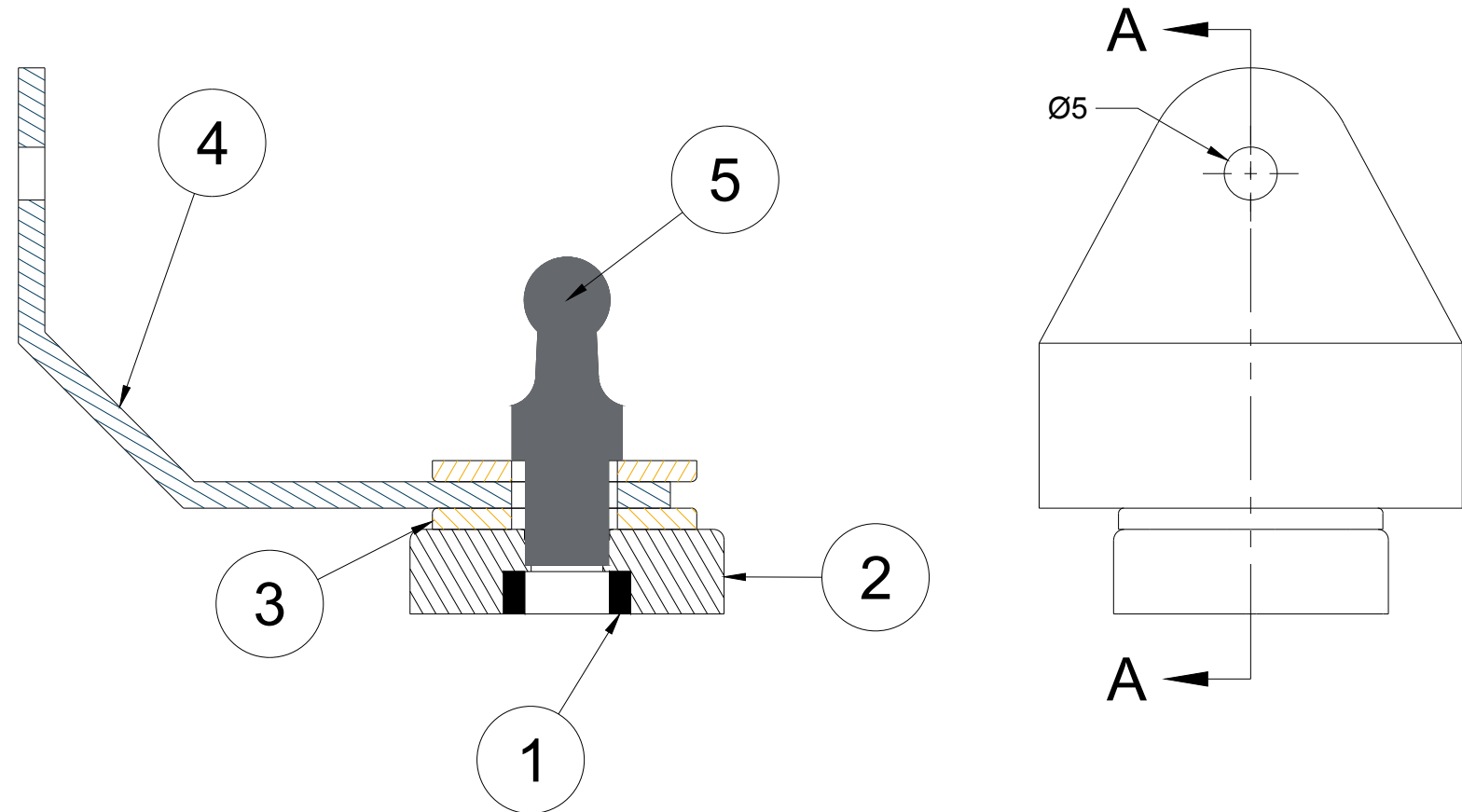
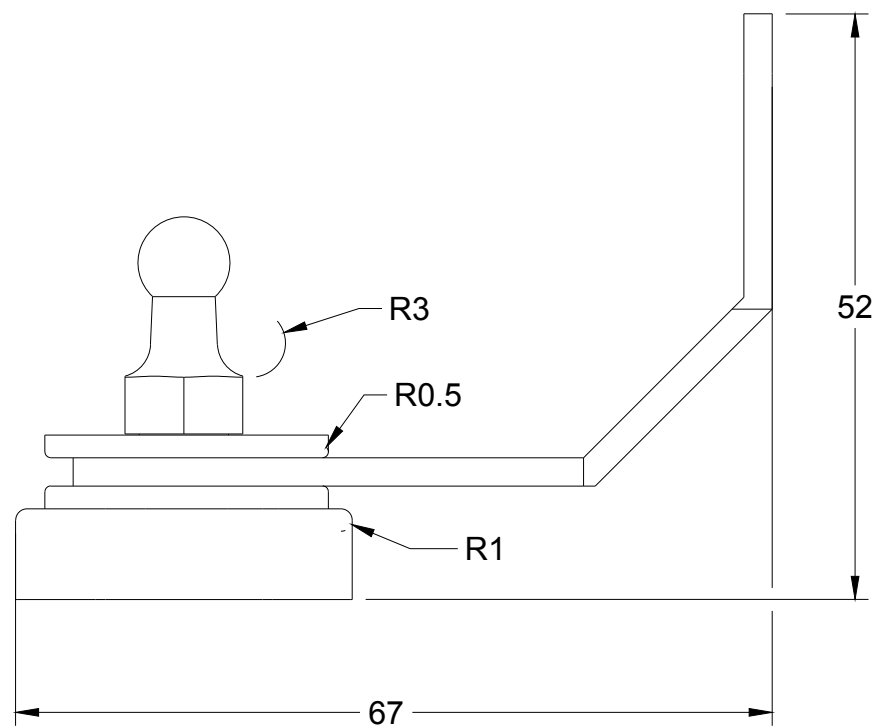



PARTS LIST			
ITEM	QTY	PART NUMBER	MATERIAL
1	1	DELRIN® WASHER	POH
2	1	DELRIN® NUT	STAINLESS STEEL
3	2	WASHER	STAINLESS STEEL
4	1	BIKE HITCH FLANGE	STAINLESS STEEL
5	1	BALL HITCH	STAINLESS STEEL

