

Design Intent Document for Basketball Hoop Assembly		
Revision Date	Author	Assembly Description
25 April, 2022	Mike Hennessy and Matthew Bentsen	Basketball Hoop Assembly

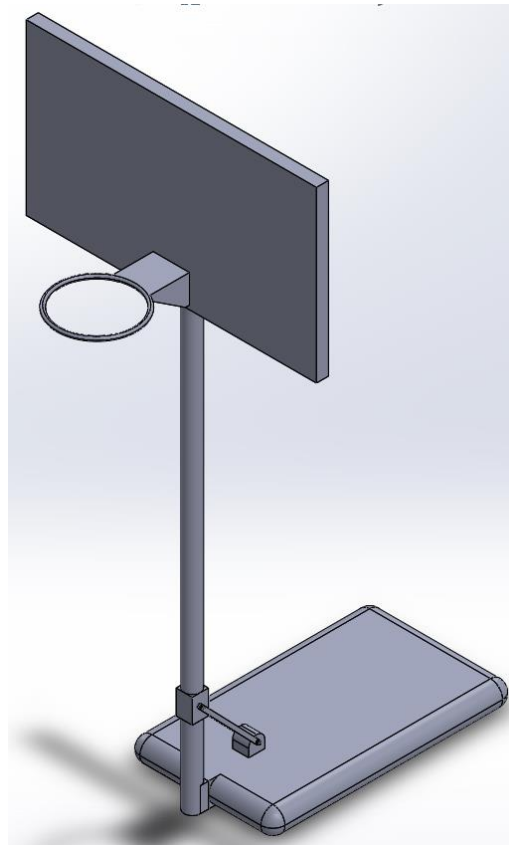


Figure 1. BASKETBALL HOOP ASSEMBLY

Assembly Overview	
General Description	This assembly is a basketball hoop assembly. It stands vertically from the ground and is stationary, with no moving parts. It does not attach to the ground, and rather just sits grounded because the base anchor has enough weight to hold it upright. It is best when placed on grass or cement. A basketball may be shot at the hoop, and the hoop should remain stationary, with the ball either going in the hoop or bouncing off a part of the backboard or rim.
Purpose	This assembly is being designed for recreational purposes. It is used for people to play basketball with. It is also portable because, though the assembly carries a lot of weight, it should not be attached anywhere else. The assembly will withstand forces being applied on it so that it has great longevity despite constant usage.
Basic Operation	The assembly will be operated by being placed on any flat surface. It will remain stationary when in use but can be moved from one place to

	another when not in use. A basketball net may be attached to the rim for better play. People may shoot or dunk the basketball into the hoop, and the rim may bend slightly, but it will withstand the forces of common gameplay.
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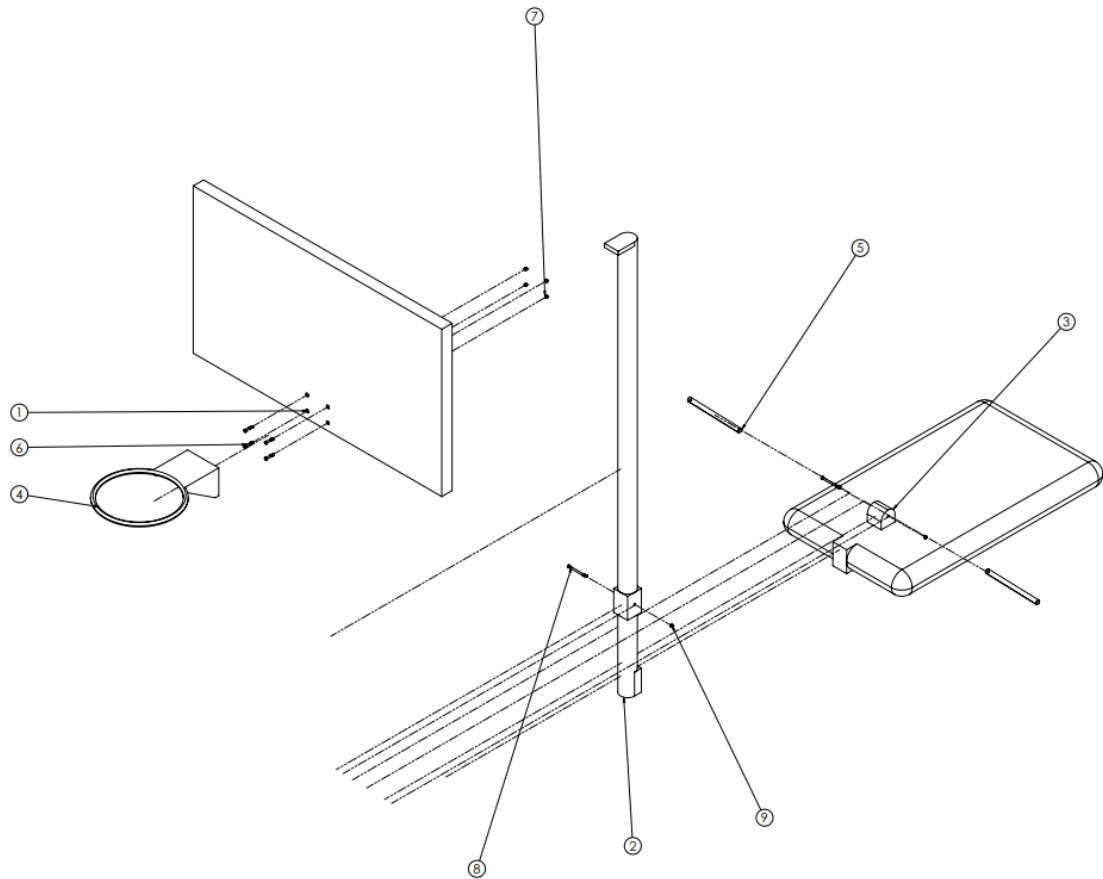


