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Exercise 1

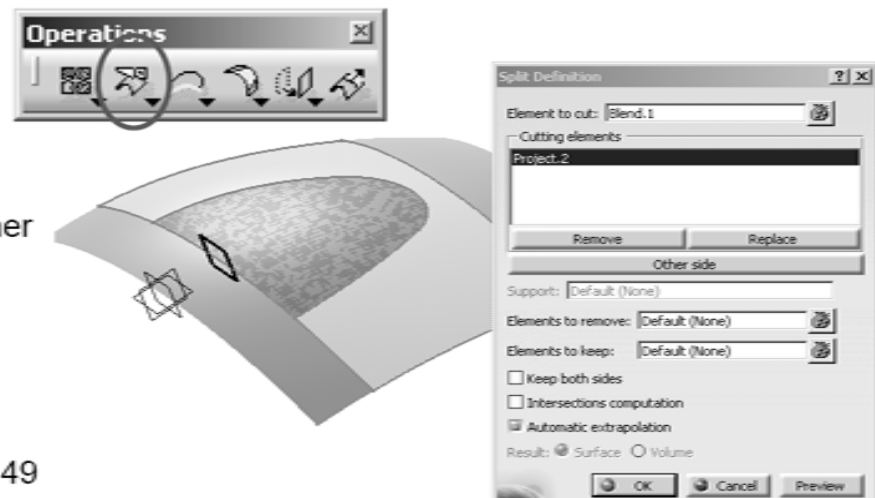
(11) To Project the sketch onto the Blend:-

- Click "Projection" icon
- Select "Along a direction" as Projection type
- Select Sketch.4 as Projected
- Select Blend.1 as Support
- Select xy plane as Direction
- Click ok to complete



(12) To Split the Blend:-

- Click "Split" icon
- Select Blend.1 as Element to cut
- Select Project.2 as Cutting element
- (Click "Other Side" option to choose the inner portion)
- Click ok to complete
- Hide Sketch.4 & Project.2

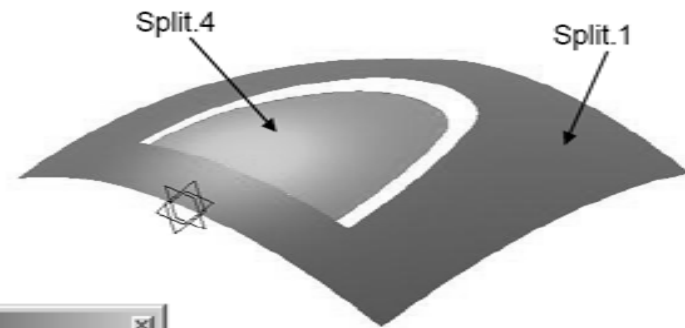


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Exercise 1

(13) To Hide all constructive elements:-

- Hide all elements except **Split.1** & **Split.4**



(14) To make 4 boundaries:-

(1st Boundary)

- Click "**Boundary**" icon
- Select "**Tangency continuity**" as Propagation type
- Select the edge as shown in Fig.5
- Click ok to complete



1st Boundary

2nd Boundary

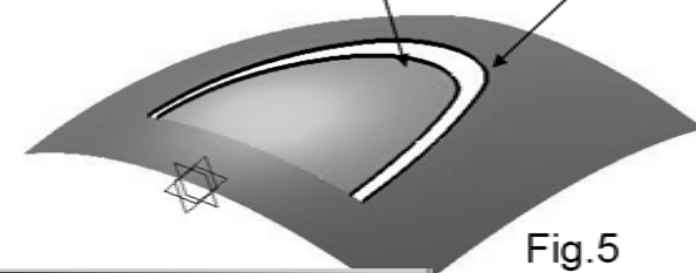
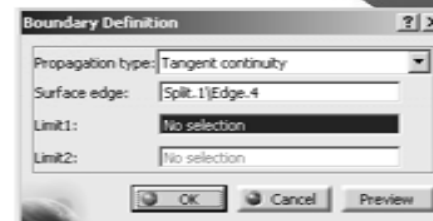


Fig.5

(2nd Boundary)


- Click "**Boundary**" icon again
- Select "**Tangency continuity**" as Propagation type
- Select the edge as shown in Fig.5
- Click ok to complete




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Exercise 1

(3rd Boundary)

- Click **"Boundary"** icon again
- Select the edge as shown in Fig.6
- Select the point  as **Limit 1**
- Click ok to complete

(4th Boundary)

- Click **"Boundary"** icon again
- Select the edge as shown in Fig.6
- Select the point  as **Limit 1**
- Click ok to complete

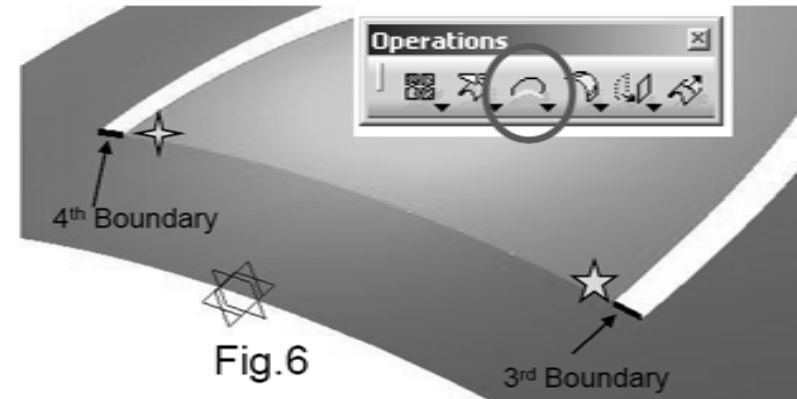
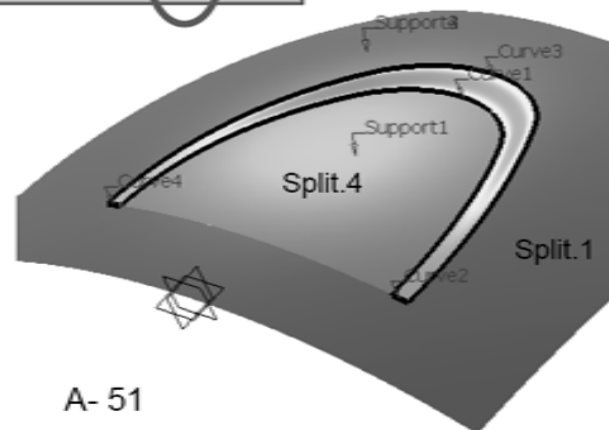