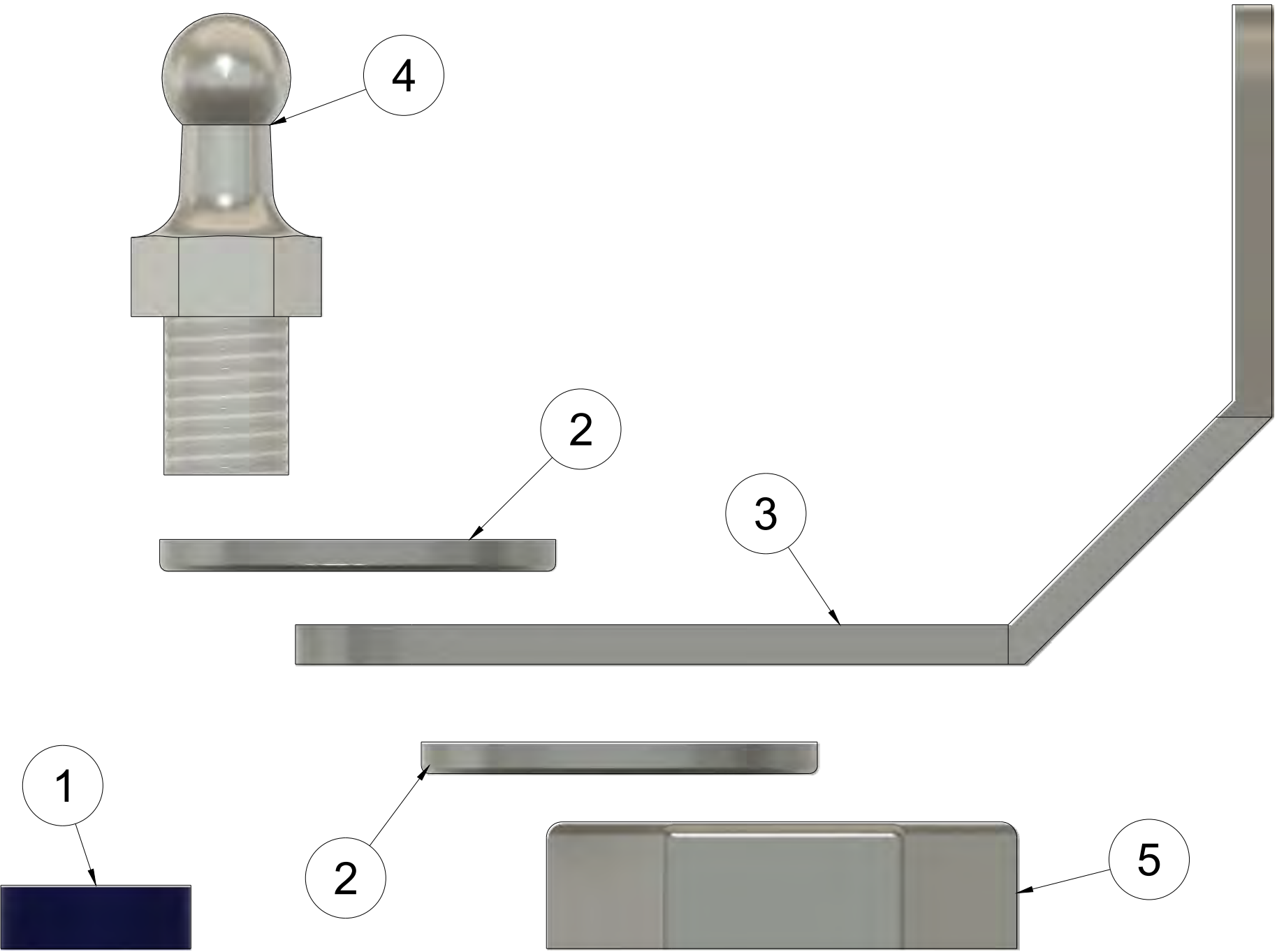
**SECTION A-A**  
SCALE 1.5:1



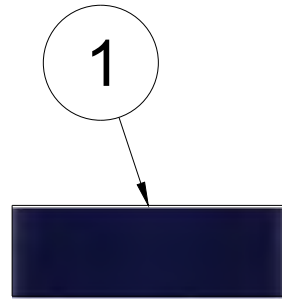
**NOTE:** A LOW BROW VERNIER CALIPER WAS USED TO MAKE THESE MEASUREMENTS SO ACCURACY ONLY TO THE ONE'S PLACE.

**DEFINITION:** POH - POLYOXYMETHYLENE

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS  TOLERANCES: X = ± 1 .X = ± .2 .XX = ± .05 X° = 1° ALL SURFACES $\sqrt{63}$  INTERPRET PER ASME Y14.5-2018			TITLE <b>BIKE CARGO TRAILER BALL HITCH</b>	
	DRAWN BY KIM KING 5/12/26		SIZE	REV
	MATERIAL STAINLESS STEEL & POH		B	A
	FINISH	PROJECTION	DWG NO 01	
SCALE 1.5:1		SHEET 1/1		



PARTS LIST			
ITEM	QTY	PART NUMBER	MATERIAL
1	1	DELRIN® WASHER	POH
2	2	WASHER	STAINLESS STEEL
3	1	BIKE HITCH FLANGE	STAINLESS STEEL
4	1	BALL HITCH	STAINLESS STEEL
5	1	DELRIN® NUT	STAINLESS STEEL



UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN MILLIMETERS

TOLERANCES:  
 X = ± 1  
 .X = ± .2  
 .XX = ± .05  
 X° = 1°  
 ALL SURFACES 63/

INTERPRET PER ASME Y14.5-2018

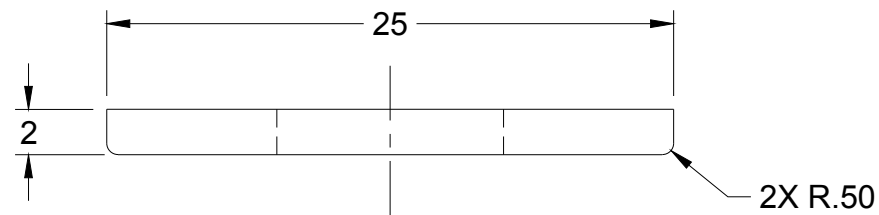
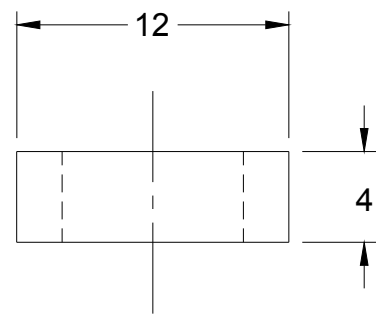
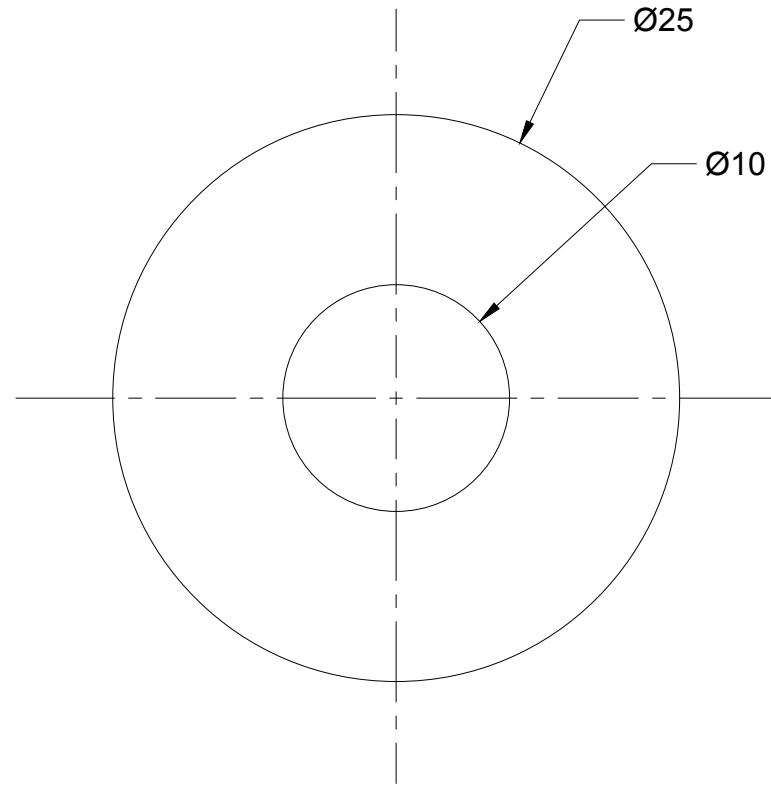
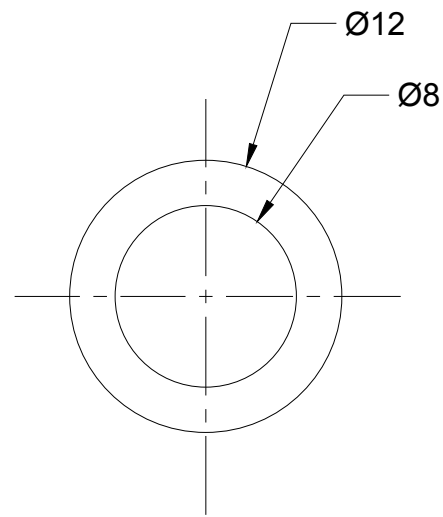
**MACHINE TECH** # LANEY COLLEGE

DRAWN BY KIM KING 5/15/26

MATERIAL  
STAINLESS STEEL & POH

FINISH PROJECTION

TITLE		
BIKE CARGO TRAILER BALL HITCH		
SIZE	DWG NO	REV
B	01	A
SCALE	SHEET	
3:1	1/1	

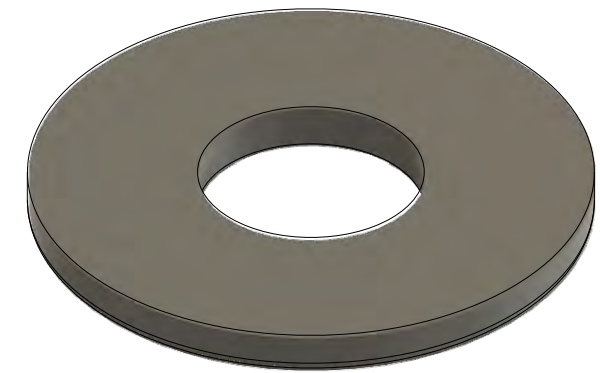