Figure 2. Basketball Hoop Assembly Parts View

Assembly Component/Feature Descriptions		
Ref	Component/Feature	Purpose
1	Backboard	The backboard is a large surface used for deflecting a basketball. It attaches to the rim in a four-bolt pattern and attaches to the long pole.
2	Large Pole	The large pole adds height to the hoop. It is attached to the backboard at the top and the base anchor at the bottom.
3	Base Anchor	The base anchor holds the assembly steadily on the ground. It is heavy, and therefore provides stability to keep the assembly stationary. It attaches to the large pole at the front end and attaches to both small poles towards the front end.
4	Rim	A basketball is meant to go through the rim. The rim is attached to the backboard in a four-bolt pattern.
5	Small Pole (2)	The small poles add extra strength to the system and prevent the

		large pole from detaching from the base anchor and falling forward. The small poles are attached to both the large pole and the base anchor, holding them in place. There are two large poles symmetrically distanced from the right plane.
6	HBOLT 0.3750-16x2x1-S (4)	The hex bolts are used as fasteners to attach the backboard and the rim.
7	HNUT 0.3750-16-D-N (4)	The hex nuts twist onto the end of the hex bolts and keep the backboard and the rim attached.
8	HBOLT 0.3750-24x5x1-S (2)	The hex bolts are used to fasten both of the small poles to the large pole and the base anchor respectively.
9	HNUT 0.3750-24-D-N (2)	The hex nuts twist onto the end of the hex bolts to keep each of the small poles secured to the large pole and base anchor.

Order of Assembly		
Step Number	Step Name	Step Description
1	Install Rim	Bolt the rim to the backboard by passing an HBOLT 0.3750-16x2x1-S through each of the four holes and secure each using an HNUT 0.3750-16-D-N.
2	Attach Large Pole	Attached the large pole to the backboard through welding.
3	Attach Base Anchor	Attach the base anchor to the base through welding.
4	Attach Small Poles to Base Anchor	Attach both small poles to the base anchor by lining up the holes of each small pole with the holes on either side of the base anchor. Pass the HBOLT 0.3750-24x5x1-S through each hole and secure with the HNUT 0.3750-24-D-N.
5	Attach Small Poles to Large Pole	Attach both small poles to the large pole by lining up the remaining holes of each small pole with the holes on either side of the rectangular section of the large pole. Pass the HBOLT 0.3750-24x5x1-S through each hole and secure with the HNUT 0.3750-24-D-N.

