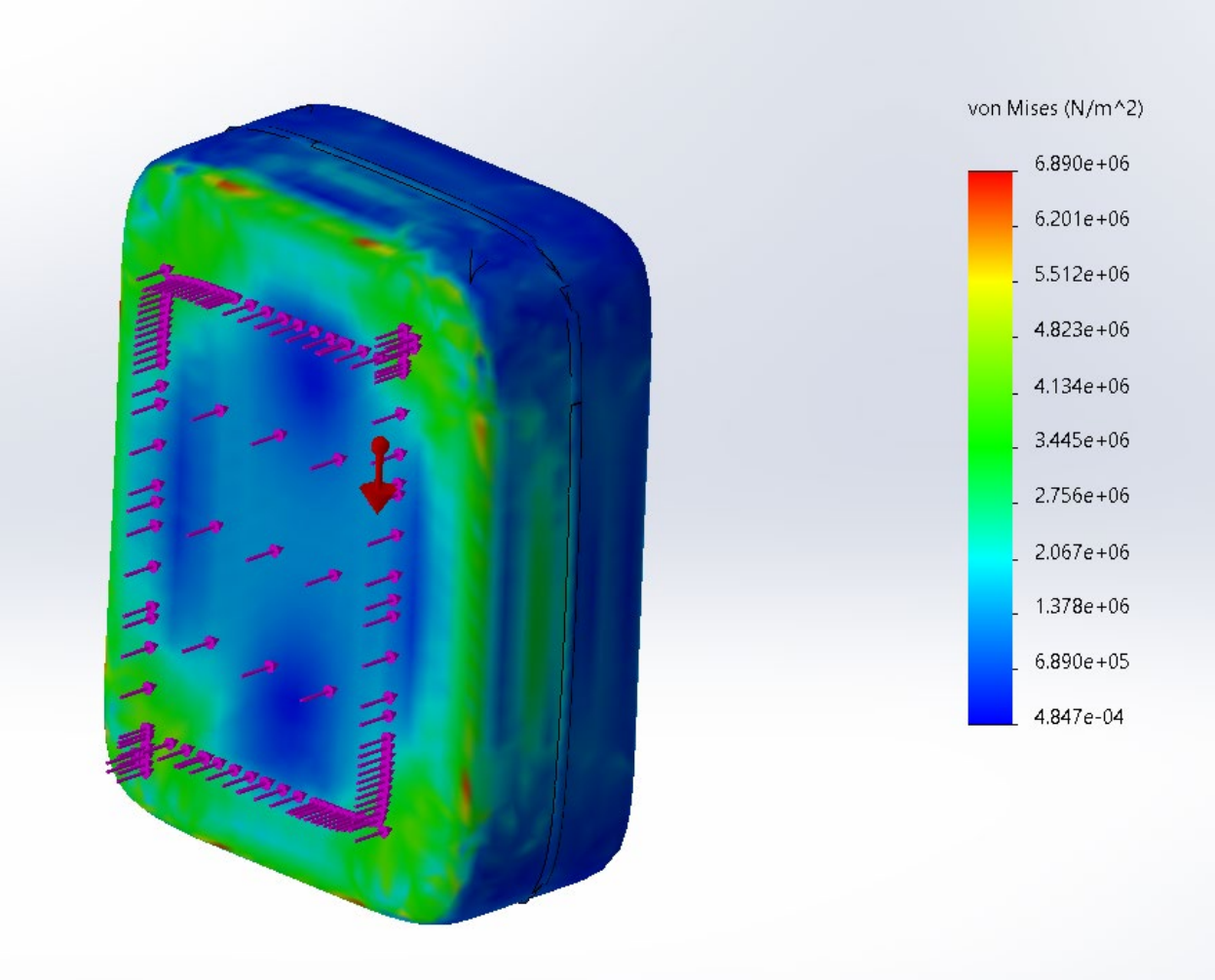
STATIC ANALYSIS: TRAVEL LUGGAGE

- Materials: Polyethylene Cross-linked (PEXa).
- Load: 500N – 50kg.
- Load position: Front to back, on a rectangle-like area of 134045.97 mm^2 on the face of the luggage.
- Support position: None.

The handle bars, the wheels and the holes for the handle bars have been removed as SolidWorks could not generate the mesh with those included.

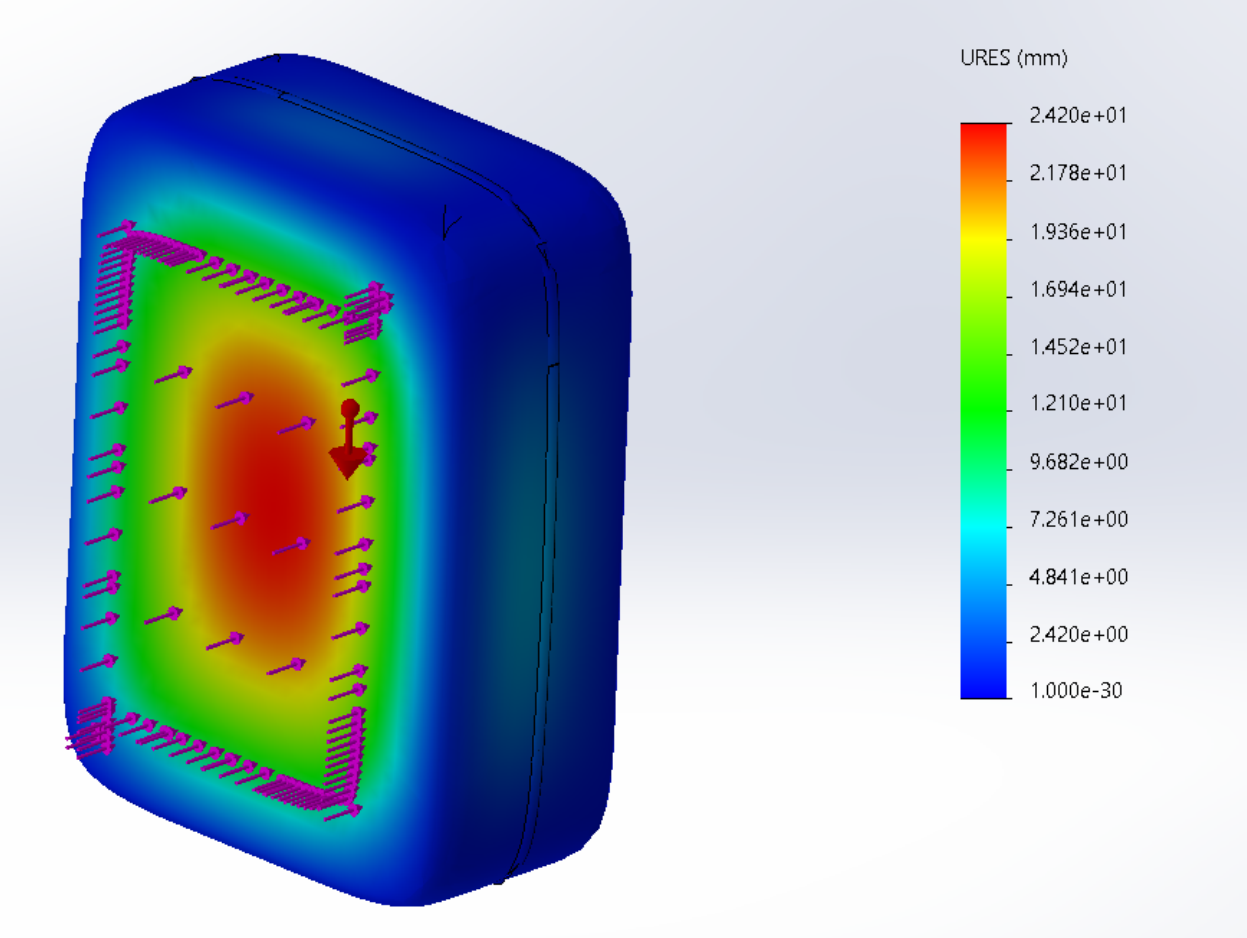
1. Von Mises Stress:



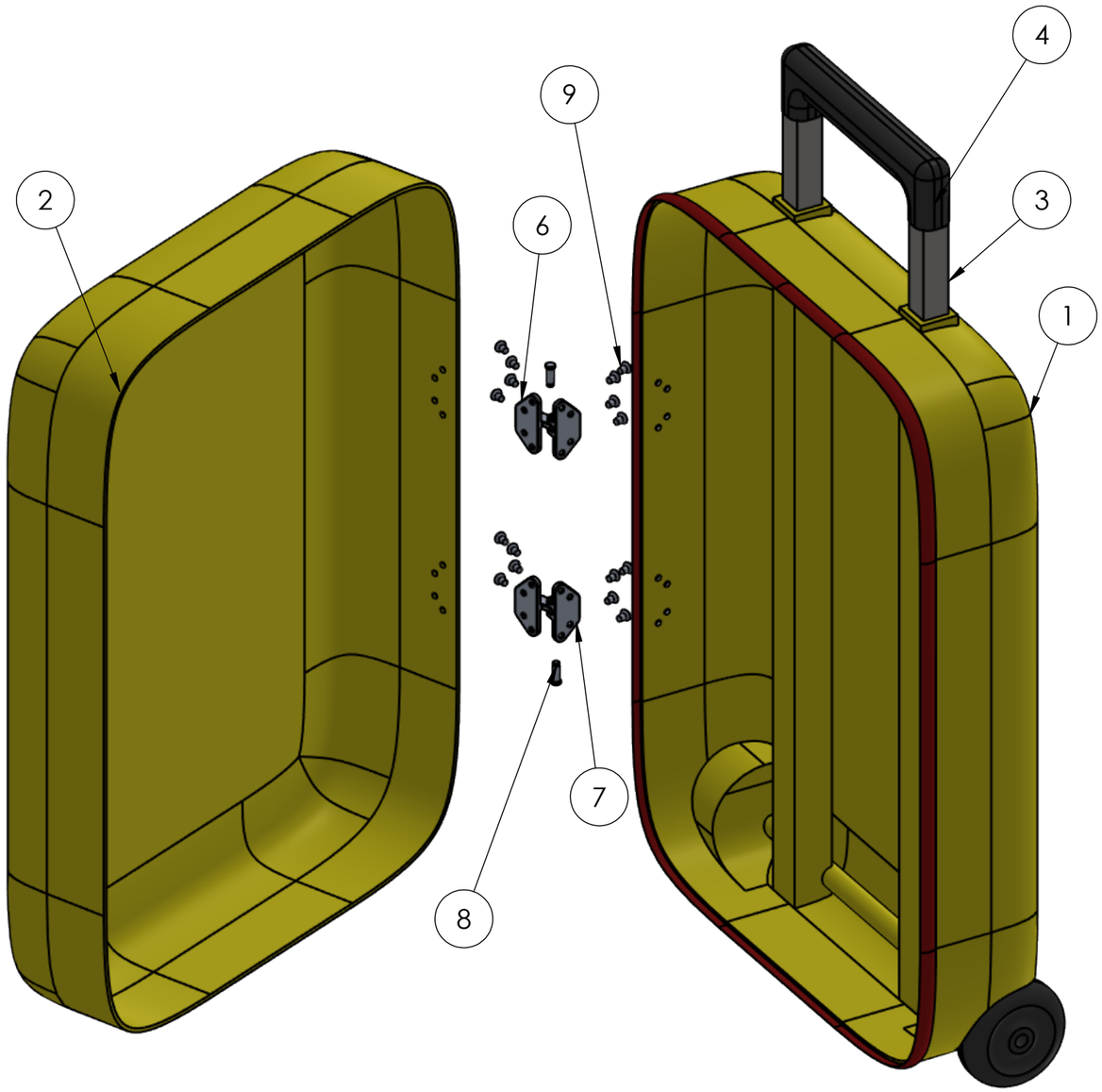
The stress analysis shows that the von Mises stress placed on the luggage ranges from 4.847e-04 to 6.890e+06 N/m^2, with 3.445e+06 N/m^2 being the most common value. The stress zone is primarily located around the area between the area where the force is applied and the edge of the suitcase. There are also some small stress zones on the sides of the suitcase. The tensible strength of polyethylene cross-linked is 18e+07 N/m^2

and the compressive strength is 14e+07 N/m^2. Therefore, the suitcase is capable of holding up against the force and will not fracture or break.