**NOTE:** A LOW BROW VERNIER CALIPER WAS USED TO MAKE THESE MEASUREMENTS SO ACCURACY ONLY TO THE ONE'S PLACE.

PLACED BOTH WASHERS IN THIS SINGLE DRAWING SINCE THEIR FEATURES ARE UNEVENTFUL.

**DEFINITION:** POH - POLYOXYMETHYLENE

**BALL HITCH ASSEMBLY PART**  
**DELRIN® POH WASHER SCALE 3:1**



**BALL HITCH ASSEMBLY PART**  
**STANDARD WASHER**  
**SCALE 3:1**

UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN MILLIMETERS

TOLERANCES:  
X = ± 1  
.X = ± .2  
.XX = ± .05  
X° = 1°  
ALL SURFACES 63/

INTERPRET PER ASME Y14.5-2018



DRAWN BY KIM KING 5/16/26

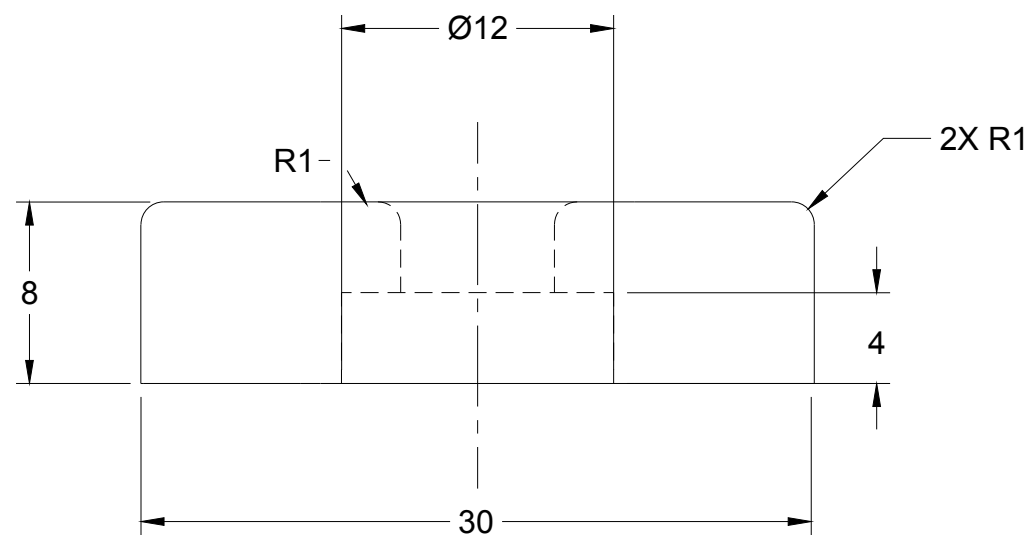
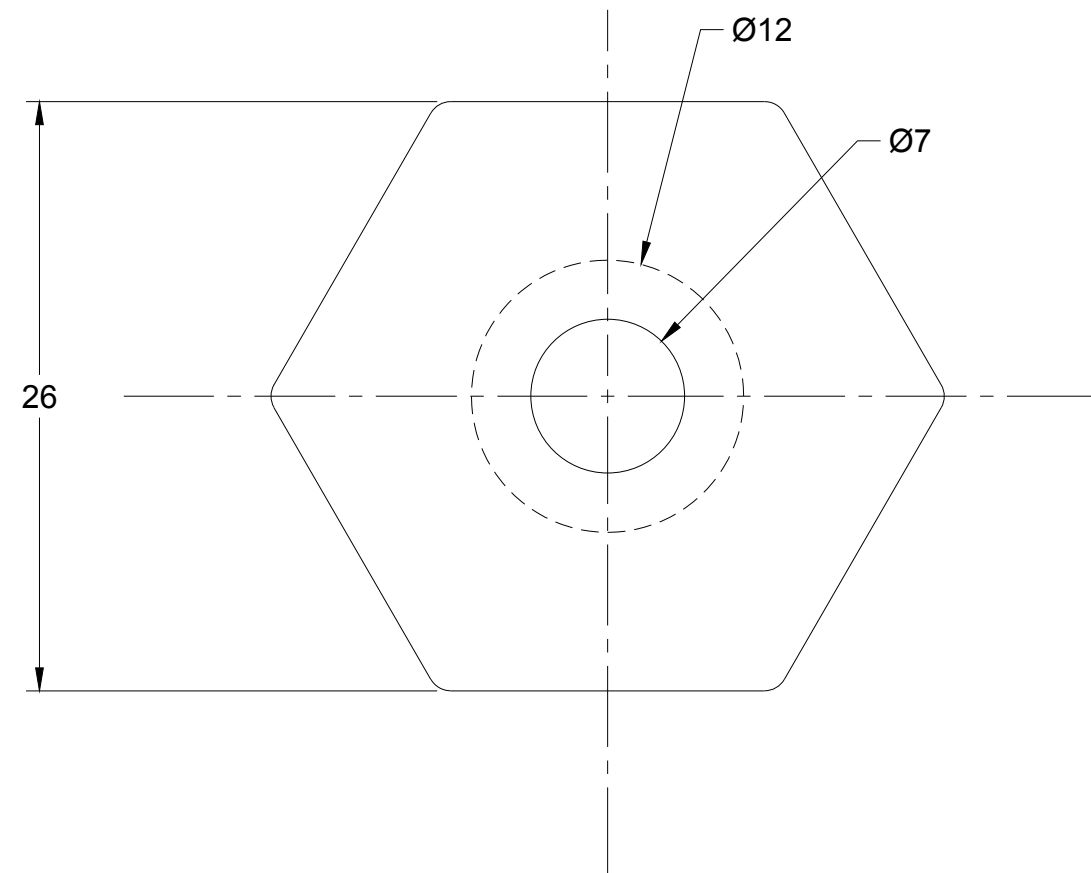
MATERIAL  
POH & STAINLESS STEEL

