

Practice Problem 5.1

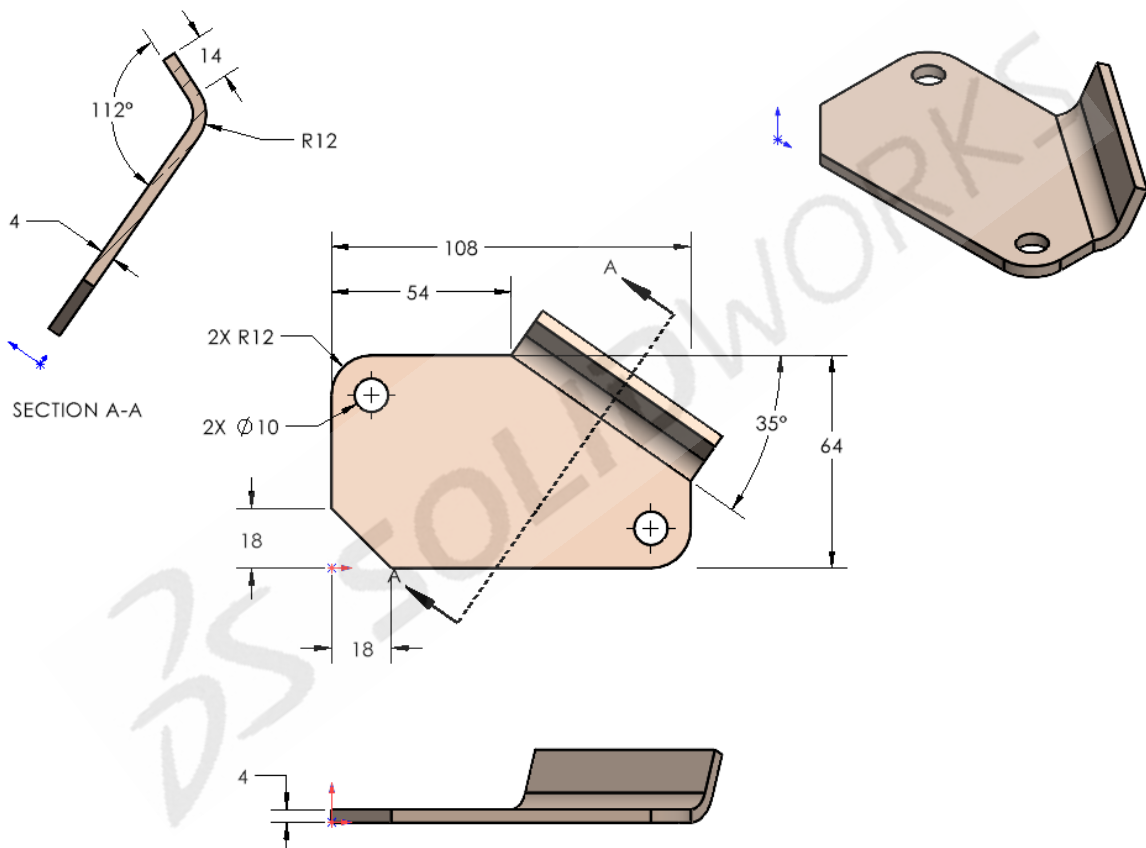
Reference Geometry (Level 5)

- Units: MMGS
- Difficulty Level: Medium
- Certification: CSWA
- Duration (min): 10
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is *asymmetric*.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Circles, Sketch Patterns
- Features: Extrude Boss
- Reference Geometry: Planes

Volume: 28862 mm³



Practice Problem 5.2

Reference Geometry (Level 5)