Appendices

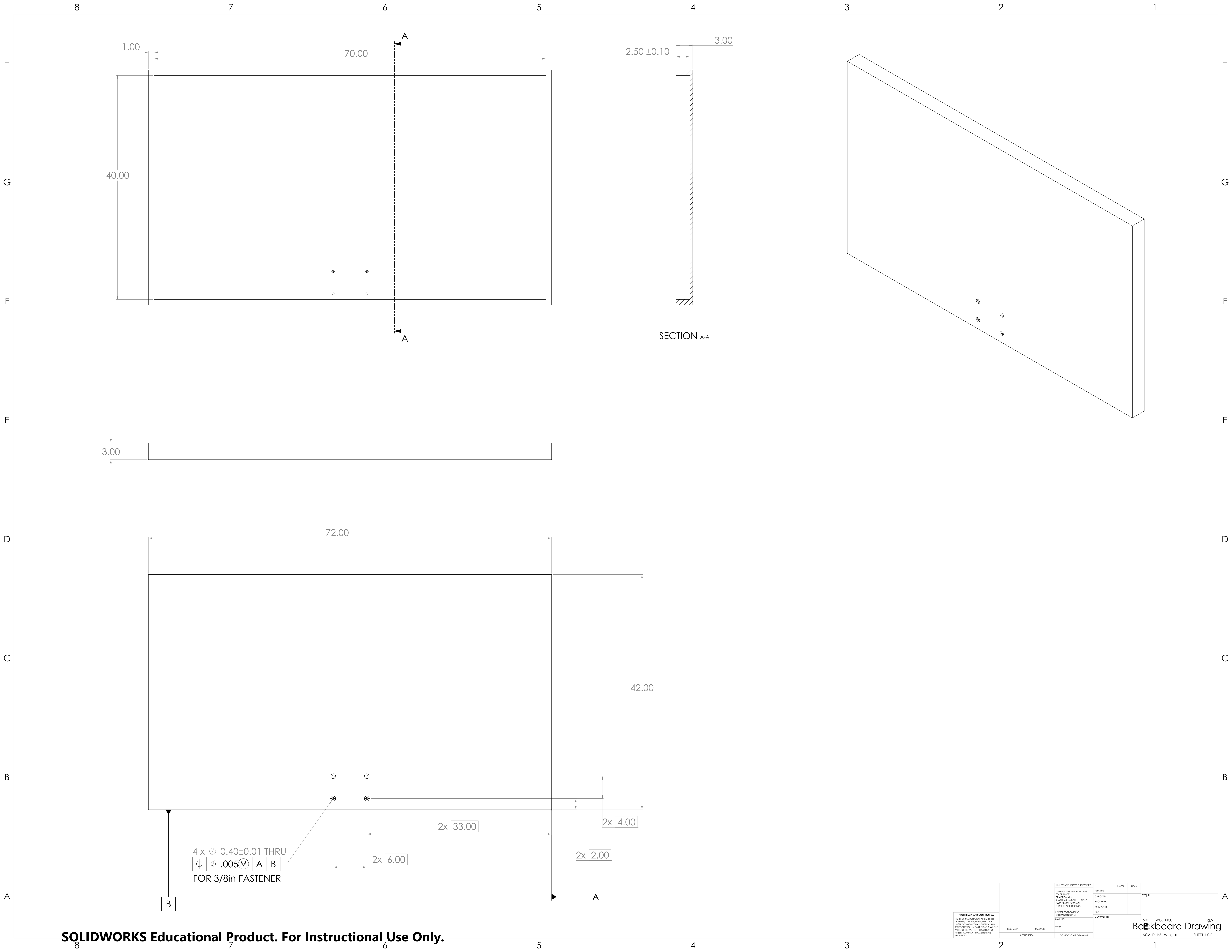
APPENDIX A) Detail Part Drawings for all Non-Standard Parts