FINISH PROJECTION

TITLE  
**BIKE CARGO TRAILER**  
**BALL HITCH**

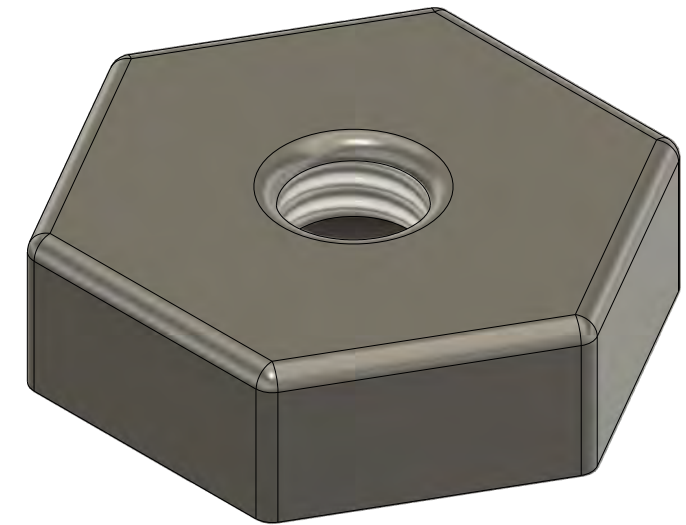
SIZE	DWG NO	REV
B	01	A

SCALE 3:1 (From parent) SHEET 1/1




**NOTE:** A LOW BROW VERNIER CALIPER WAS USED TO MAKE THESE MEASUREMENTS SO ACCURACY ONLY TO THE ONE'S PLACE.

**THREAD - ANSI METRIC**  
**SIZE - 8 MM**  
**DESIGNATION - M8X1.25**  
**DIRECTION - RIGHT HAND**

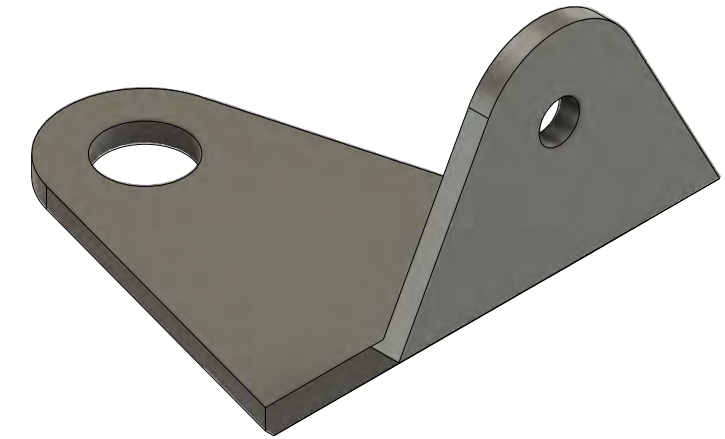


**BALL HITCH ASSEMBLY PART**  
**DELRIN® NUT**  
 SCALE 3:1

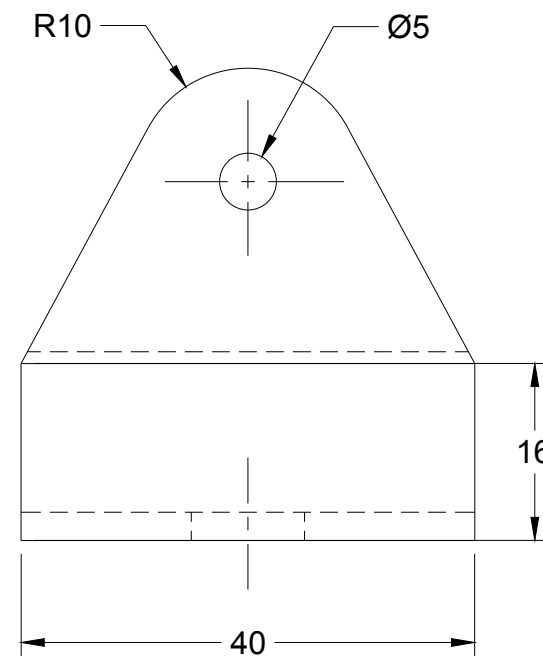
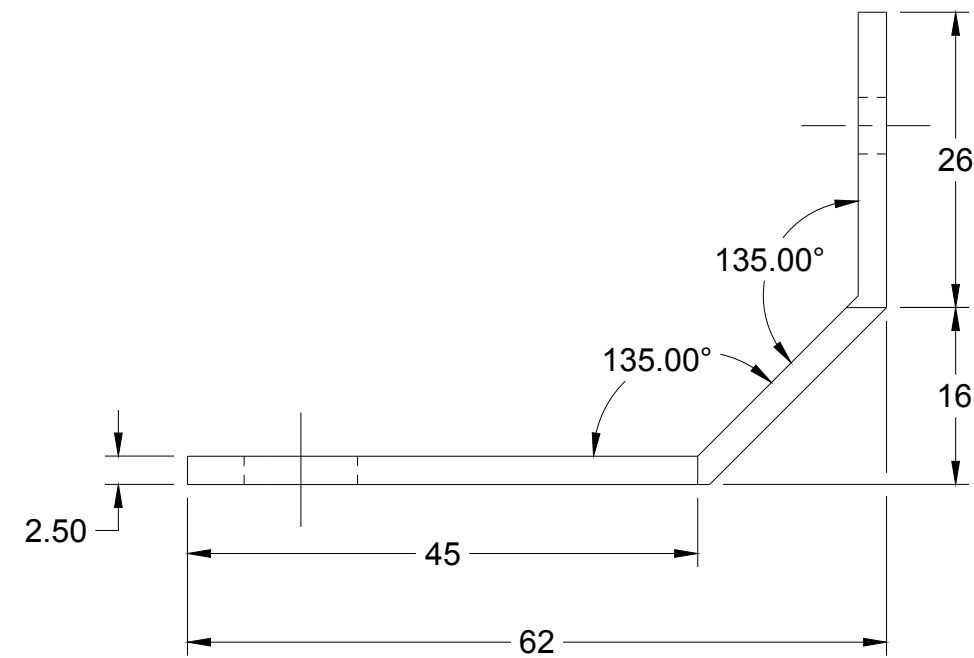
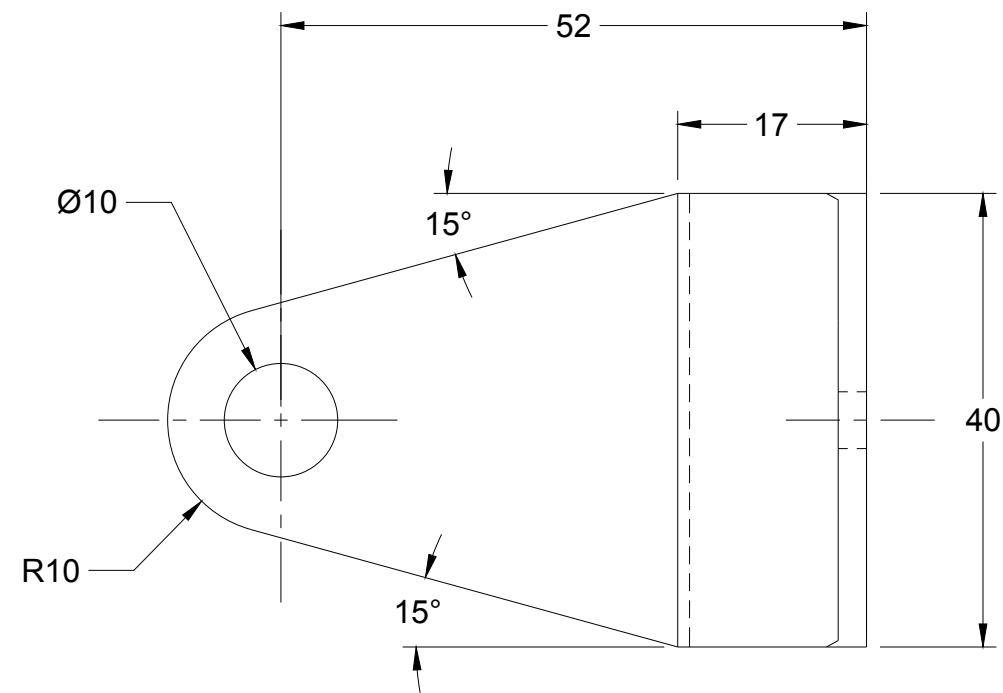
UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS  TOLERANCES: X = ± 1 .X = ± .2 .XX = ± .05 X° = 1° ALL SURFACES $\sqrt{63}$  INTERPRET PER ASME Y14.5-2018			TITLE	
	DRAWN BY KIM KING		5/16/26	
	MATERIAL		STAINLESS STEEL	
	FINISH	PROJECTION		
		SIZE	DWG NO	REV
		B	01	A
		SCALE	SHEET	
		3:1 (From parent)	1/1	