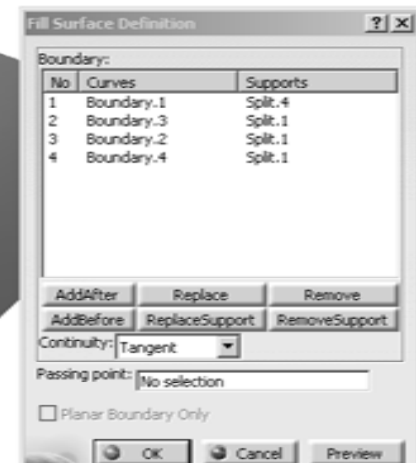
Fig.6

(15) To Create a Fill:-

- Click **"Fill"** icon
- Select **Boundary.1** then **Split.4** then **Tangent**
- Select **Boundary.2** then **Split.1** then **Tangent**
- Select **Boundary.3** then **Split.1** then **Tangent**
- Select **Boundary.4** then **Split.1** then **Tangent**
- Click ok to complete



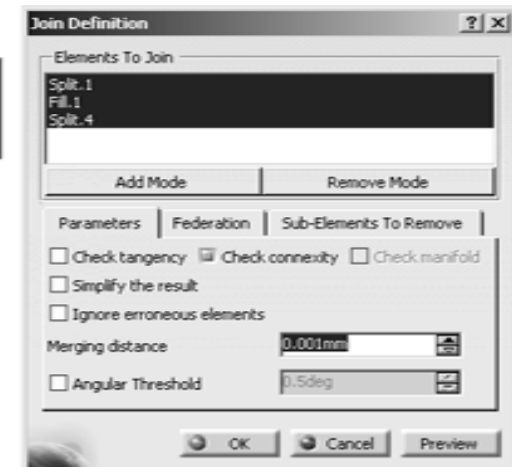
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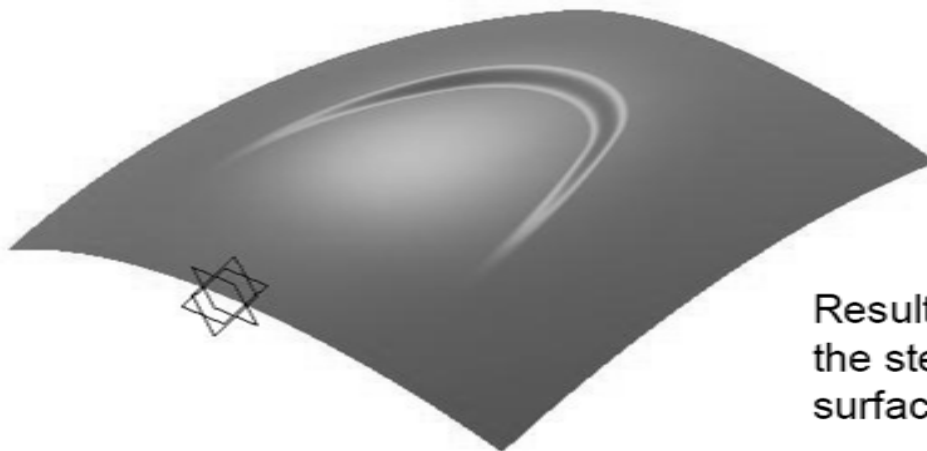
Exercise 1

(16) To Join surfaces:-

- Click "Join" icon
- Select **Split.1**, **Fill.1** & **Split.4**
- Click ok to complete



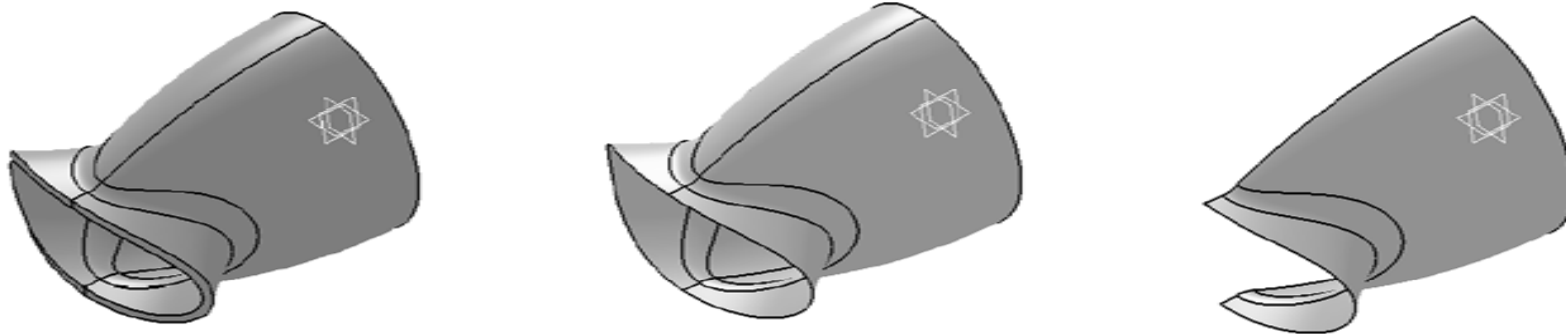
(17) Hide all Boundaries



Result: No sharp edge between the step-down and the original surface

END of Exercise.1

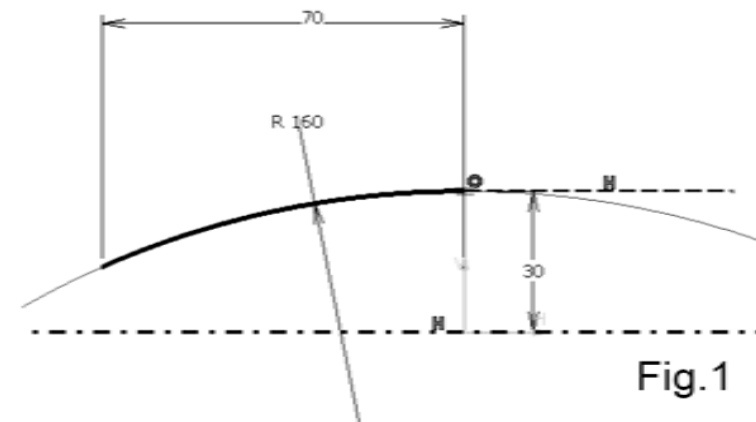
Exercise 2



(1) Start/Shape/Generative Shape Design

(2) To make a Revolve surface:-

- Click "**Sketch**" icon and select **zx plane**
- Draw an **arc** (R160) with one end (0,30) as shown in Fig.1, which should be tangent to a horizontal axis
- Draw another horizontal axis on x-axis (which will be selected to be the axis of rotation later)
- Click "Exit" to complete