2. Displacement:



The stress analysis shows that the displacement of the luggage ranges from almost 0 to 2.420e+01 mm, decreasing gradually from the center of the area where the force is applied to the edge of the suitcase. There is also some deformation on the sides of the suitcase, at around 7.261 mm. Given that the length from front to back of the suitcase is 200 mm, this is an acceptable rate of deformation, as the suitcase could be further reinforced by personal items put inside during travel.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Shell 1		1
2	Shell 2		1
3	Handle bar		2
4	Handle		1
5	Wheel		2
6	Lever 1		2
7	Lever 2		2
8	Lever connector		2
9	Nut		16

UNLESS OTHERWISE SPECIFIED:
DIMENSIONS ARE IN MILLIMETERS
SURFACE FINISH:
TOLERANCES:
LINEAR:
ANGULAR:

FINISH:

DEBURR AND BREAK SHARP EDGES

DO NOT SCALE DRAWING

REVISION

	NAME	SIGNATURE	DATE
DRAWN	Trieu Huynh Ba Nguyen		
CHK'D			
APPV'D			
MFG			
Q.A			

MATERIAL:

WEIGHT:

TITLE:

Travel luggage

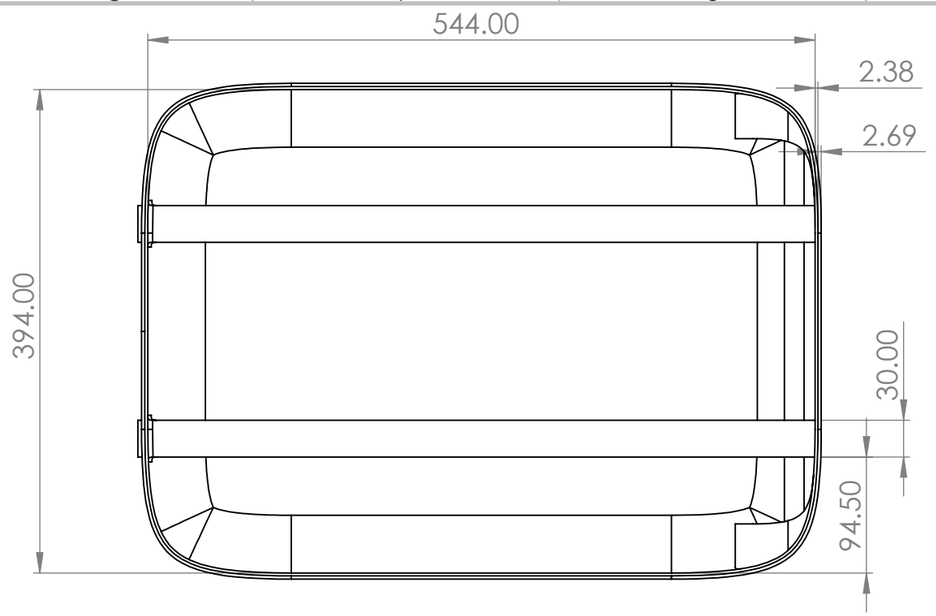
DWG NO.