**BIKE CARGO TRAILER**  
**BALL HITCH**

**NOTE:** A LOW BROW VERNIER CALIPER WAS USED TO MAKE THESE MEASUREMENTS SO ACCURACY ONLY TO THE ONE'S PLACE.



**BALL HITCH ASSEMBLY PART  
FLANGE**  
SCALE 1.5:1



UNLESS OTHERWISE SPECIFIED  
DIMENSIONS ARE IN MILLIMETERS

TOLERANCES:  
X = ± 1  
.X = ± .2  
.XX = ± .05  
X° = 1°  
ALL SURFACES 63/

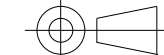
INTERPRET PER ASME Y14.5-2018



DRAWN BY KIM KING 5/16/26

MATERIAL  
STAINLESS STEEL

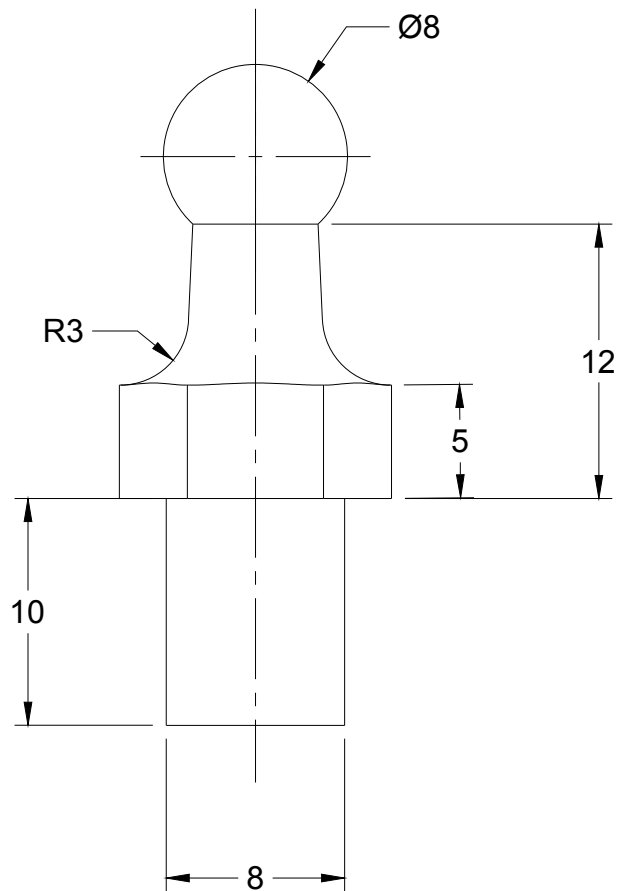
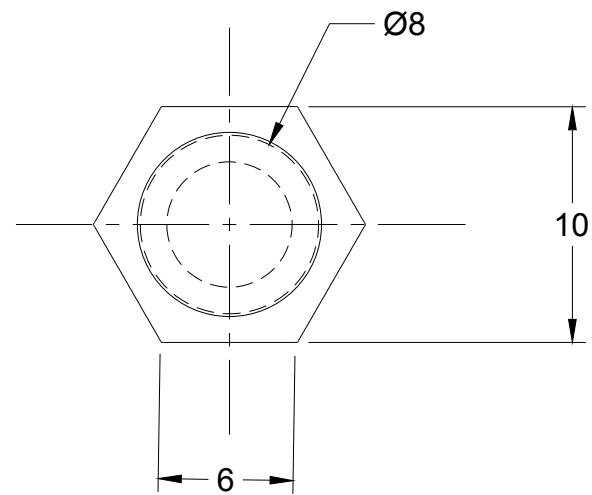
FINISH PROJECTION



TITLE  
**BIKE CARGO TRAILER  
BALL HITCH**

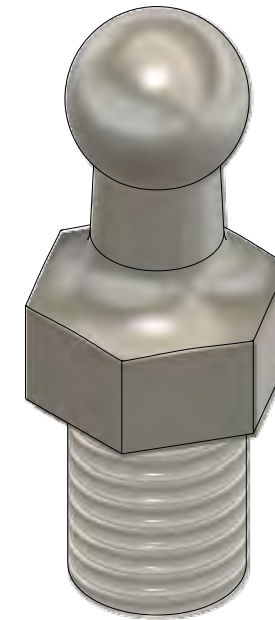
SIZE	DWG NO	REV
B	01	A

SCALE	SHEET
1.5:1	1/1





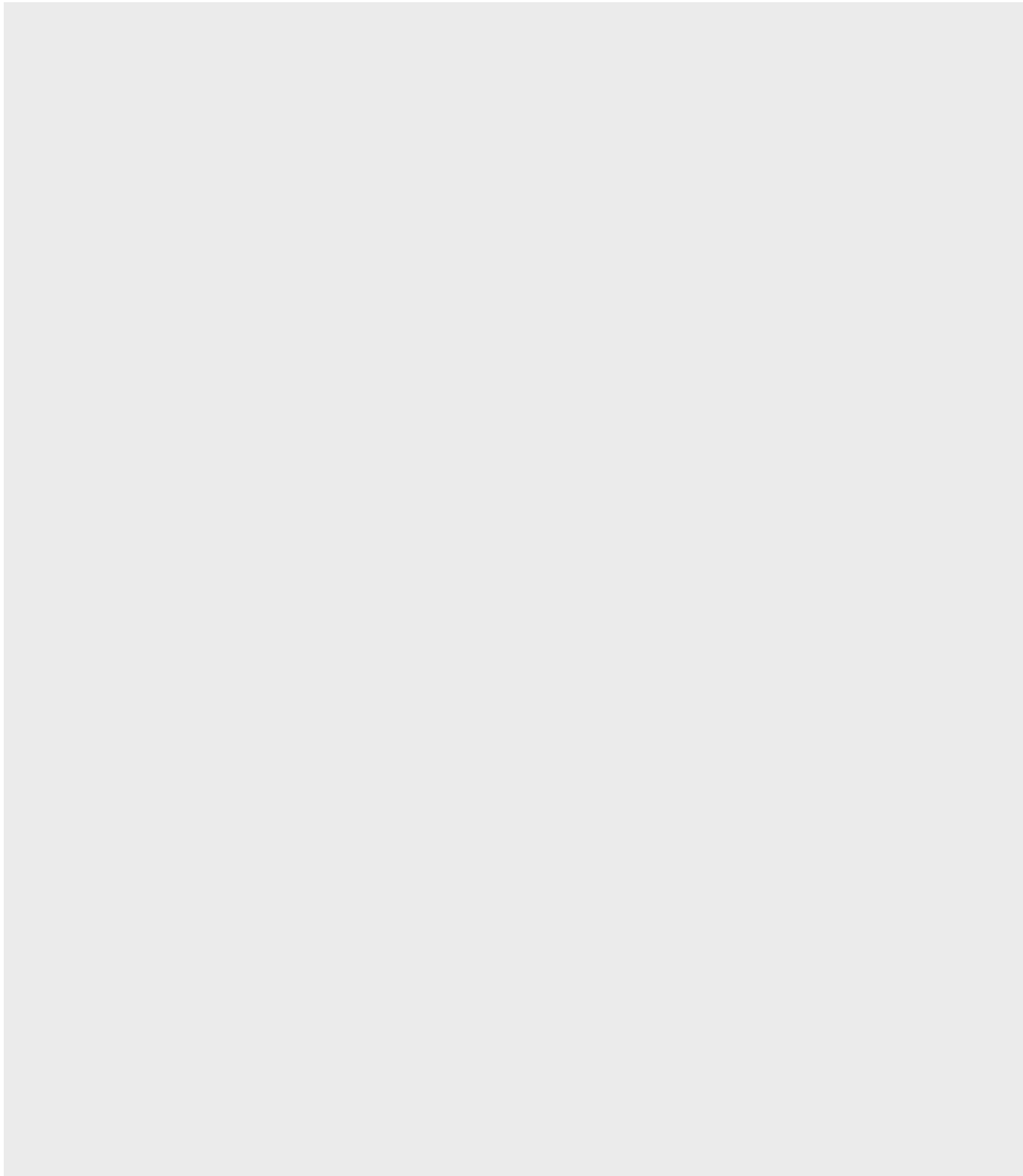
**NOTE:** A LOW BROW VERNIER CALIPER WAS USED TO MAKE THESE MEASUREMENTS SO ACCURACY ONLY TO THE ONE'S PLACE.