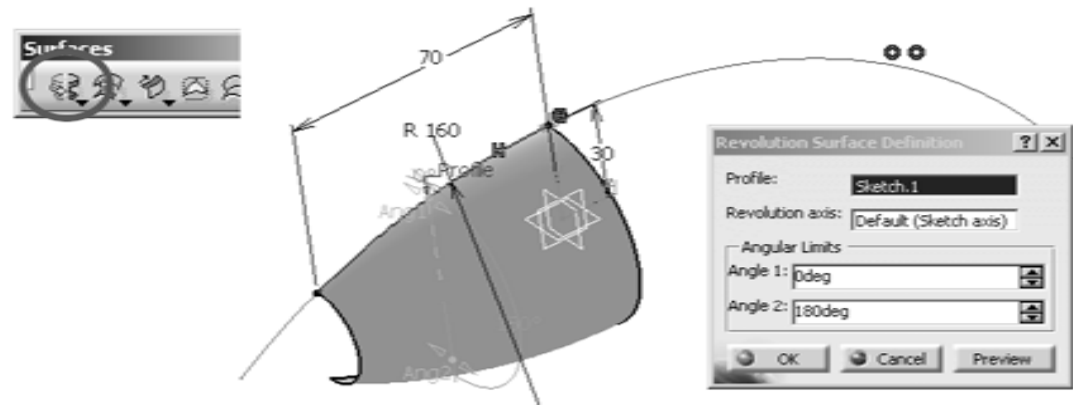


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Exercise 2

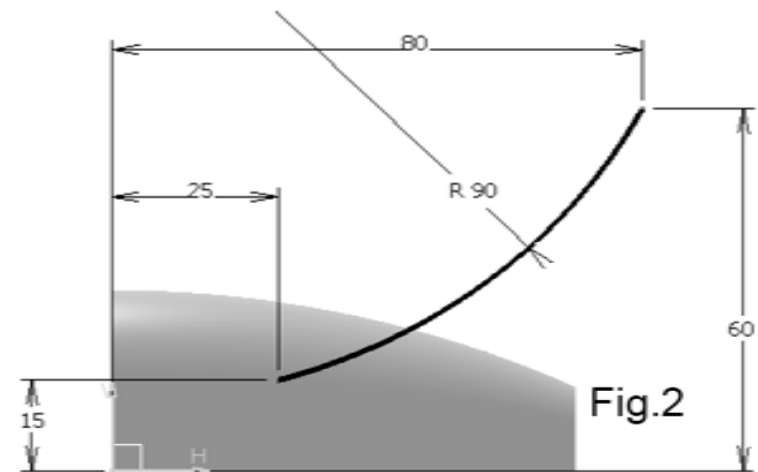
(con't)

- Click "**Revolve**" icon
- Select **Sketch.1** as **Profile**
- (Sketch axis will be selected as **Revolution axis**)
- Enter 0deg as **Angle.1**
- Enter 180deg as **Angle.2**
- Click ok to complete
- **Hide Sketch.1**



(3) To make the 2nd Sketch:-

- Click "**Sketch**" icon and select **xy Plane**
- Draw an Arc (R90) as shown in Fig.2
- Click "**Exit**" icon to complete



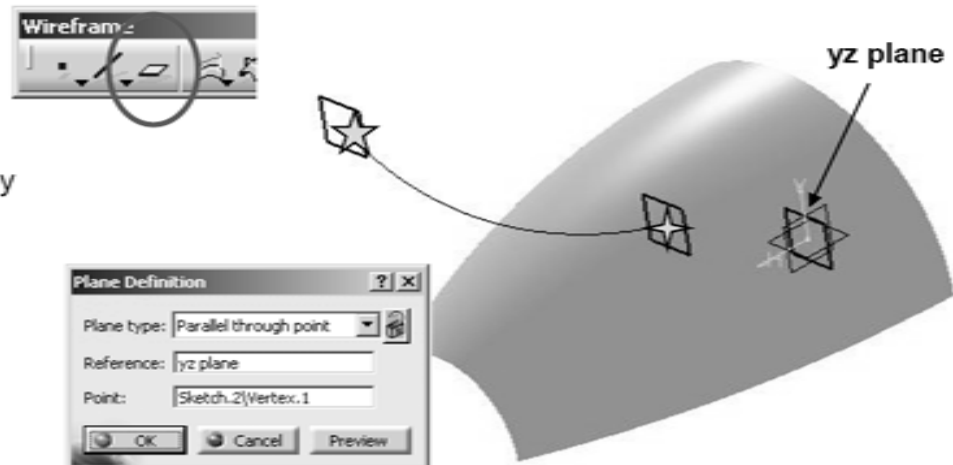
A- 54

Exercise 2

(4) To make reference planes:-

- Click **"Plane"** icon
- select **yz Plane**
- **then select the end point** ☆ of the arc
(**"Parallel through point"** will be automatically selected as **"Plane Type"**)
- Click ok to complete

- Click **"Plane"** icon again
- select **yz Plane**
- **then select the end point** ✨ of the arc
- Click ok to complete



(5) To make the 3rd Sketch:-

- Click **"Sketch"** icon and select **Plane.1**
- Draw an ellipse with one end touching **Sketch.2** as shown in **Fig.3**
- (While adding the constraint (D30), right-click and select **"semiminor axis"**)
- Click Exit to complete