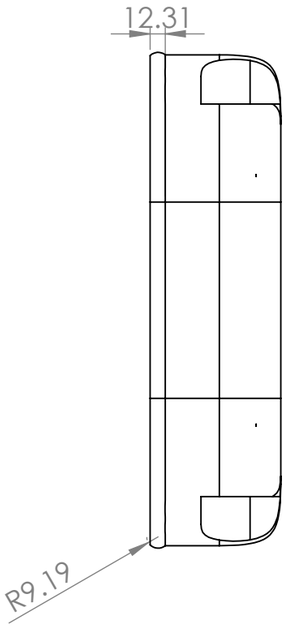
Exercise 4

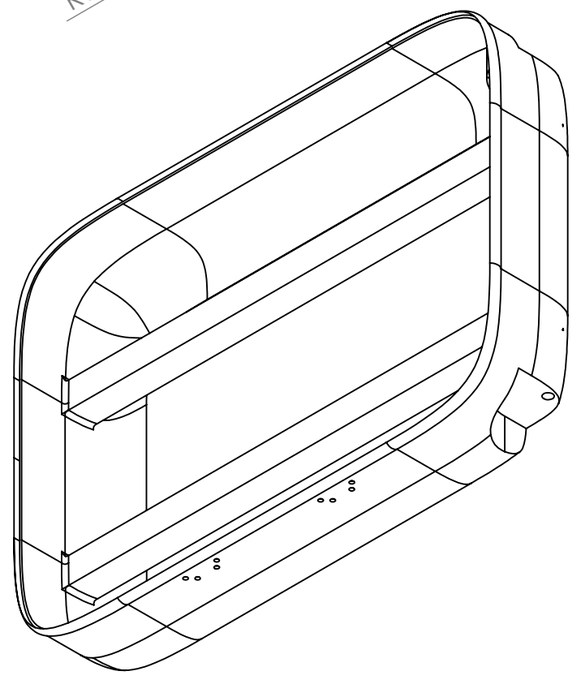
A3

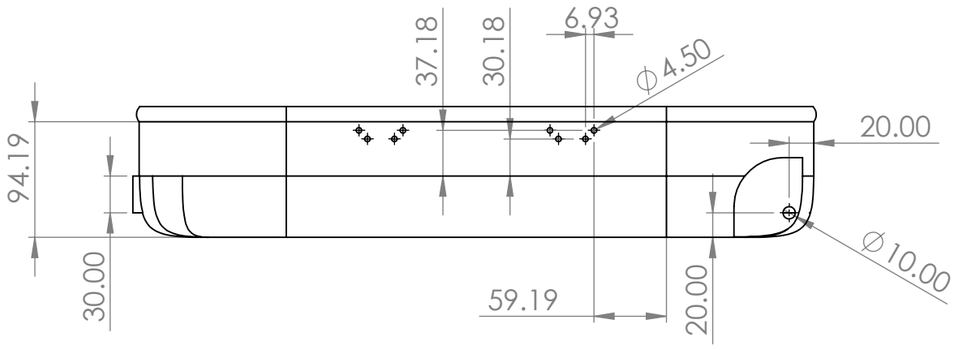
SCALE:1:4

SHEET 1 OF 1

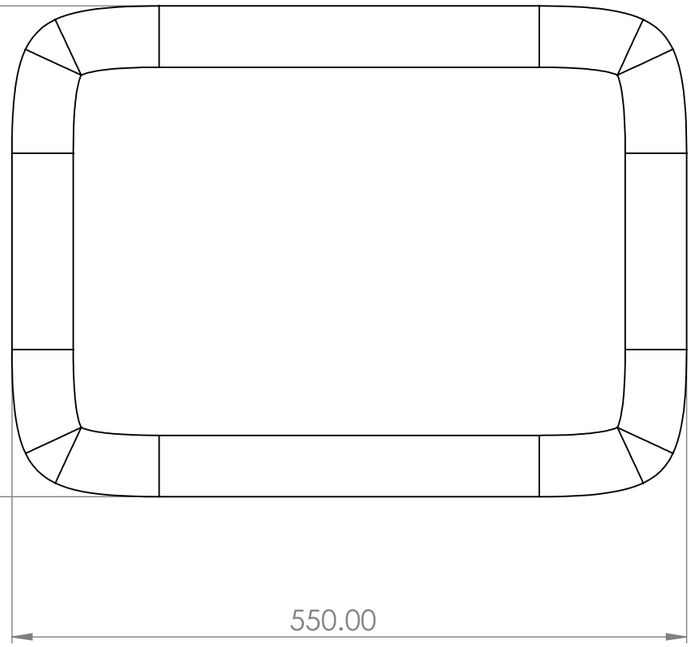


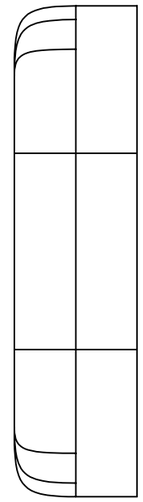


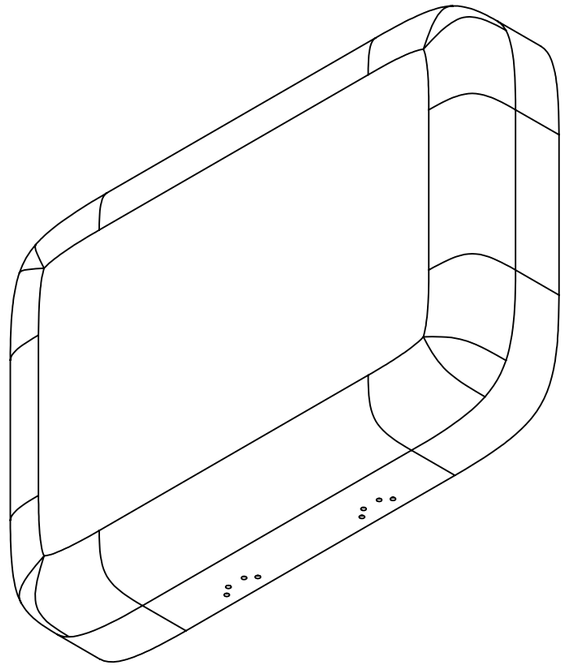


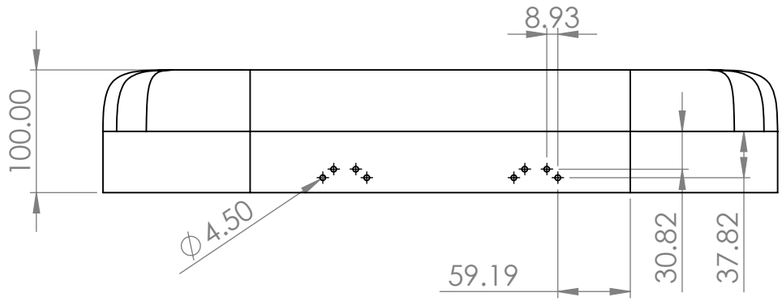


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:		DEBURR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE:	
DRAWN	Trieu Huynh Ba Nguyen					Shell 1	
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO.	A3
						Exercise 4	
				WEIGHT:		SCALE:1:5	SHEET 1 OF 1

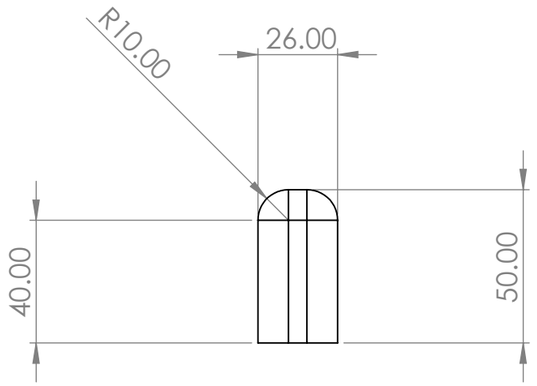


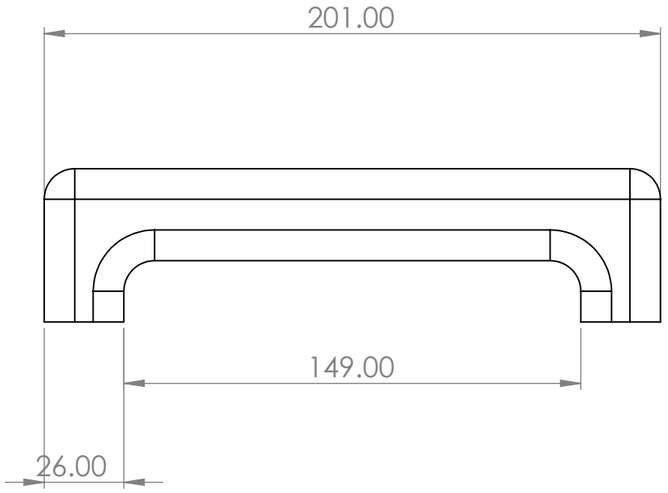


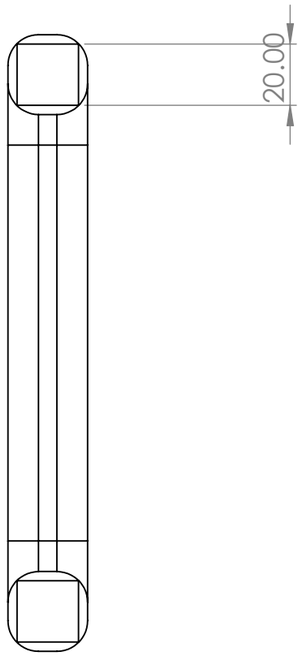


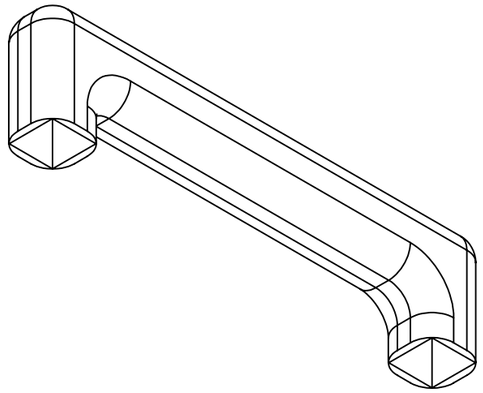


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:			DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE: Shell 2	
DRAWN	Trieu Huynh Ba Nguyen						
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO. Exercise 4	A3
				WEIGHT:		SCALE:1:5	SHEET 1 OF 1