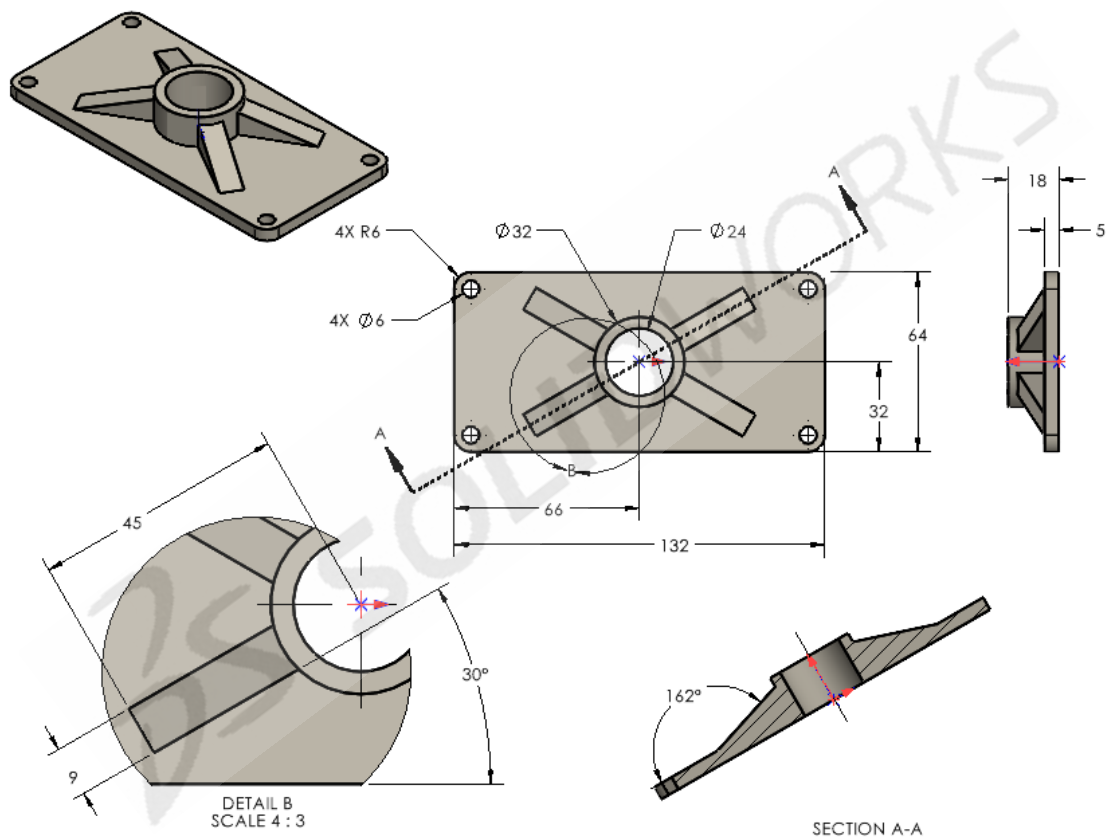
- Units: MMGS
- Difficulty Level: Medium
- Certification: CSWA
- Duration (min): 15
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is symmetric.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Circles
- Features: Extrude Boss
- Reference Geometry: Planes

HINT: Start ribs inside cylinder wall.