**THREAD** - ANSI METRIC  
**SIZE** - 8 MM  
**DESIGNATION** - M8X1.25  
**DIRECTION** - RIGHT HAND



**BALL HITCH ASSEMBLY PART**  
**BALL HITCH**  
 SCALE 3:1

UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN MILLIMETERS  TOLERANCES: X = ± 1 .X = ± .2 .XX = ± .05 X° = 1° ALL SURFACES 63/			TITLE <b>BIKE CARGO TRAILER          BALL HITCH</b>	
	DRAWN BY KIM KING 5/16/26		SIZE <b>B</b>	DWG NO 01
	MATERIAL STAINLESS STEEL		FINISH	PROJECTION 
	INTERPRET PER ASME Y14.5-2018		SCALE 3:1 (From parent)	REV A  SHEET 1/1



# QUIK-PAK BIKE CARGO TRAILER BALL HITCH

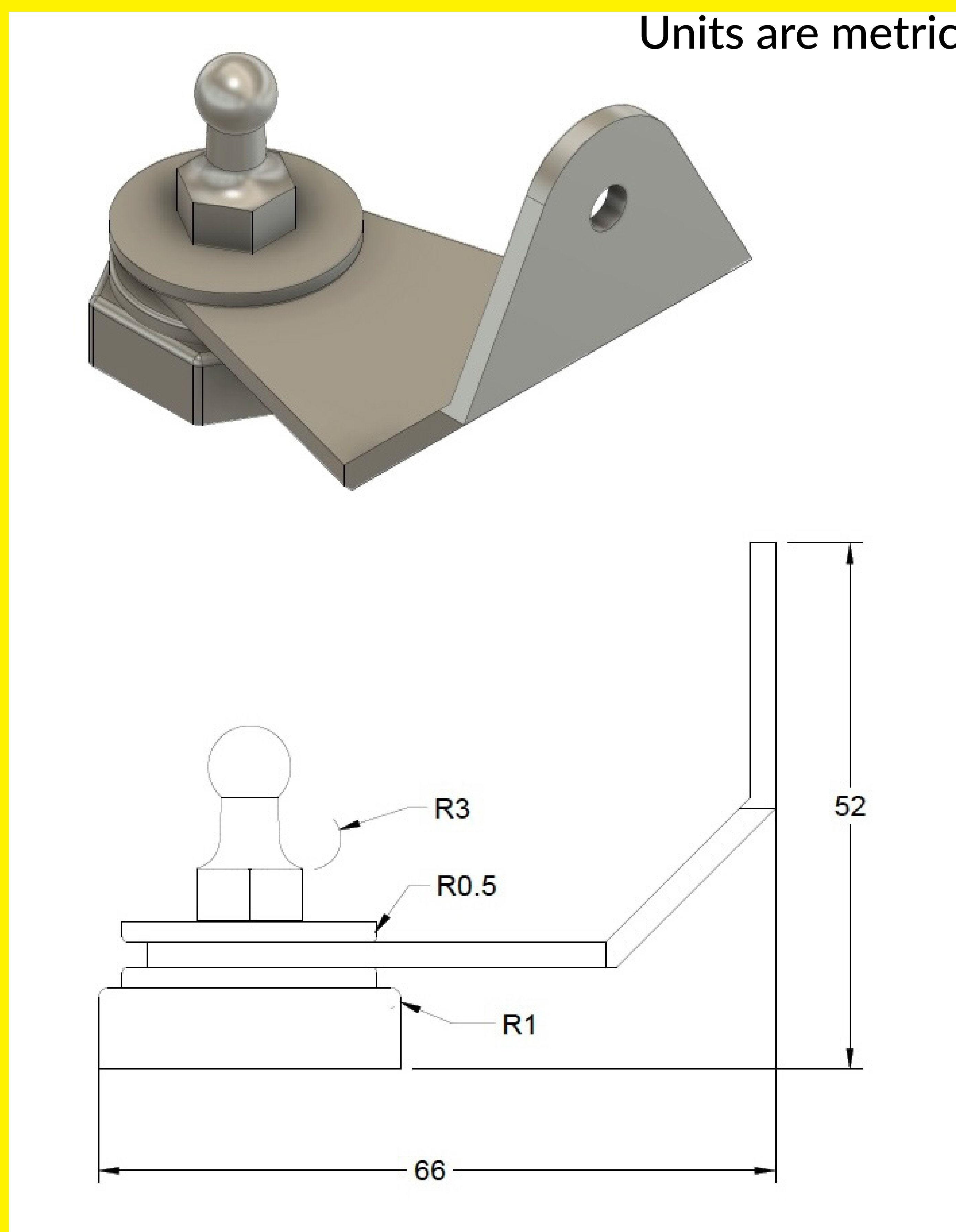
KIM KING  
MACH 20 CAD SOLID MODELING



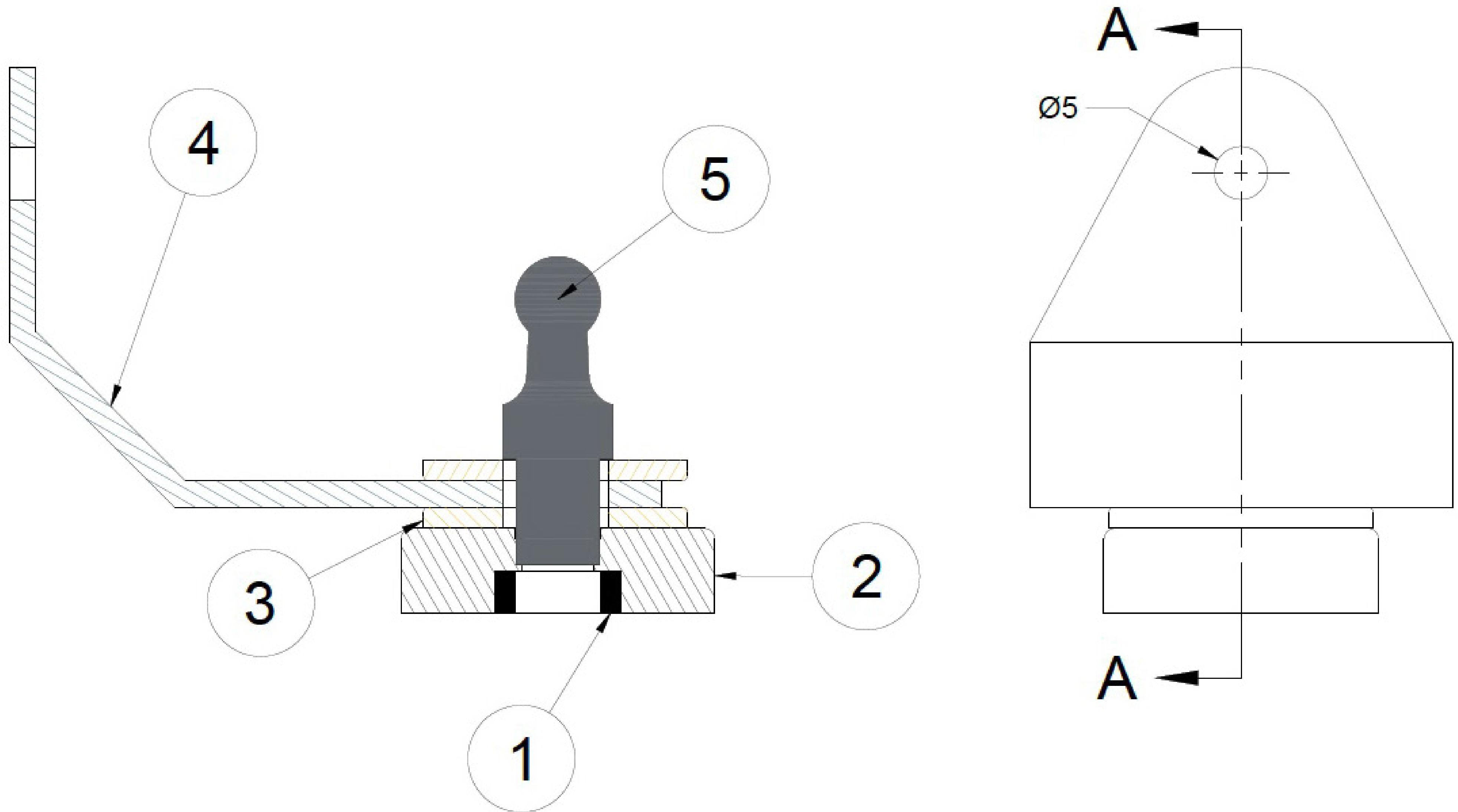
# QUIK-PAK TRAILER BALL HITCH ASSEMBLY

- Unique
- One-to-Two second attachment/detachment
- Connects to bicycle rear wheel axle
- Ball-socket, Delrin© hitch assembly

## 1 Image & Description



**SECTION A-A**  
SCALE 1.5:1



## 2 BOM

ITEM	QTY	PART NAME	MATERIAL