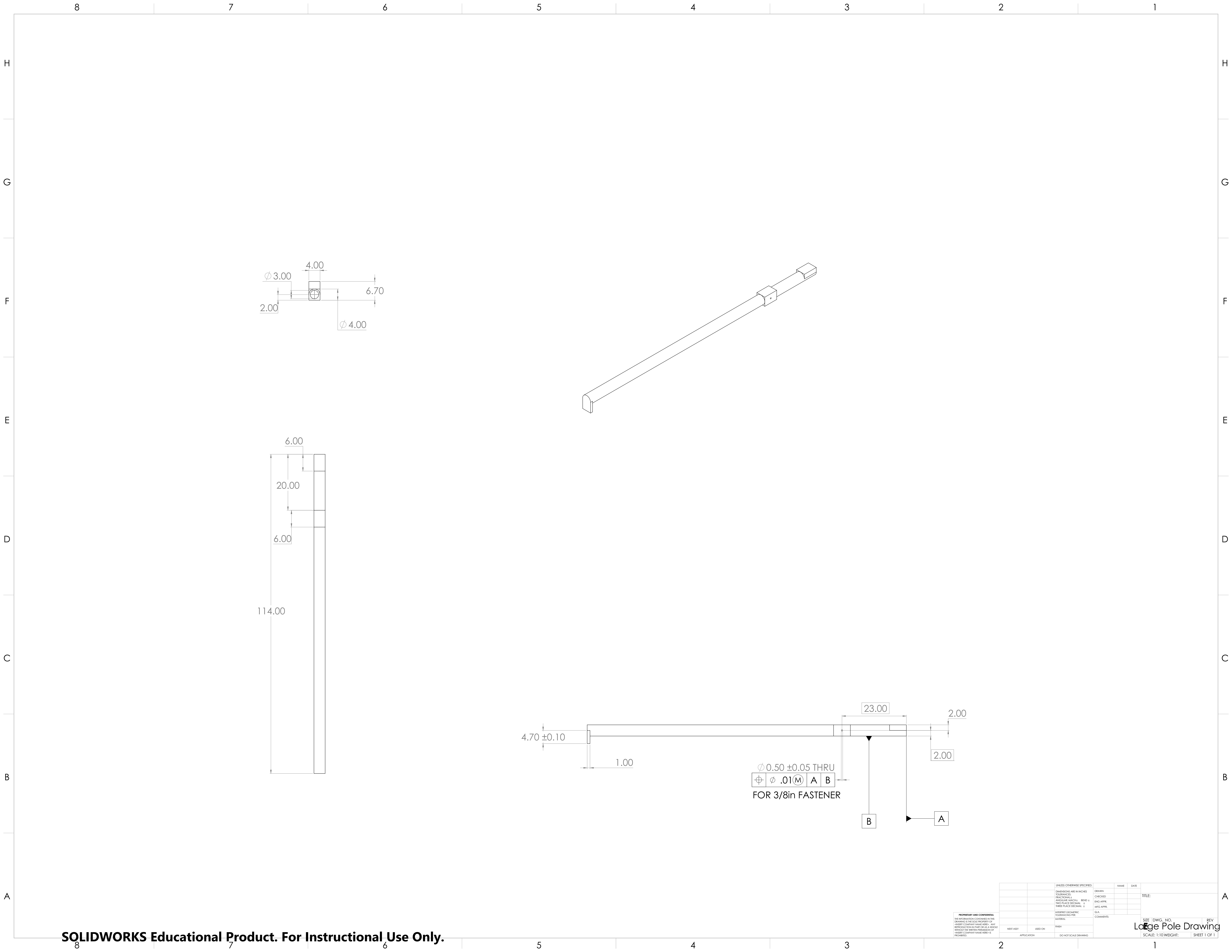
APPENDIX B) Installation Drawing

APPENDIX C) Interface Tolerance Analysis