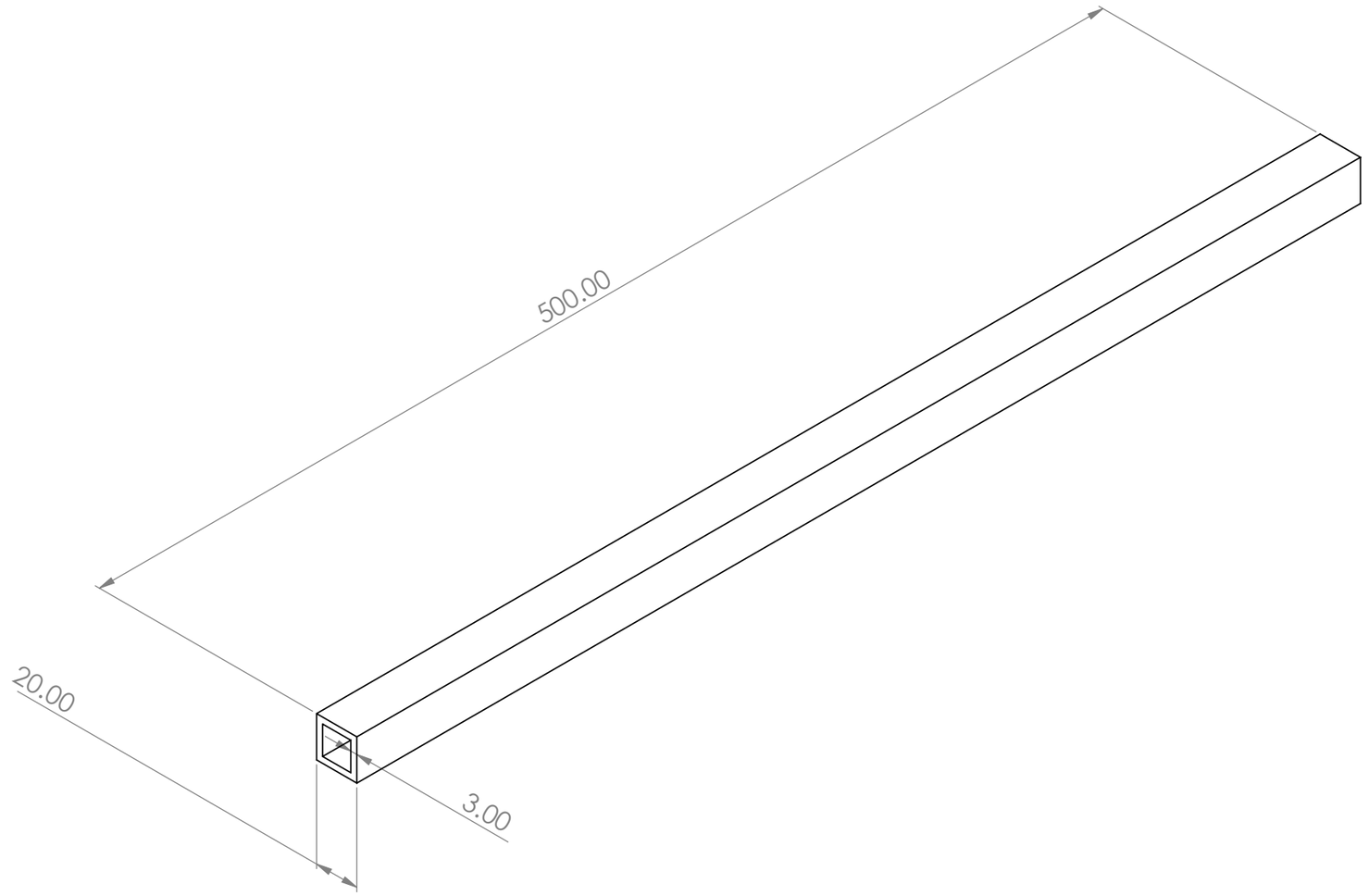




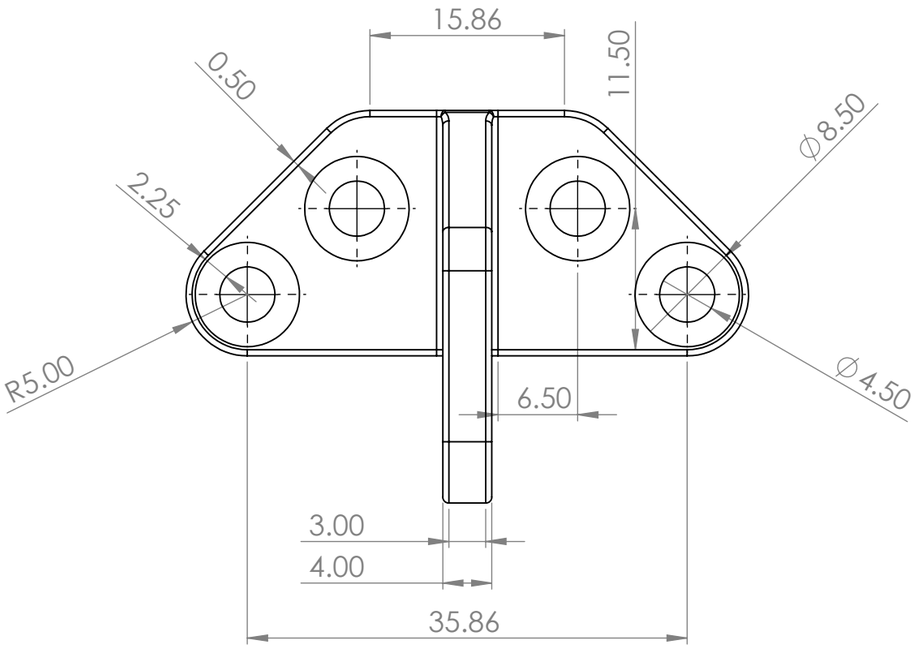


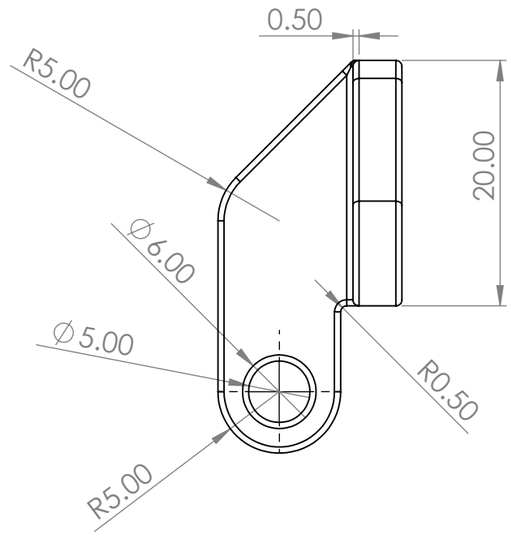


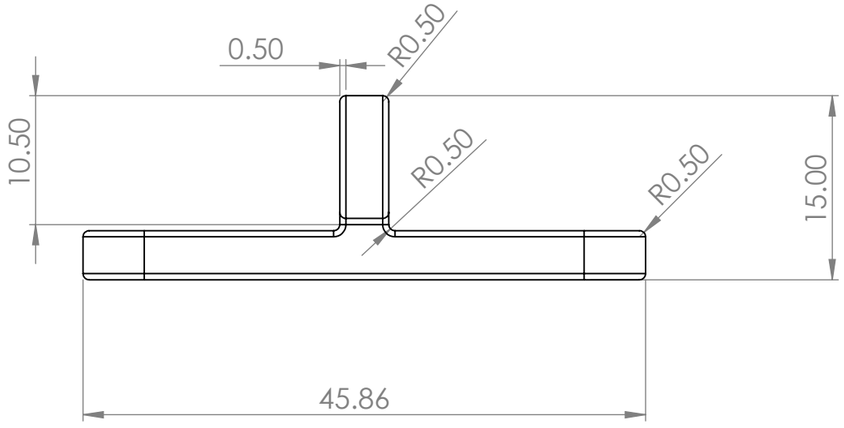
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:			DEBURR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING / REVISION
	NAME	SIGNATURE	DATE				TITLE:
DRAWN	Trieu Huynh Ba Nguyen						
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:			DWG NO. Handle horizontal / A3
				WEIGHT:			SCALE:1:2 / SHEET 1 OF 1

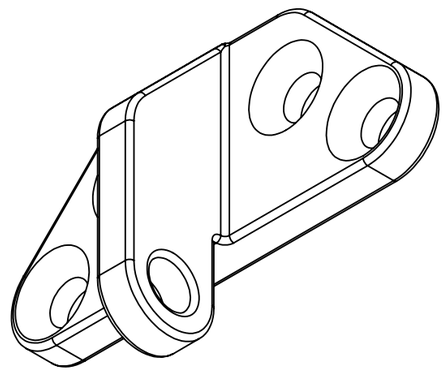


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:			DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE:	