Volume: 48824 mm³



Practice Problem 5.3

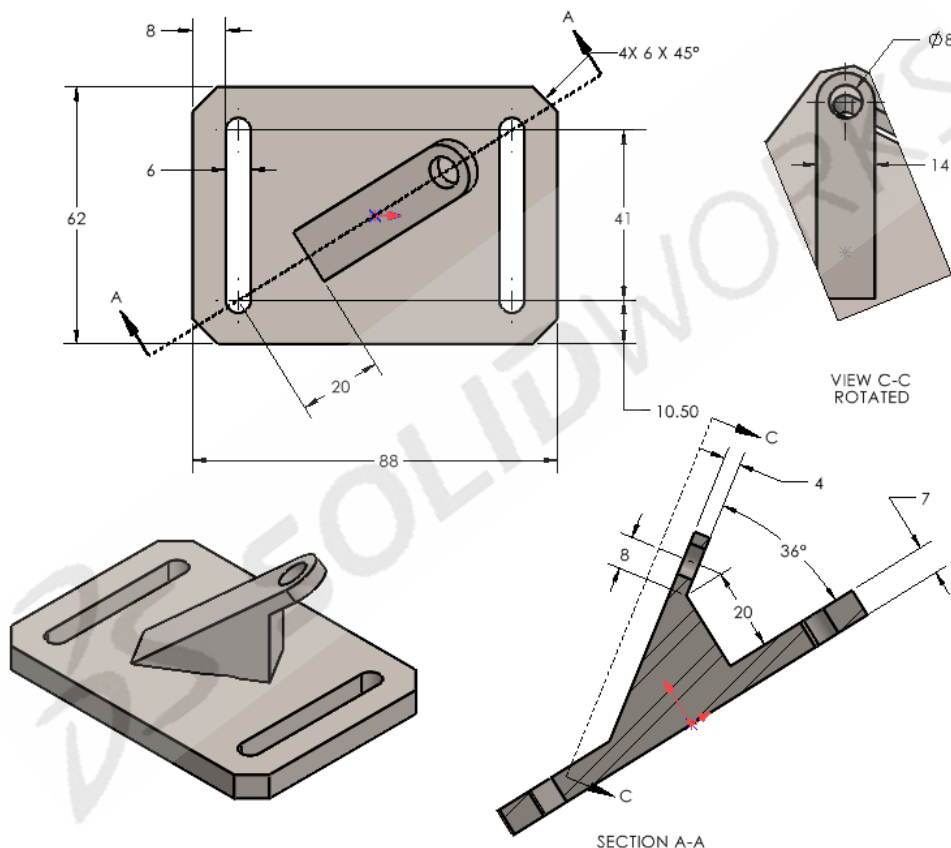
Reference Geometry (Level 5)

- Units: MMGS
- Difficulty Level: Medium
- Certification: CSWA
- Duration (min): 10
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is *asymmetric*.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Rectangles, Arcs, Circles, Slots
- Features: Extrude Boss
- Reference Geometry: Planes

Volume: 40316 mm³



Practice Problem 5.4

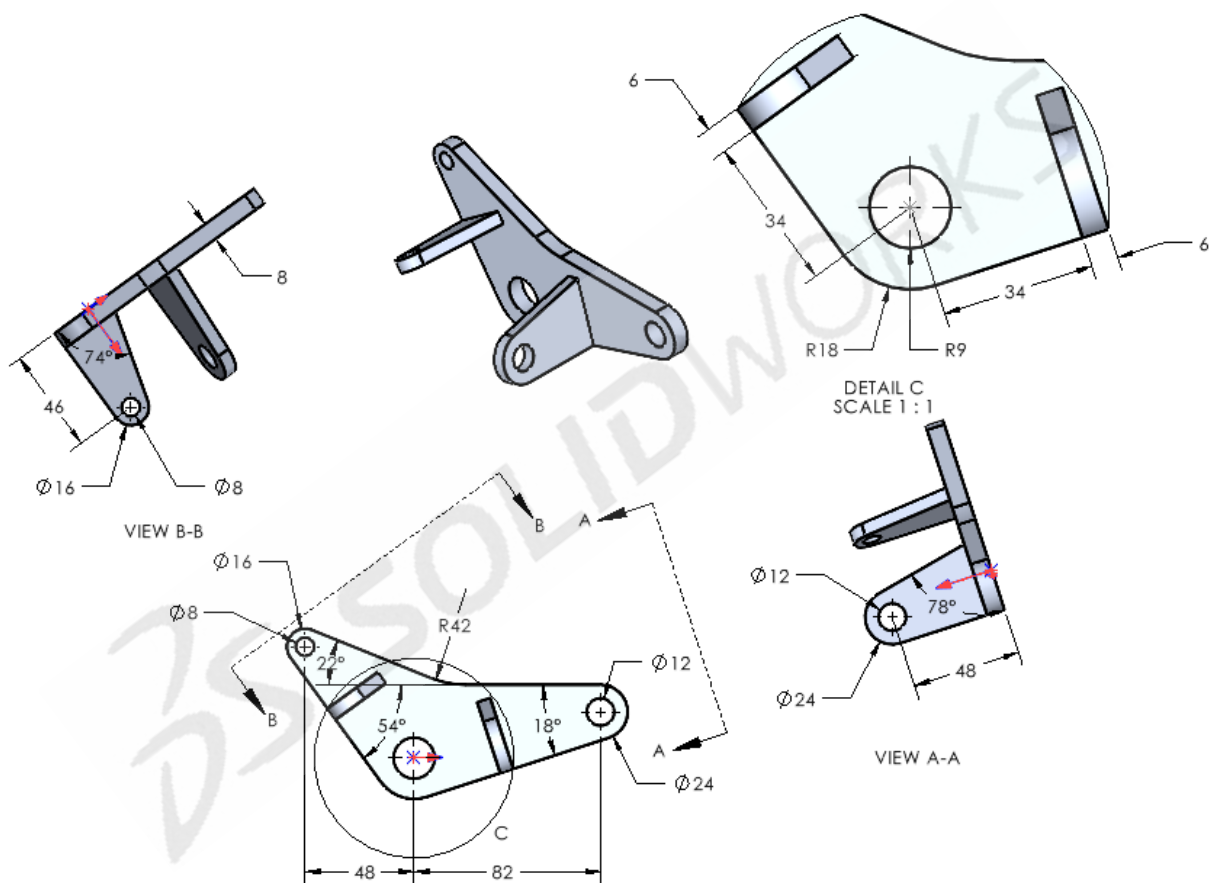
Reference Geometry (Level 5)