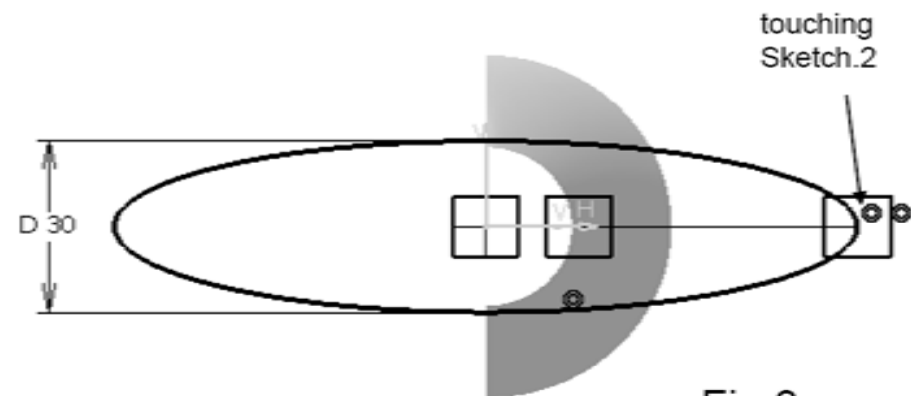


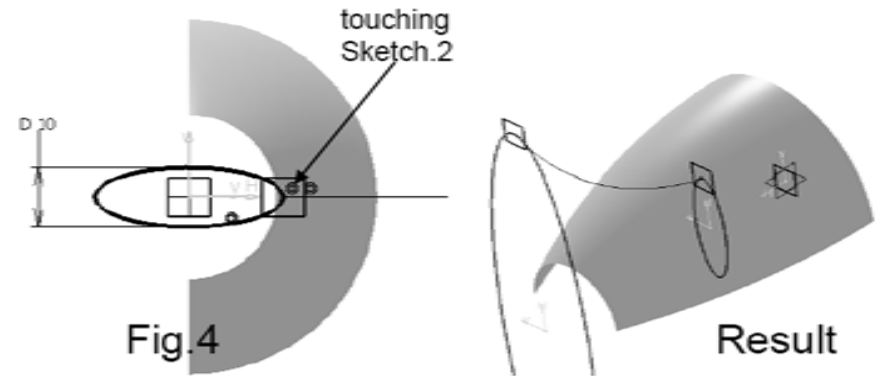
Fig.3

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Exercise 2

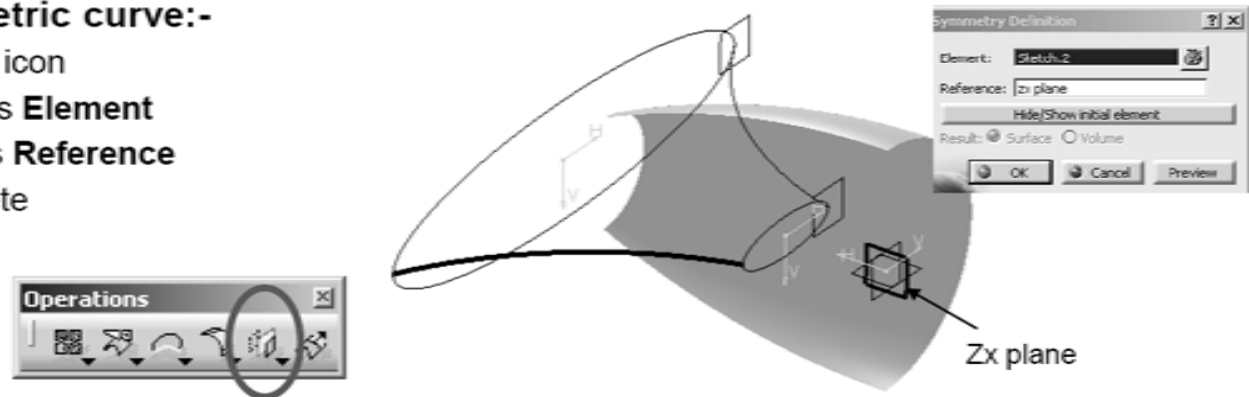
(6) To make the 4th Sketch:-

- Click "**Sketch**" icon and select **Plane.2**
- Draw an ellipse with one end touching **Sketch.2** as shown in **Fig.4**
- (While adding the constraint (D10), right-click and select "semiminor axis")
- Click Exit to complete



(7) To make a symmetric curve:-

- Click "**Symmetry**" icon
- Select **Sketch.2** as **Element**
- select **zx Plane** as **Reference**
- Click ok to complete

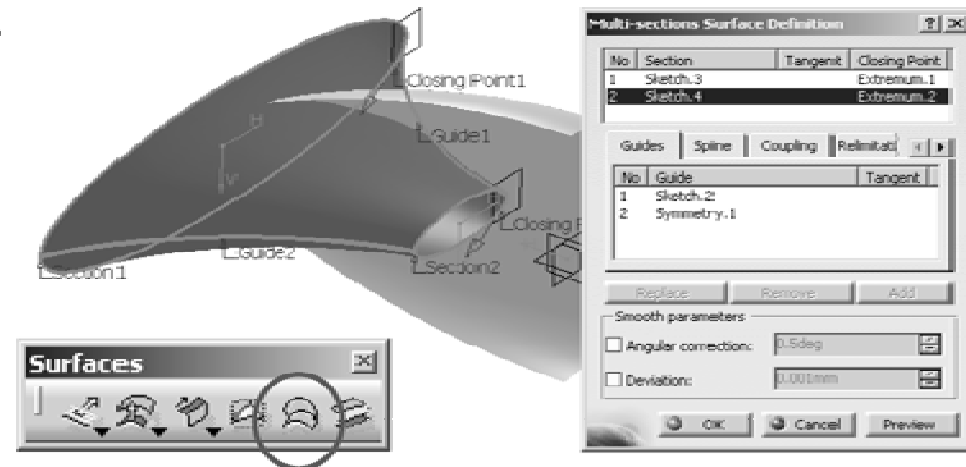


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Exercise 2

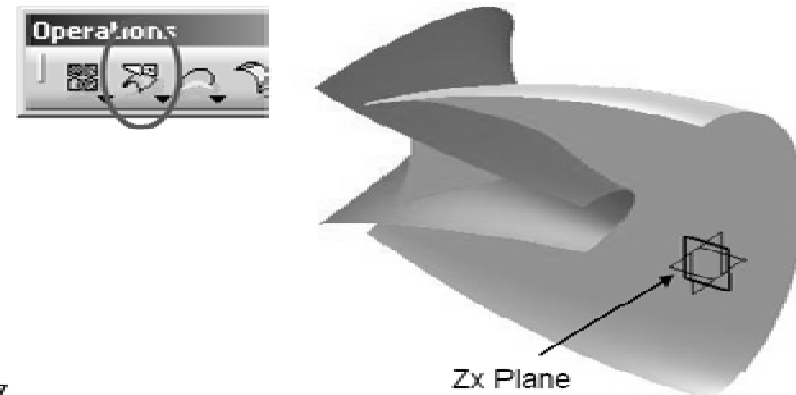
(7) To make a Multi-sections Surface:-

- Click "Multi-sections Surface" icon
- Select **Sketch.3** as **Section#1**
- Select **Sketch.4** as **Section#2**
- Select **Sketch.2** as **Guide#1**
- Select **Symmetry.1** as **Guide#2**
- Click ok to complete
- **Hide Sketch.2, Sketch.3, Sketch.4, Symmetry.1, Plane.1 & Plane.2**



(8) To Split the surface:-

- Click "Split" icon
- Select **Multi-sections Surface.1** as **Element to cut**
- Select **Zx Plane** as **Cutting element**
- (Click "Other Side" option to choose the correct portion)
- Click ok to complete