DRAWN	Trieu Huynh Ba Nguyen						
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO. handle	A3
				WEIGHT:		SCALE:1:2	SHEET 1 OF 1

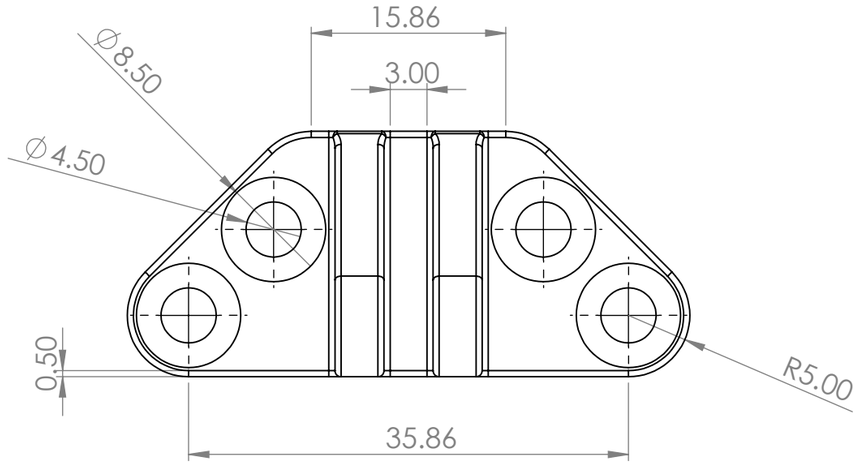


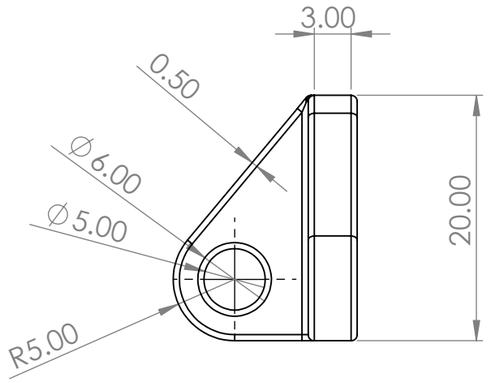


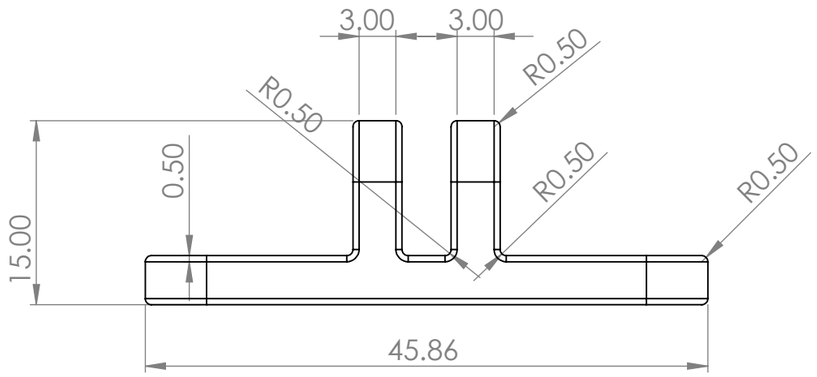


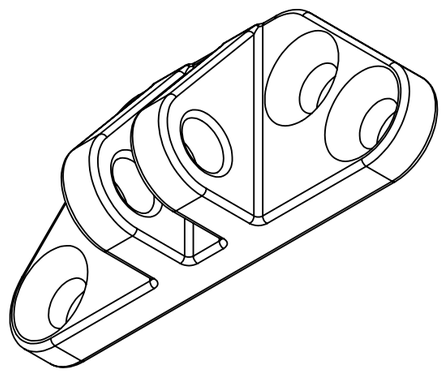


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:				DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE				TITLE:	
DRAWN	Trieu Huynh Ba Nguyen						Lever 1	
CHK'D								
APPV'D								
MFG								
Q.A				MATERIAL:			DWG NO. Exercise 4	A3
				WEIGHT:			SCALE:2:1	SHEET 1 OF 1