- Units: MMGS
- Difficulty Level: Medium
- Certification: CSWA
- Duration (min): 15
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is *asymmetric*.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Arcs, Circles, Sketch Fillets
- Features: Extrude Boss
- Reference Geometry: Planes

Volume: 54372 mm³



Practice Problem 5.6

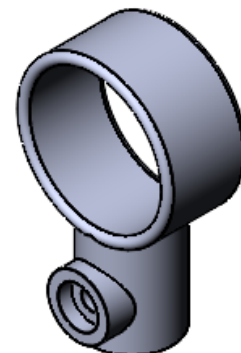
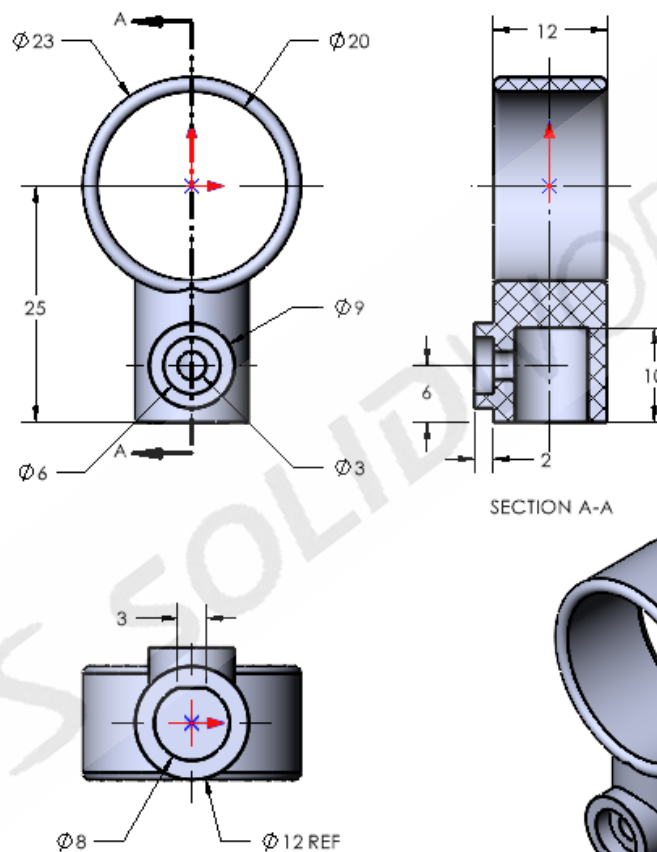
Reference Geometry (Level 5)

- Units: MMGS
- Difficulty Level: Hard
- Certification: CSWA
- Duration (min): 35
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is symmetric.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Circles
- Features: Extrude Boss, Extrude Cut, Fillets and Chamfers
- Reference Geometry: Planes