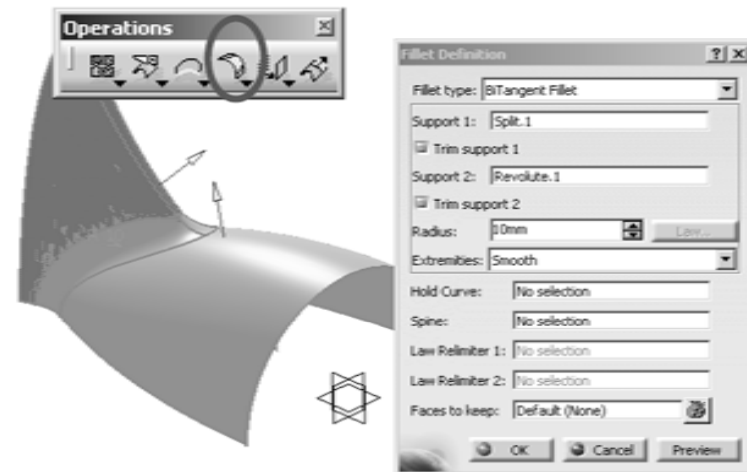


A-57

Exercise 2

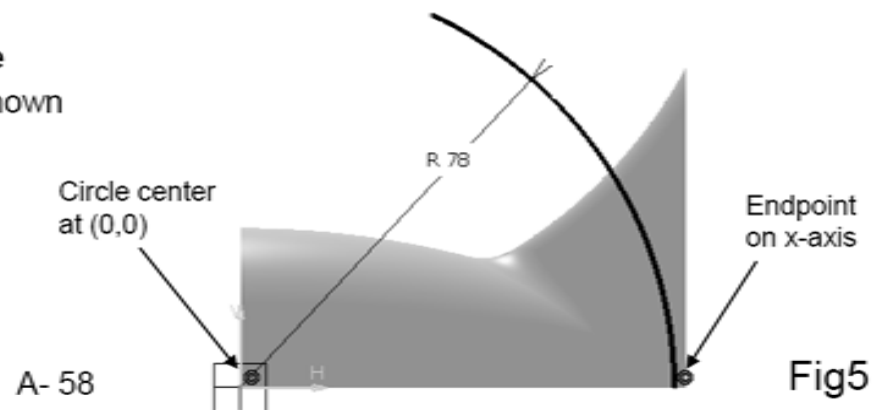
(9) To make a Fillet between 2 surfaces:-

- Click “Shape Fillet” icon
- Select **Split.1** as **Support.1**
- Select “Trim Support.1”
- Select **Revolute.1** as **Support.2**
- Select “Trim Support.2”
- Enter **10mm** as **Radius**
- (Click on the red arrow if it is not pointing outward)
- Click ok to complete



(10) To make 5th Sketch:-

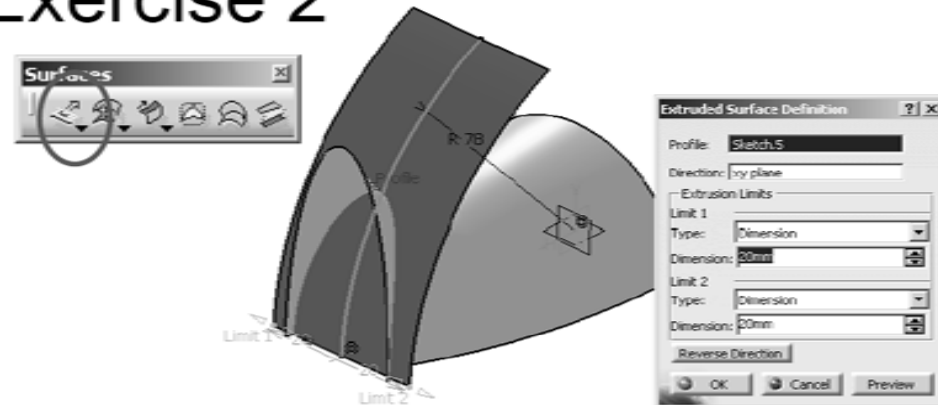
- Click “Sketch” icon and select **xy Plane**
- Draw an Arc (R78, center at (0,0)) as shown in Fig.5
- (One endpoint must be on x-axis)
- Click ok to complete



Exercise 2

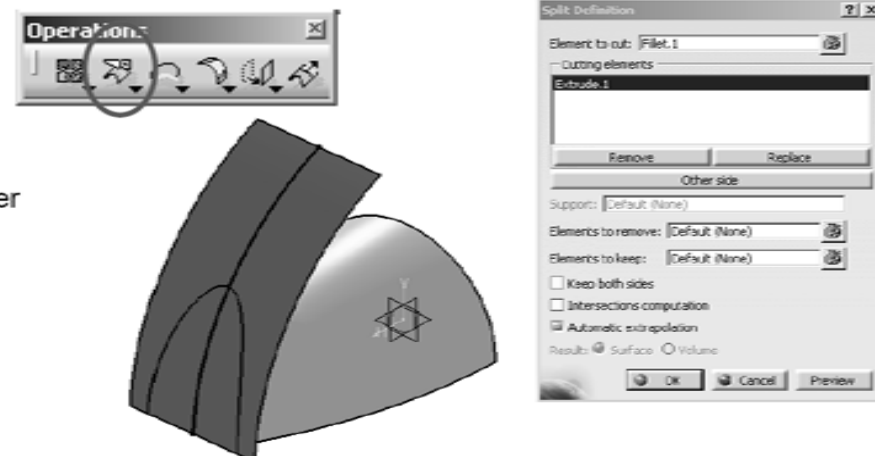
(11) To make an Extrude:-

- Click "**Extrude**" icon
- Select **Sketch.5** as **Profile**
- (The Sketch Plane, **xy Plane** will be automatically selected as **Direction**)
- Enter 20mm as **Limit.1**
- Enter 20mm as **Limit.2**
- Click ok to complete



(12) To Split Surface:-

- Click "**Split**" icon
- Select **Fillet.1** as **Element to cut**
- Select **Extrude.1** as **Cutting element**
- (Click "**Other Side**" option to choose the bigger portion)
- Click ok to complete
- **Hide Extrude.1 & Sketch.5**

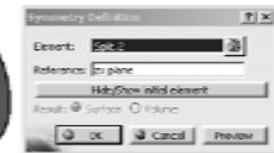


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Exercise 2

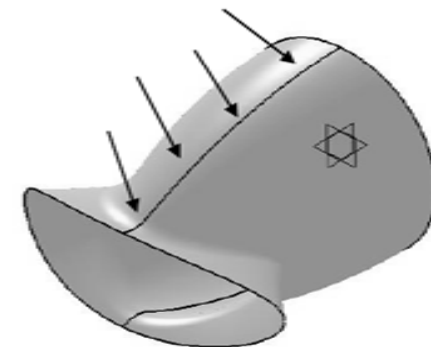
(13) To make a Symmetry:-

- Click "Symmetry" icon
- Select **Split.2** as **Element**
- Select **zx Plane** as **Reference**
- Click ok to complete



(14) To visual-check the tangency continuity along the interface:-

- Click "Shading" icon
- (All black surface edges now disappear)
- Check if any sharp edge appears along the centre interface. If yes, go back to previous step(s) to correct the error.