APPENDIX D) Drawing Checklists for each Drawing

Appendix A - Part Drawings

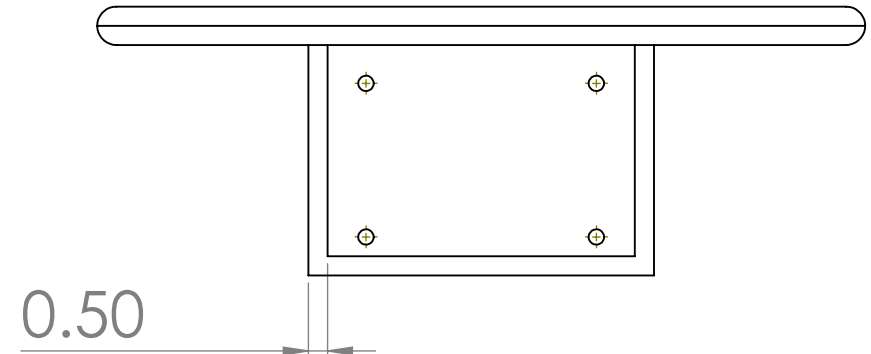
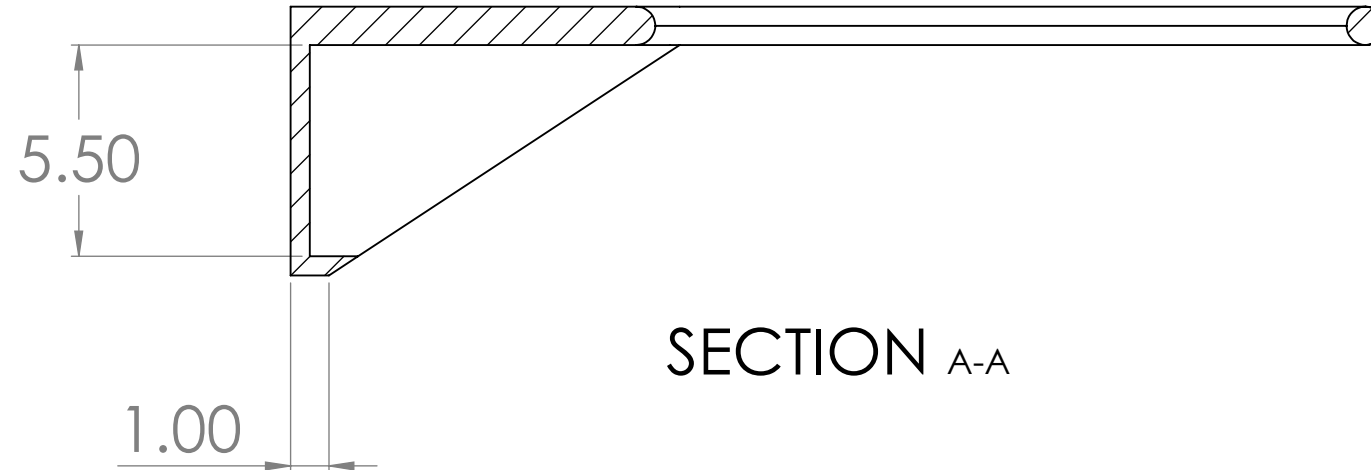