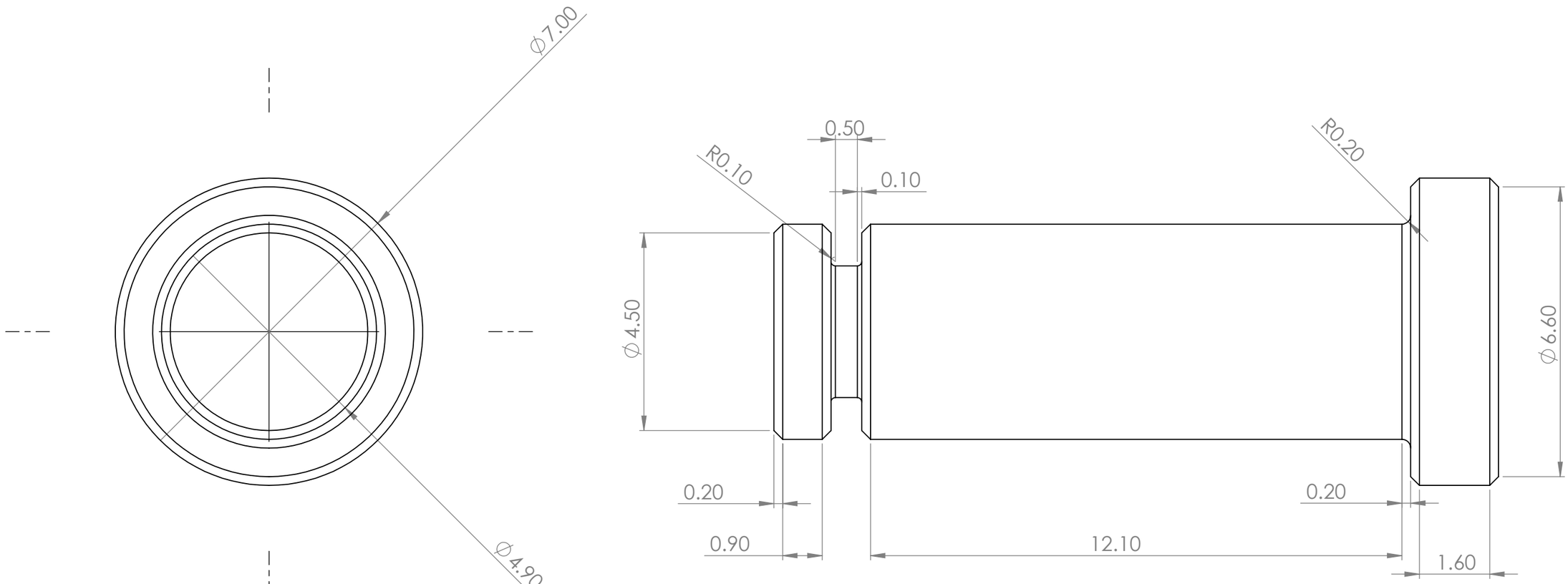




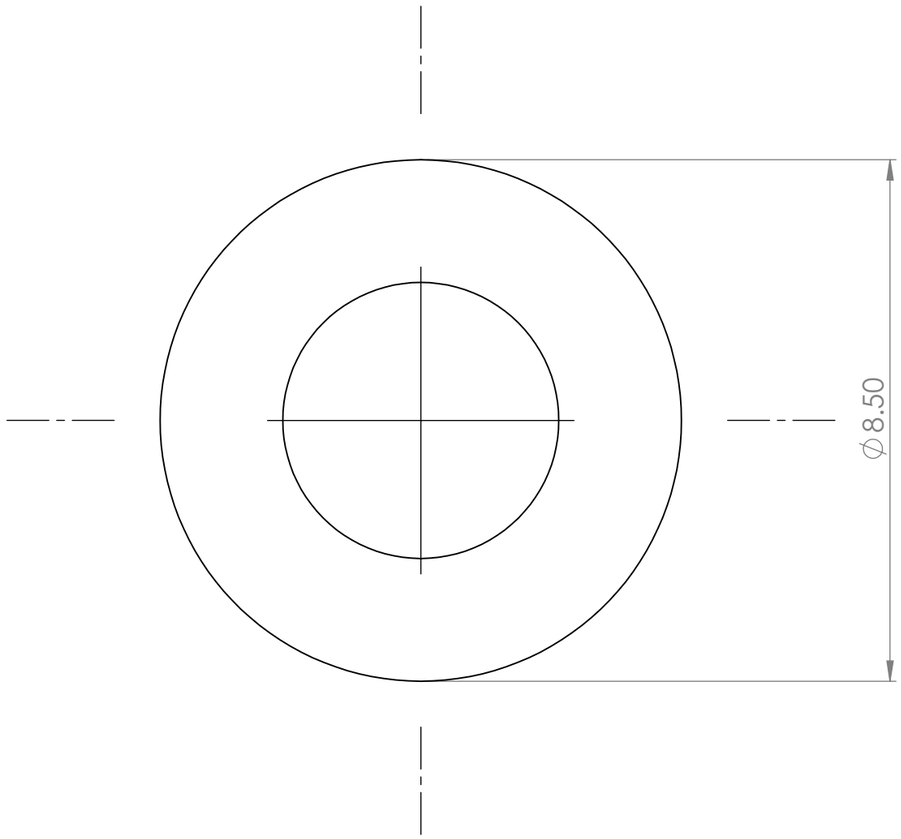


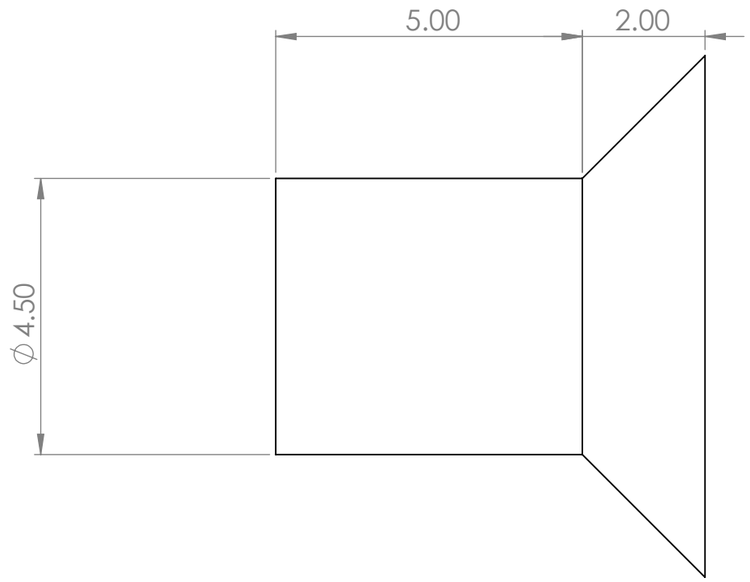


UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:				DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING / REVISION
	NAME	SIGNATURE	DATE				TITLE: Lever 2
DRAWN	Trieu Huynh Ba Nguyen						
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:			DWG NO. Exercise 4 / A3
				WEIGHT:			SCALE:2:1 / SHEET 1 OF 1