(15) To Join Surfaces:-

- Click "Join" icon
- Select **Split.2** and **Symmetry.2** as **Elements to Join**
- Click ok to complete
- (Split.2 & Symmetry.2 will be hidden automatically)

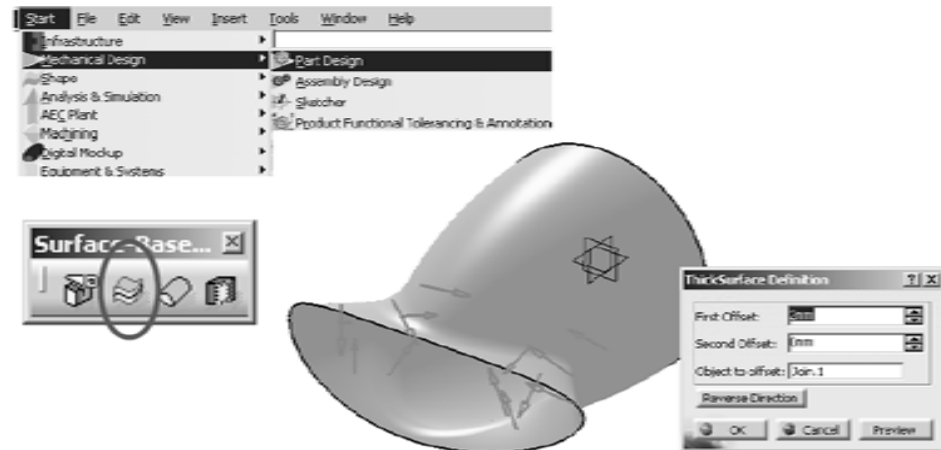


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Exercise 2

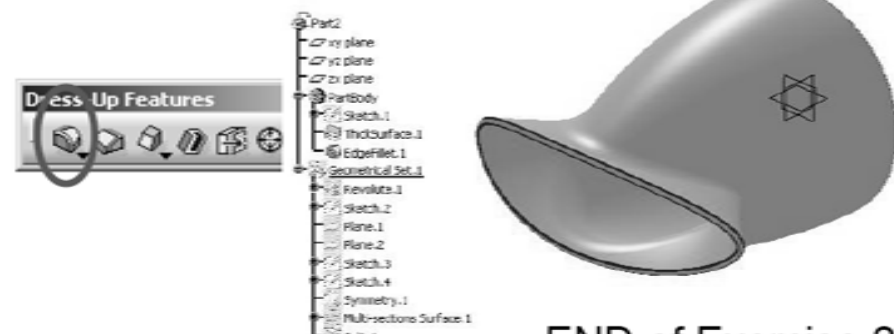
(16) To make a Solid:-

- Start/Mechanical Design/Part Design
- Click “**Thick Surface**” icon
- Click ok on the pop-up warning window
- Select **Join.1** as **Object to Offset**
- Enter **2mm** as **First Offset**
- (If the red-arrows are not pointing inward, click “Reverse Direction” or directly click on an arrow to change the direction)
- Click ok to complete
- **Hide Geometrical Set.1**



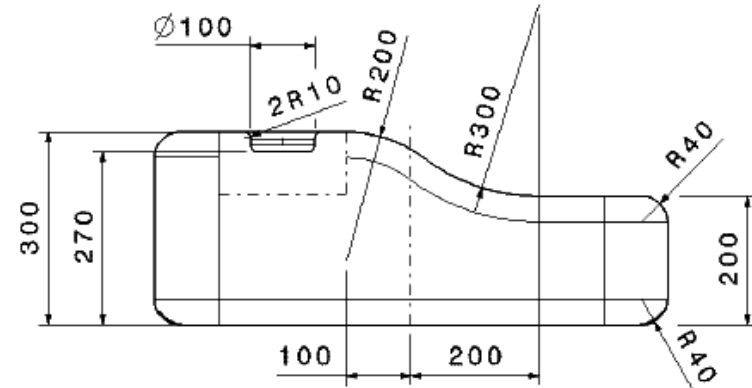
(17) To add Fillets onto the solid:-

- Click “**Edge Fillet**” icon
- Select **all sharp edges**
- Enter **0.5mm** as **Radius**
- Click ok to complete

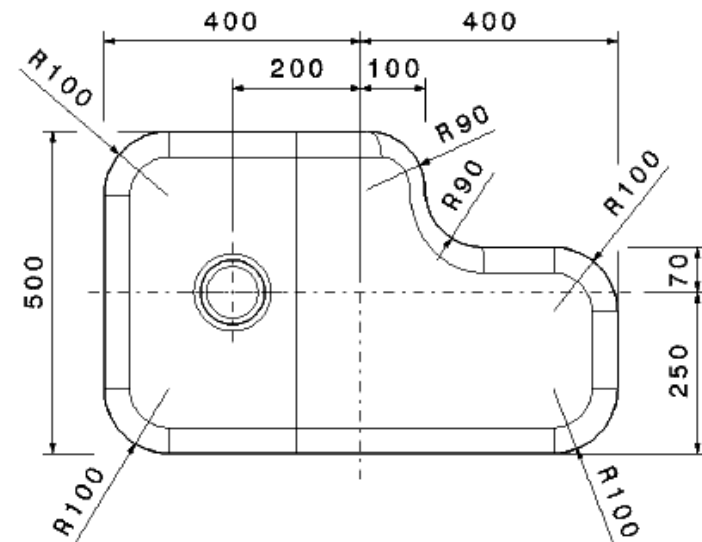
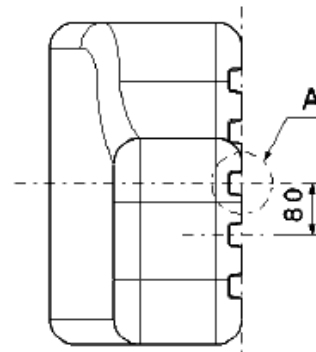
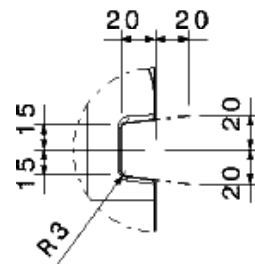