Volume: 2344 mm³



Practice Problem 5.7

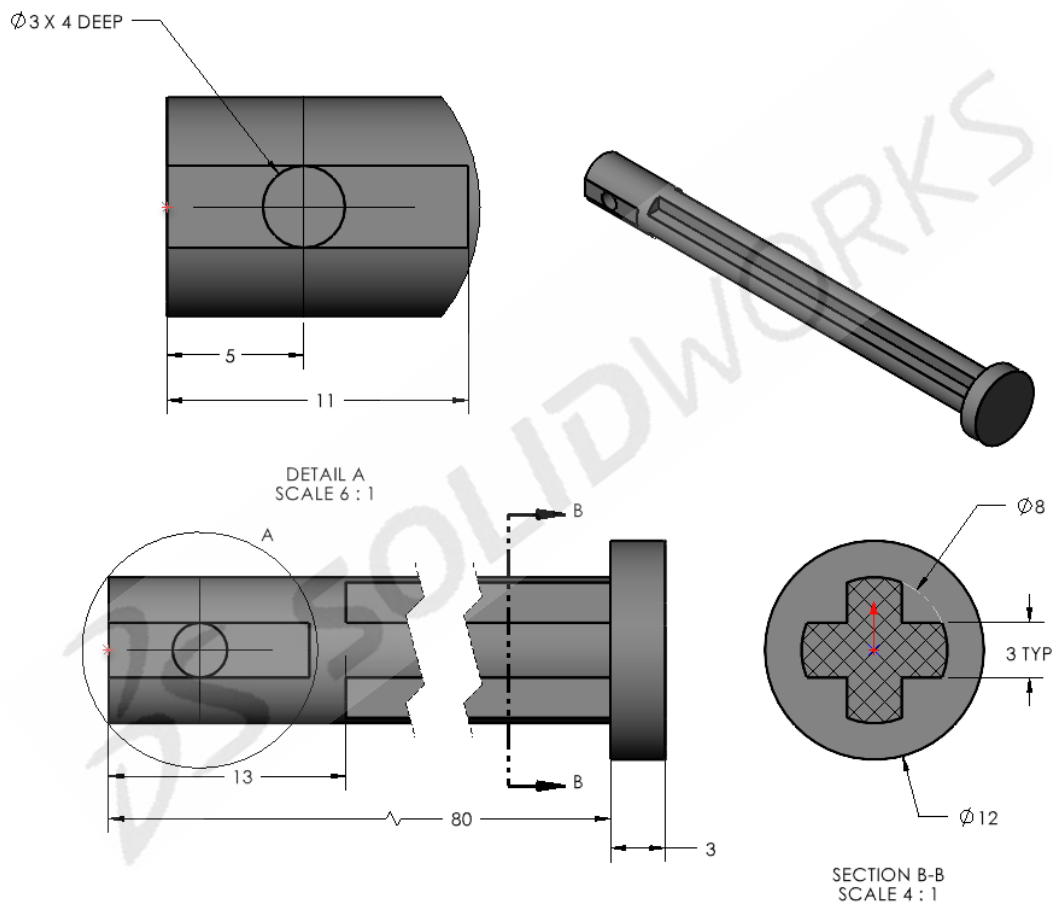
Reference Geometry (Level 5)

- Units: MMGS
- Difficulty Level: Medium
- Certification: CSWA
- Duration (min): 20
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is symmetric.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Circles, Trim
- Features: Extrude Boss, Extrude Cut
- Reference Geometry: Planes

Volume: 3494 mm³



Practice Problem 5.8

Reference Geometry (Level 5)