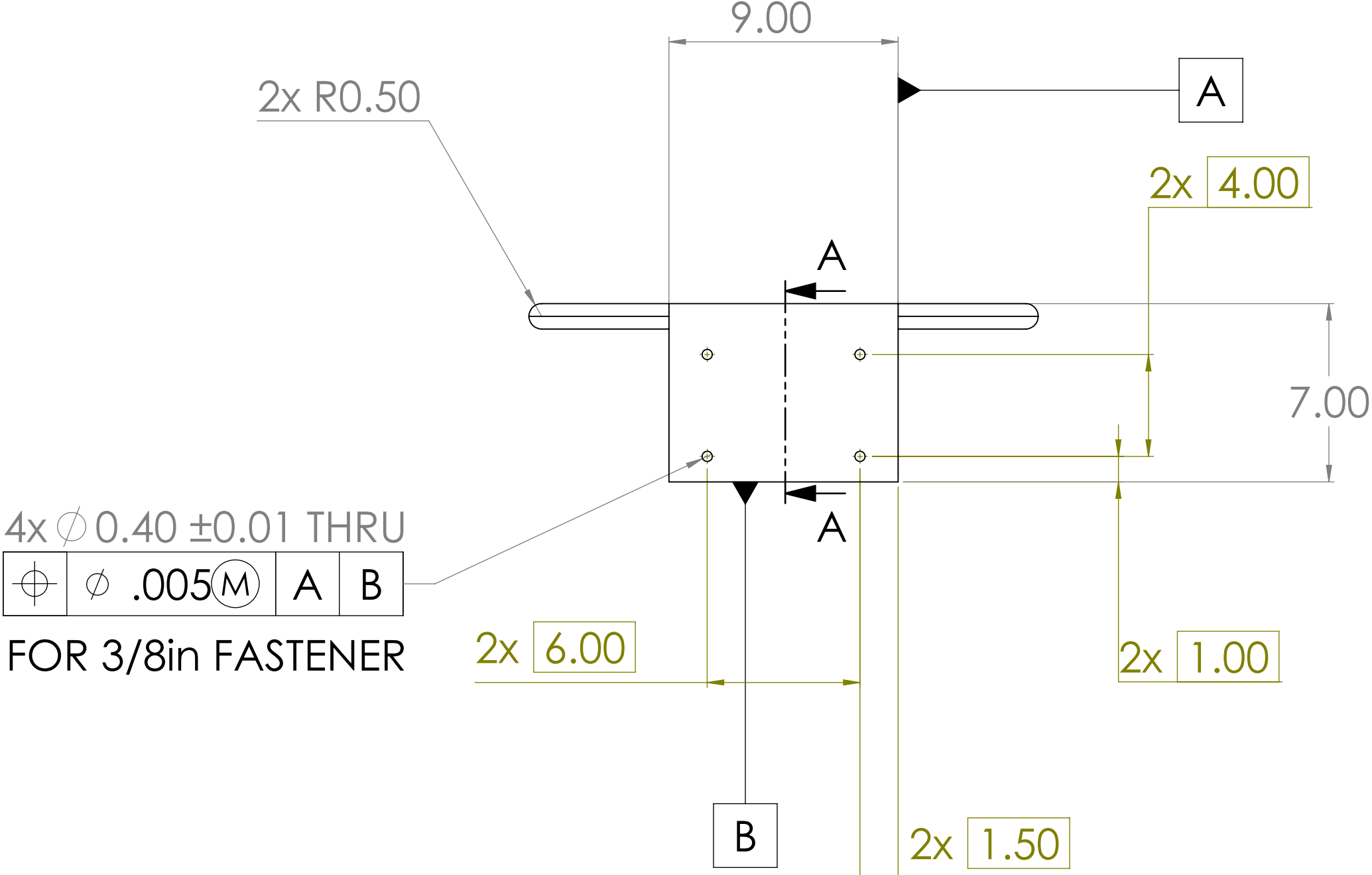
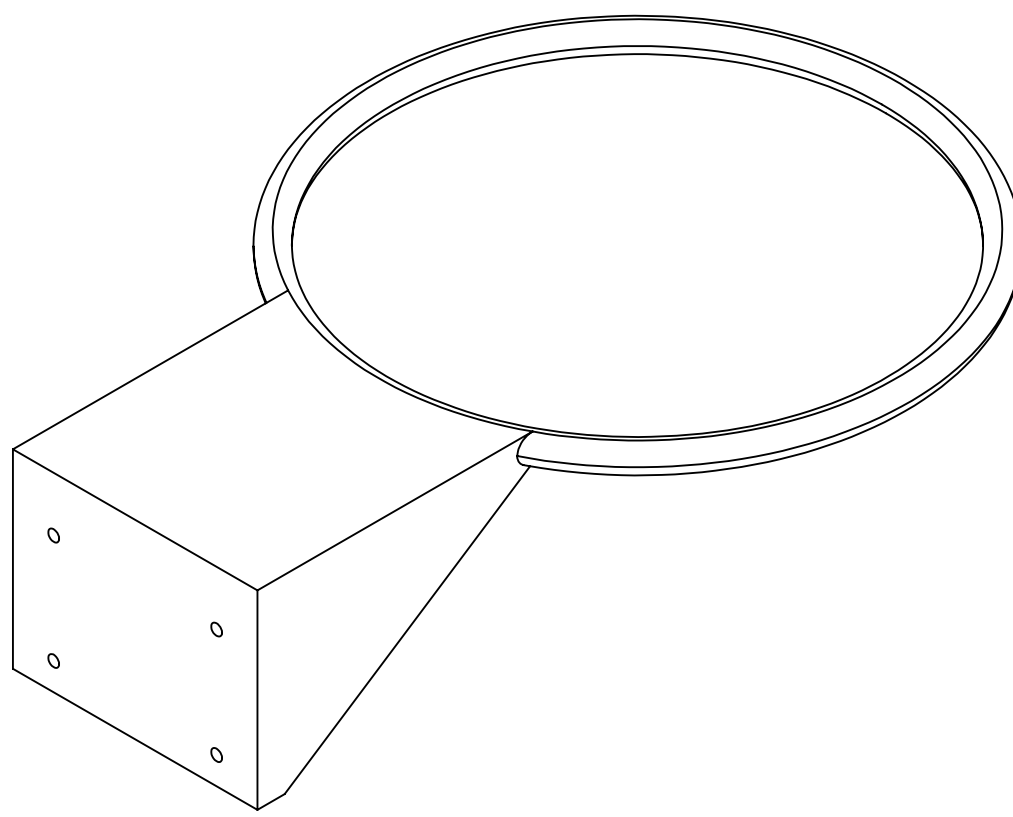
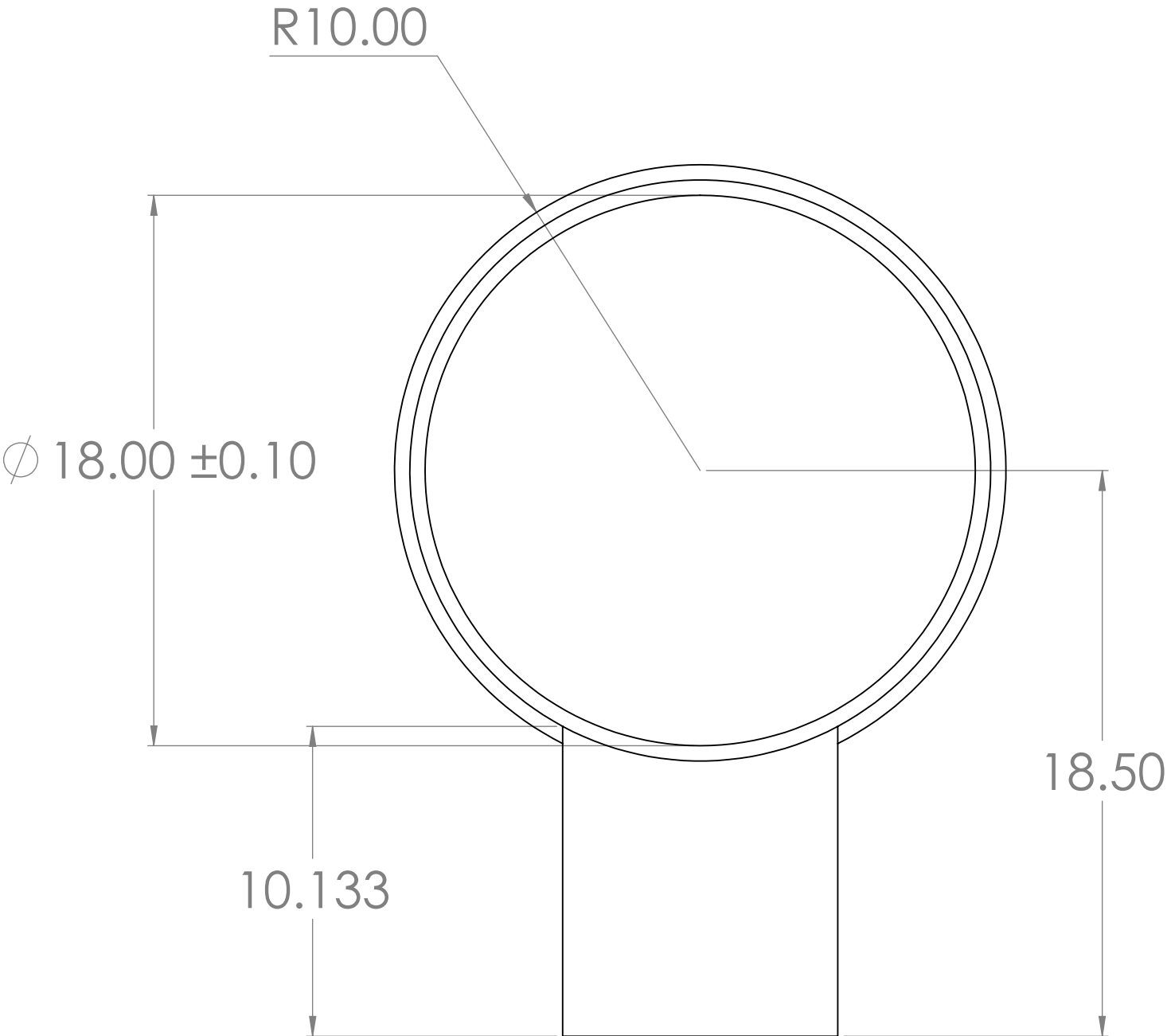