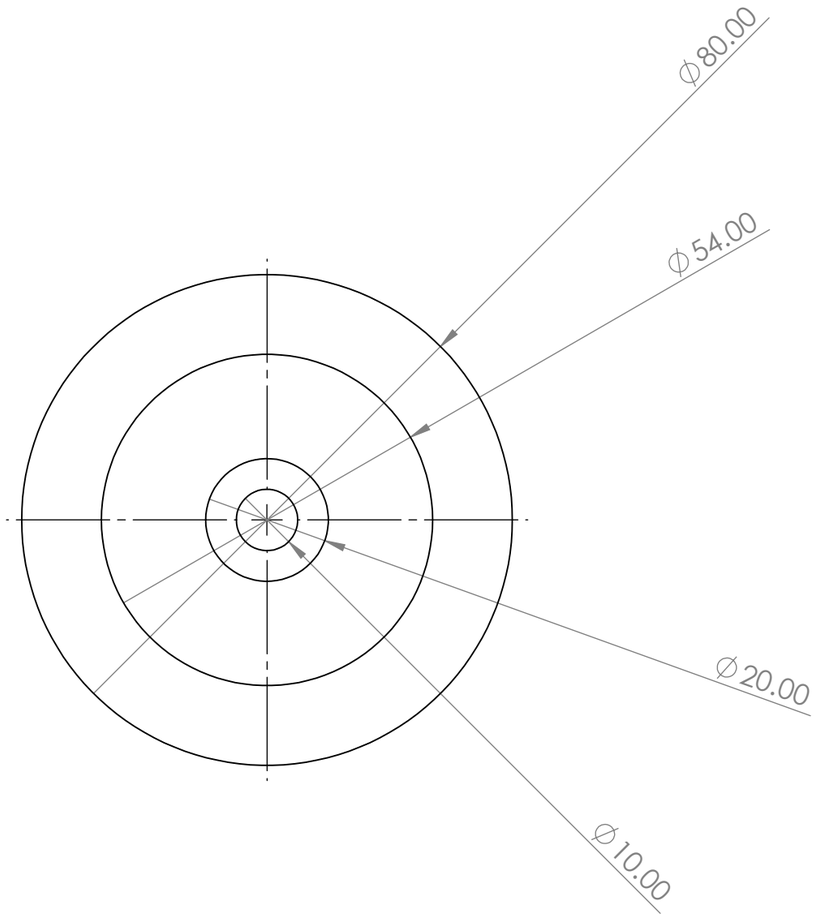


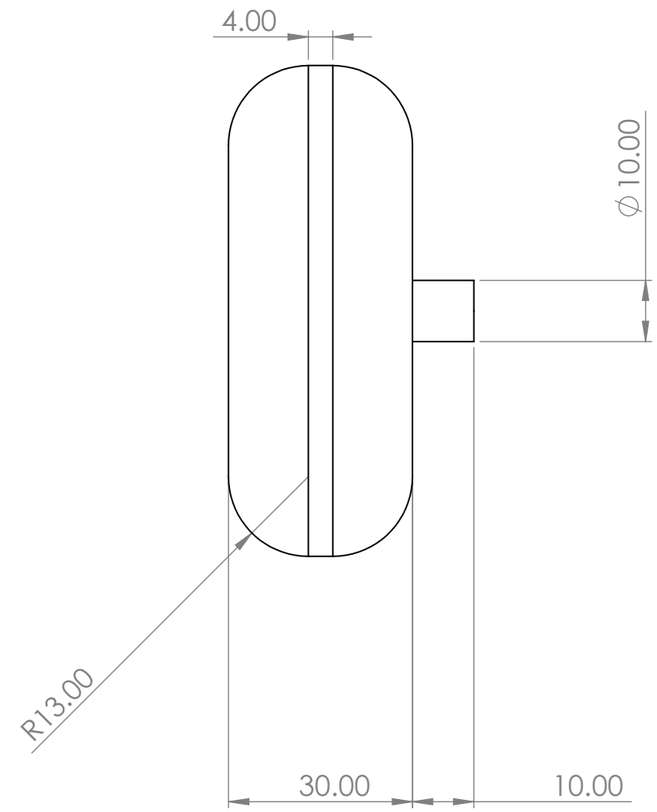
UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:		DEBURR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE:	
DRAWN	Trieu Huynh Ba Nguyen					Lever connector	
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO. Exersice 4	A3
				WEIGHT:		SCALE:10:1	SHEET 1 OF 1





UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:			DEBURR AND BREAK SHARP EDGES	DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE: Nut	
DRAWN	Trieu Huynh Ba Nguyen						
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO. Exercise 4	A3
				WEIGHT:		SCALE:10:1	SHEET 1 OF 1





UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN MILLIMETERS SURFACE FINISH: TOLERANCES: LINEAR: ANGULAR:		FINISH:		DEBURR AND BREAK SHARP EDGES		DO NOT SCALE DRAWING	REVISION
	NAME	SIGNATURE	DATE			TITLE:	
DRAWN	Trieu Huynh Ba Nguyen						
CHK'D							
APPV'D							
MFG							
Q.A				MATERIAL:		DWG NO. wheel	A3
				WEIGHT:		SCALE:1:1	SHEET 1 OF 1

MATERIALS: TRAVEL LUGGAGE

ITEM NUMBER	PART NAME	MATERIALS	QUANTITY
1	Shell 1	Polyethylene Cross-linked	1
2	Shell 2	Polyethylene Cross-linked	1
3	Handle bar	1060 Alloy (Aluminium)	2
4	Handle	Polyethylene Cross-linked	1
5	Wheel	Silicon rubber	2
6	Lever 1	1060 Alloy (Aluminium)	2
7	Lever 2	1060 Alloy (Aluminium)	2
8	Lever connector	1060 Alloy (Aluminium)	2
9	Nut	1060 Alloy (Aluminium)	16