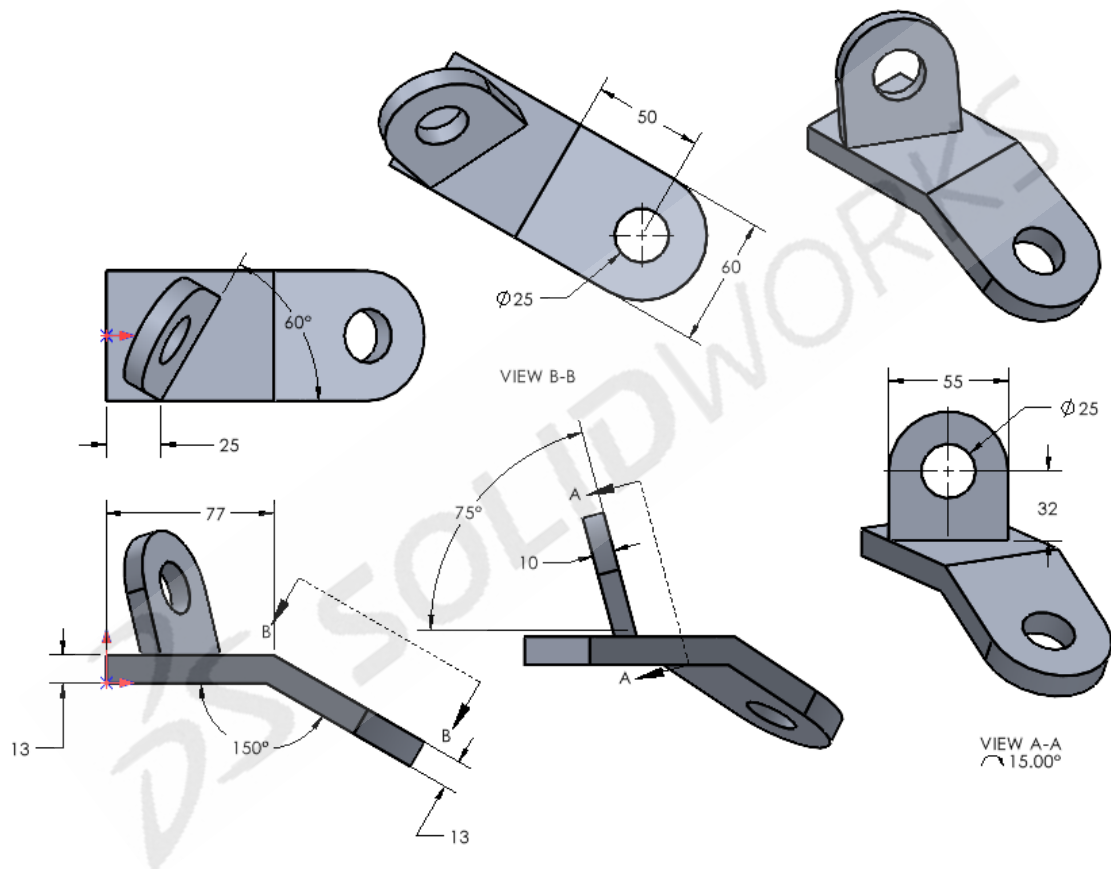
- Units: MMGS
- Difficulty Level: Medium
- Certification: CSWA
- Duration (min): 15
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is *asymmetric*.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Circles, Trim
- Features: Extrude Boss, Extrude Cut
- Reference Geometry: Planes

HINT: Use a sketch to define the plane.

Volume: 132174 mm³



Practice Problem 5.9

Reference Geometry (Level 5)

- Units: MMGS
- Difficulty Level: Medium
- Certification: CSWA
- Duration (min): 15
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is *asymmetric*.
 - All sketches are fully-defined.