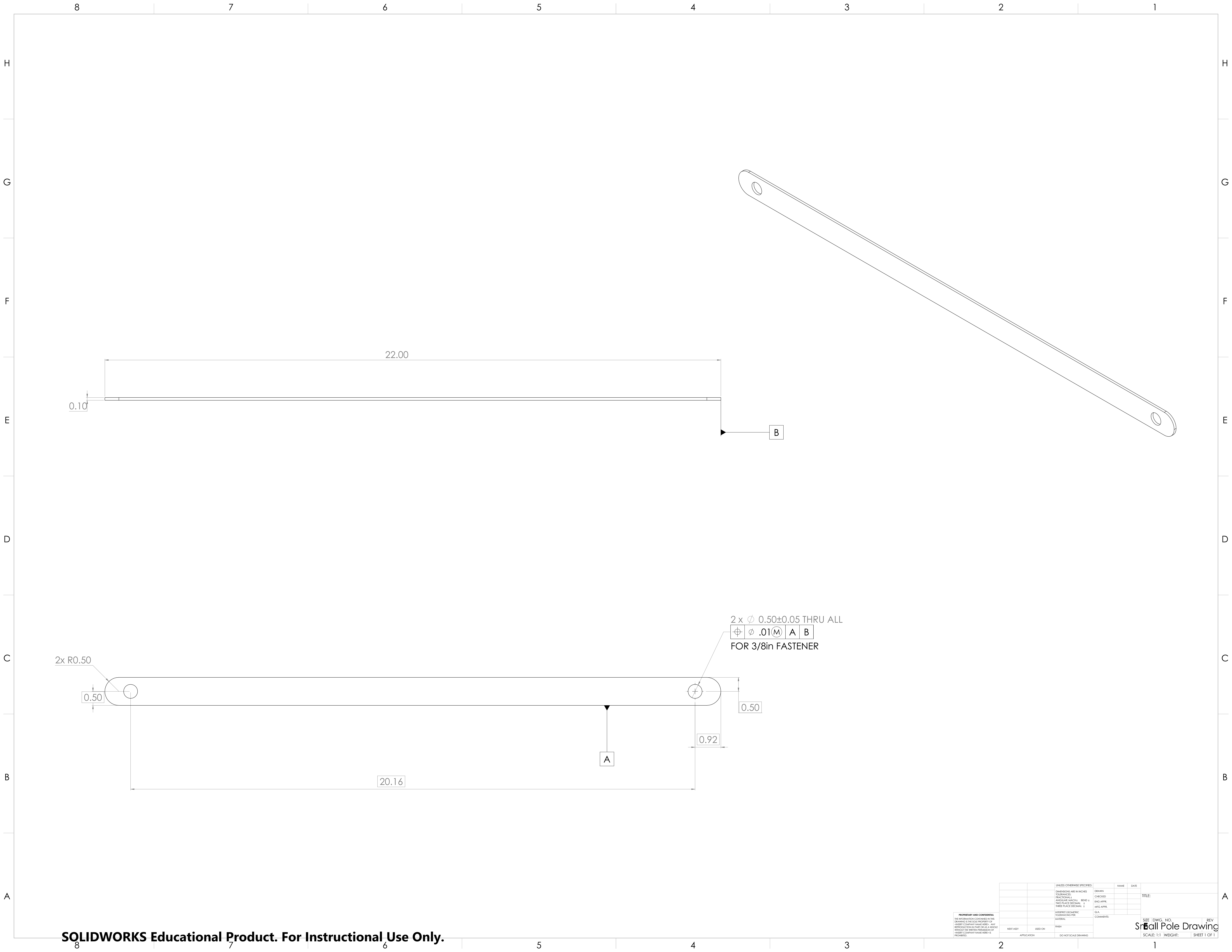


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		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES	CHECKED		
		FRACTIONAL 1/16	DECIMAL 1/16	END APPR.	
		ANGULAR 1/16	END APPR.		
		THREE PLACE DECIMAL 1/1000	END APPR.		
		THREE PLACE DECIMAL 1/1000	END APPR.		
		INTERPRET GEOMETRIC	COMMENTS:		
		TOLERANCES			
		(MATERIAL)			
		FINISH			
		APPLICATION			
		DO NOT SCALE DRAWING			