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END of Exercise.2

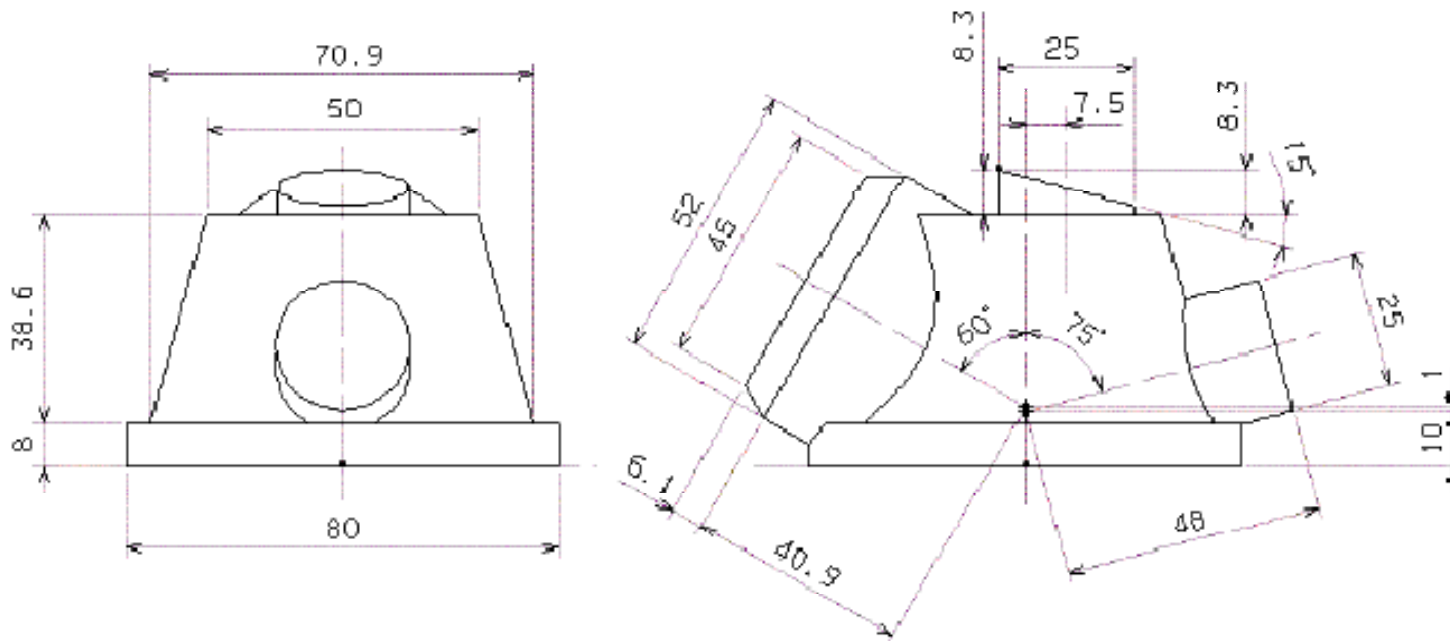


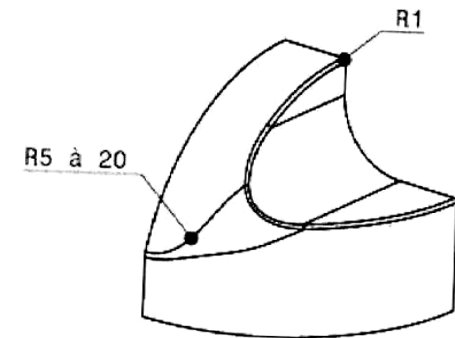
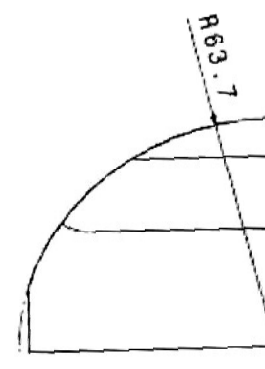
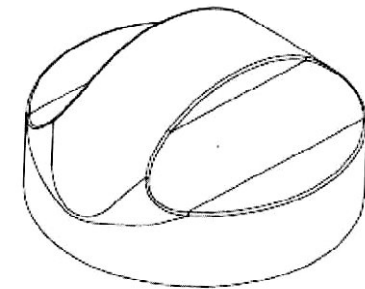
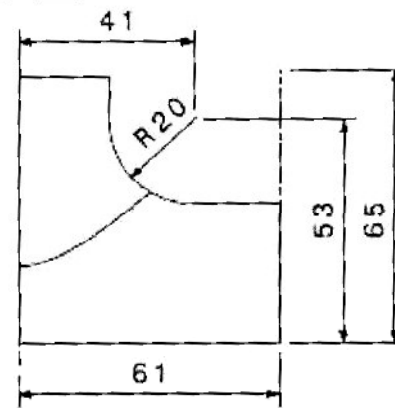
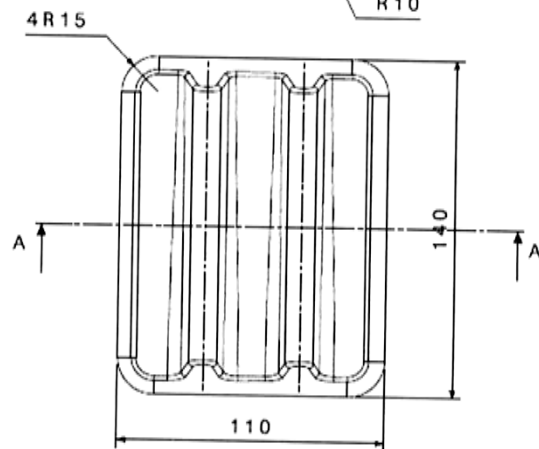
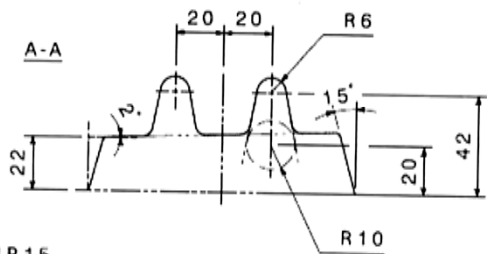
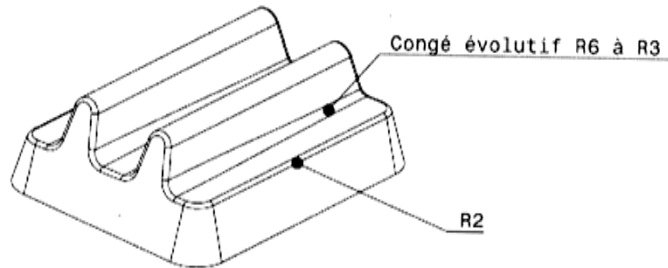
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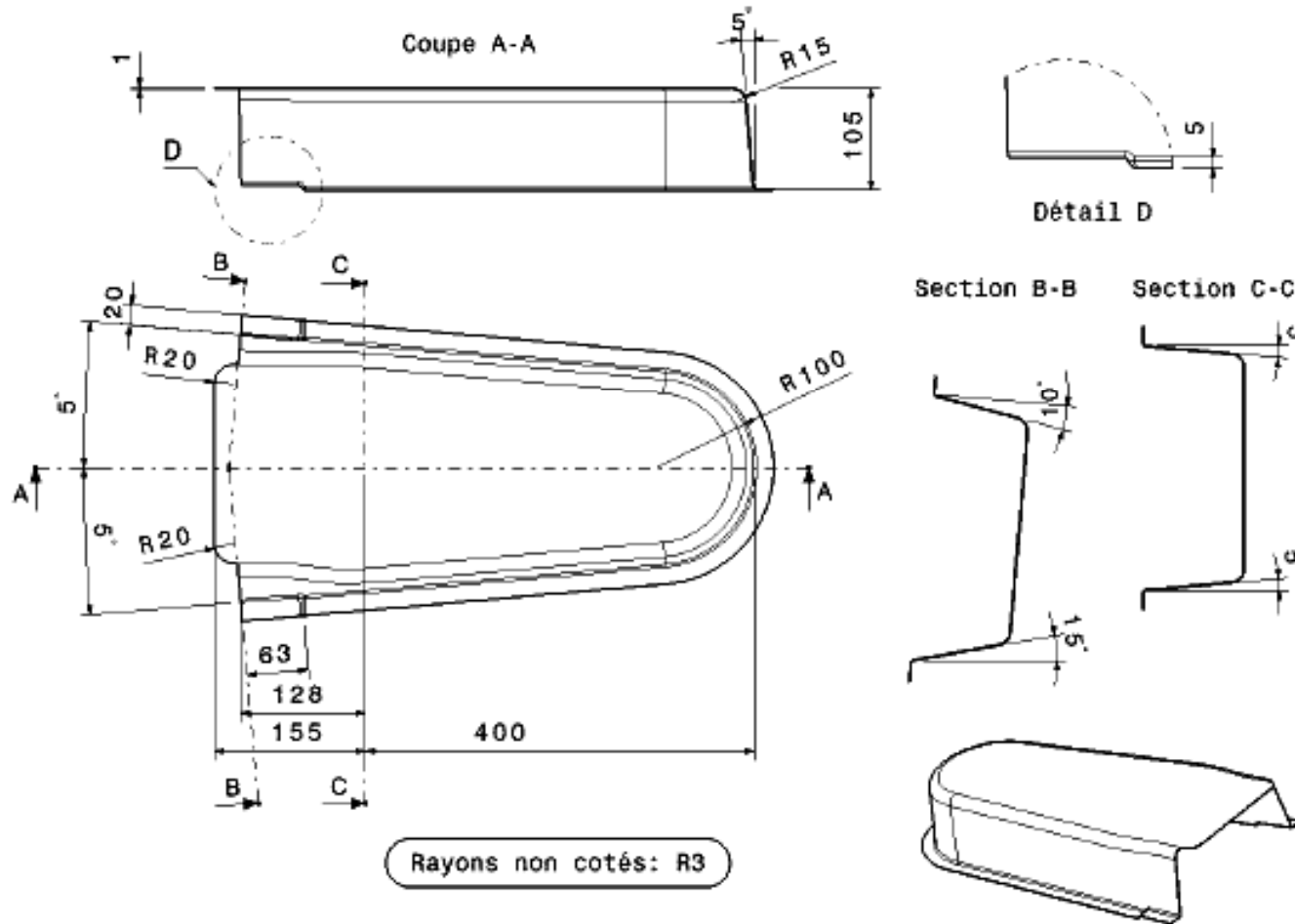