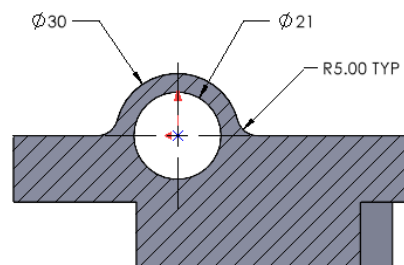
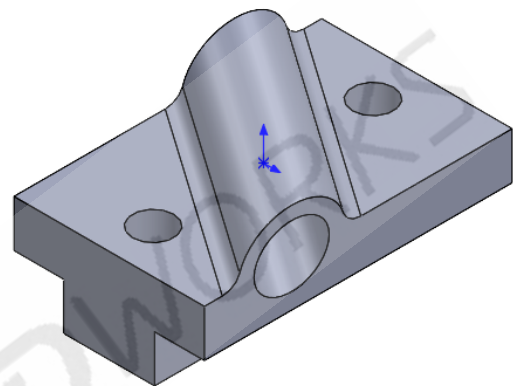
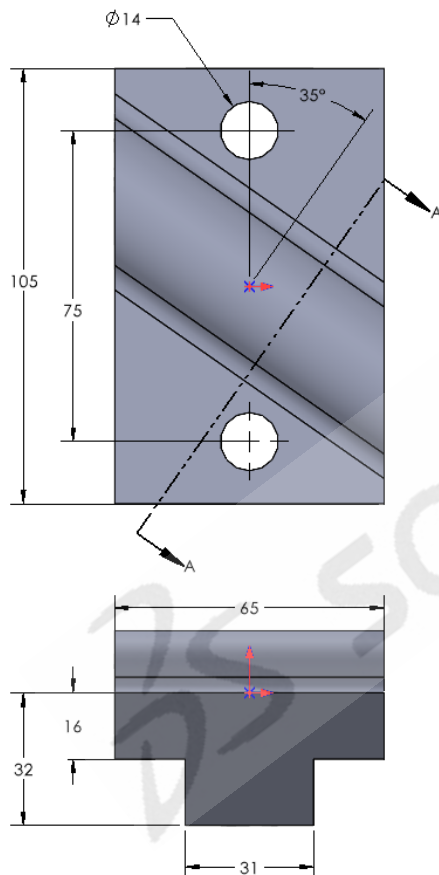
Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Circles
- Features: Extrude Boss, Extrude Cut
- Reference Geometry: Planes, Axes

HINTS:

- Create an axis using a standard plane.
- Use Up to Surface end conditions.

Volume: 152544 mm³



SECTION A-A
VIEW ROTATED

Practice Problem 5.10

Reference Geometry (Level 5)

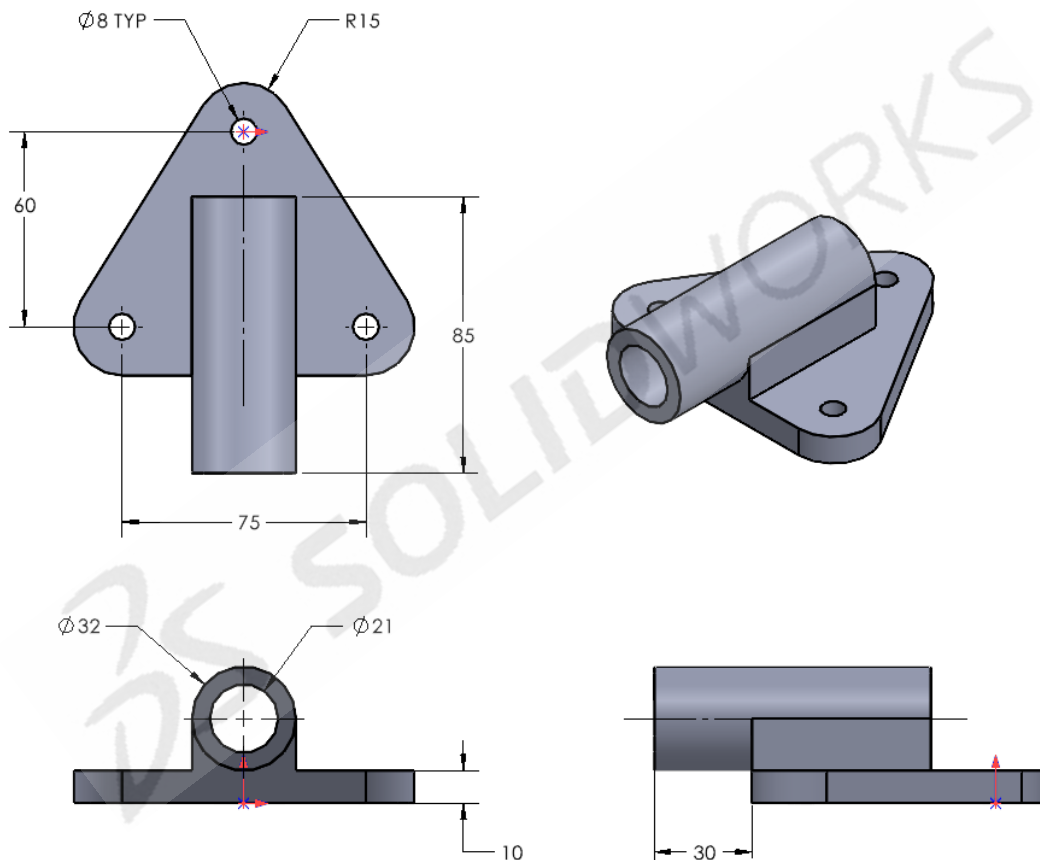
- Units: MMGS
- Difficulty Level: Easy
- Certification: CSWA
- Duration (min): 10
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is symmetric.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Circles, Sketch Fillets, Convert Entities, Trim
- Features: Extrude Boss, Extrude Cut
- Reference Geometry: Planes