1	1	DELRIN WASHER	POH
2	1	DELRIN NUT	STAINLESS STEEL
3	2	WASHER	STAINLESS STEEL
4	1	FLANGE	STAINLESS STEEL
5	1	BALL HITCH	STAINLESS STEEL

Units are metric

- Access to a lathe
- Special cutting tool required
- Lathe radius cutting tool (expensive)
- Option - Create ball turning attachment
  - Bypass Vertical Mill use
  - Fabrication process (involved)
  - Off-center discs for lathe operations

### 3 Design Challenges

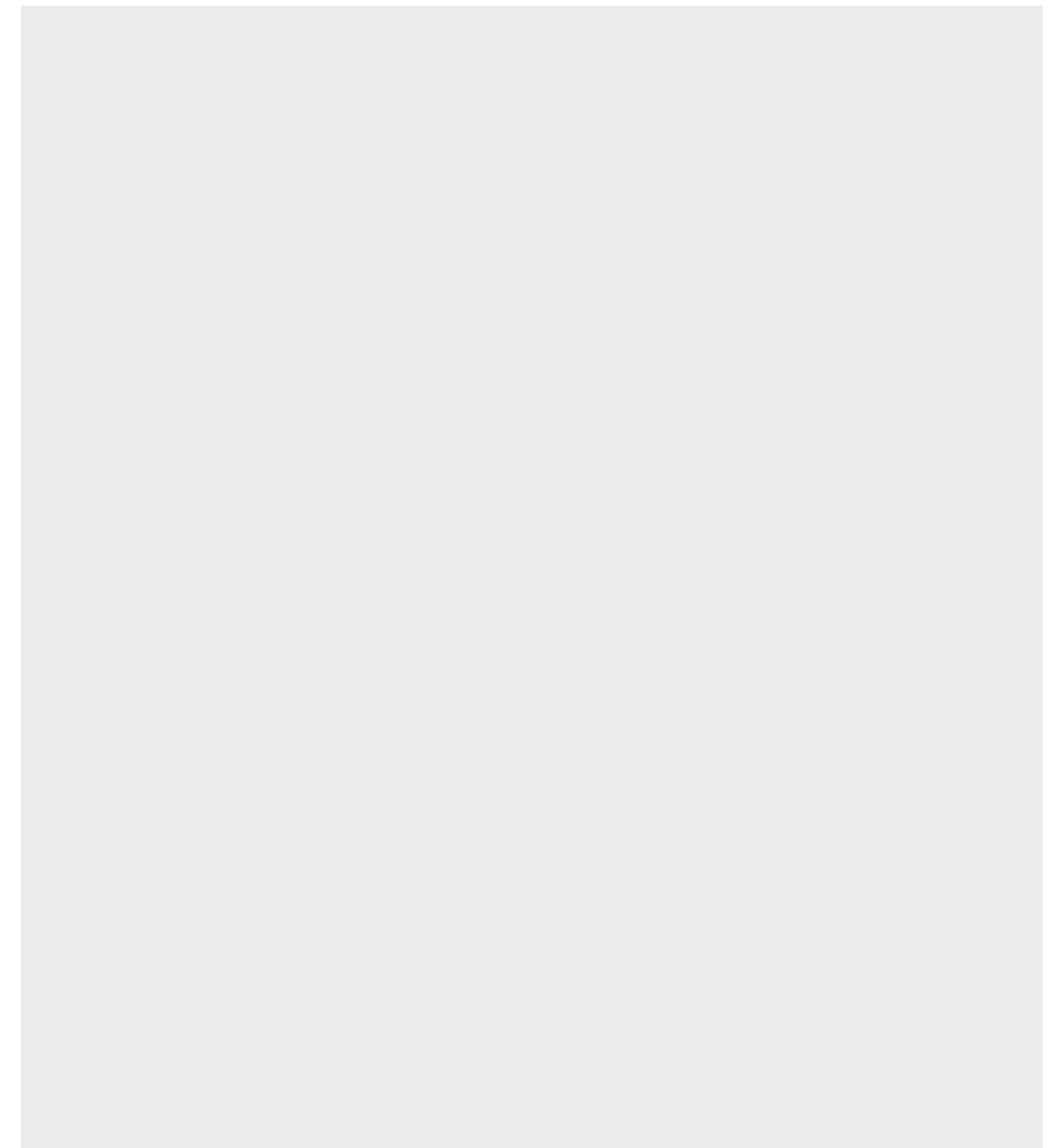


- (Still) Like reverse engineering designs
- Compile SOO when disassembling
- Measure, Re-measure, Re-measure
- Solicit feedback from experienced machinists
- Make Mitutoyo Vernier Caliper investment
- Apply patience (mandatory)

## **4 Lessons Learned**

- Obtain lathe shop access\*
- Fabricate:
  - Ball turning attachment
  - Radius cutting tool
  - Ball hitch assembly
- Research metals e.g. 4130 Chromoly Steel

\*Laney Machine Shop  
(possibility)



## 5 Unfinished Tasks