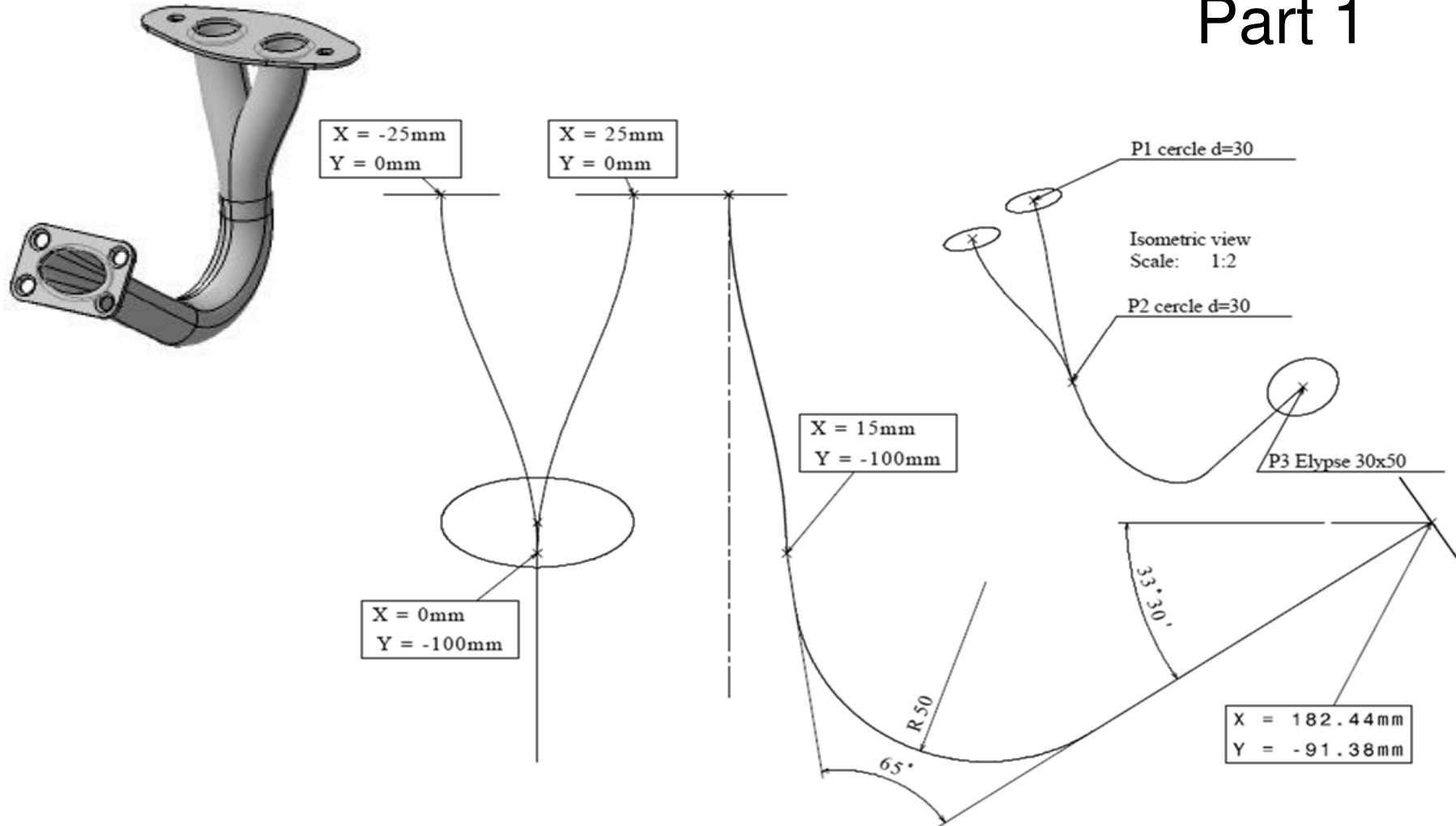
CARTER HYDRAULIQUE
RAYON GENERAL : R 3







Part 1



Part 2