HINT: The pipe is tangent to the plate.

Volume: 105501 mm³



Practice Problem 5.11

Reference Geometry (Level 5)

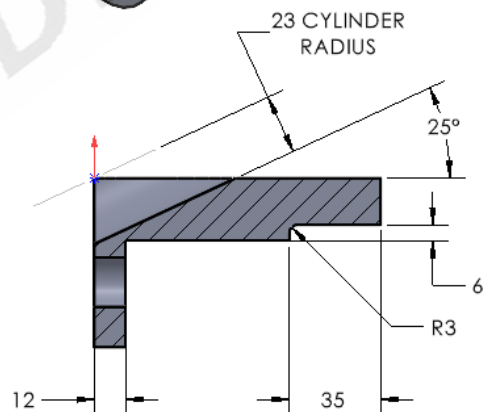
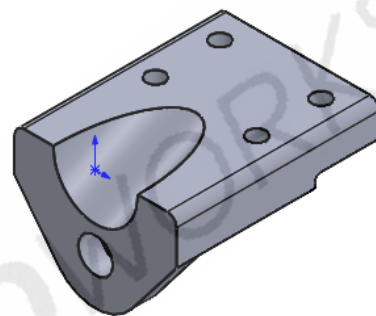
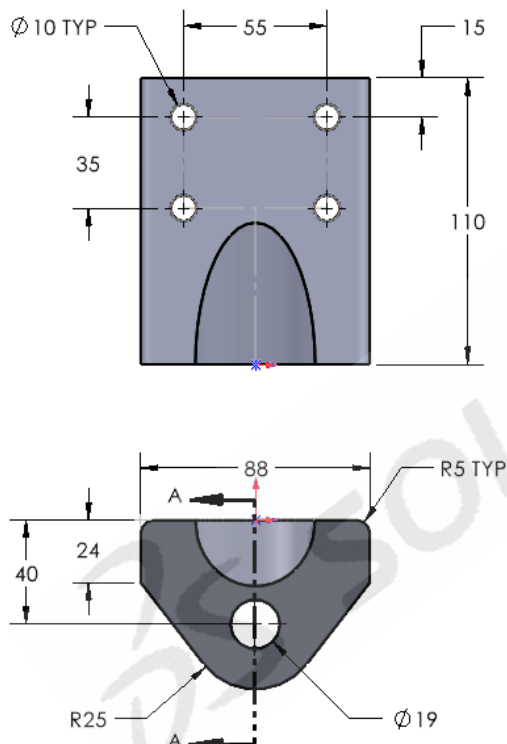
- Units: MMGS
- Difficulty Level: Easy
- Certification: CSWA
- Duration (min): 10
- Design Intent:
 - The part's origin location is indicated in red.
 - The part is symmetric.
 - All sketches are fully-defined.

Suggested Sketch Tools / Features

- Sketch: Lines, Centerlines, Rectangles, Arcs, Circles
- Features: Extrude Boss, Extrude Cut
- Reference Geometry: Planes

HINT: Create a plane on an angle through the front edge, and cut with a circle.

Volume: 208819 mm³



SECTION A-A