TITLE:		SIZE	DWG. NO.	REV
Large Pole Drawing		1:10	1	1
SCALE: 1:10		WEIGHT:	SHEET 1 OF 1	

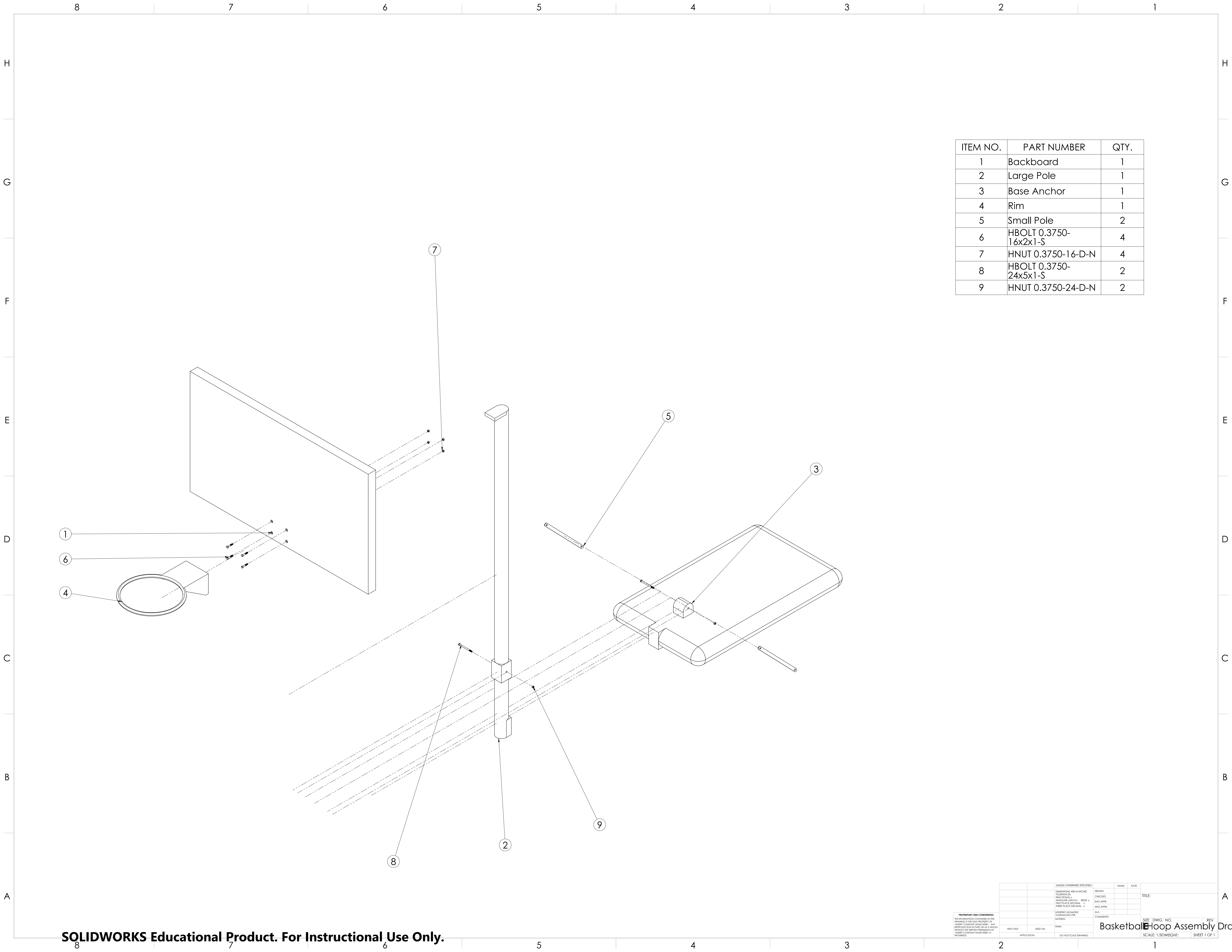
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		THREE PLACE DECIMAL ±	INFO APPR.		
		INTERPRET GEOMETRIC	Q.A.		
		TOLERANCES	COMMENTS:		
		(MATERIAL)			
		FINISH			
		USED ON			
		APPLICATION			
		DO NOT SCALE DRAWING			

Appendix B - Installation Drawings



ITEM NO.	PART NUMBER	QTY.
1	Backboard	1
2	Large Pole	1
3	Base Anchor	1
4	Rim	1
5	Small Pole	2
6	HBOLT 0.3750-16x2x1-S	4
7	HNUT 0.3750-16-D-N	4
8	HBOLT 0.3750-24x5x1-S	2
9	HNUT 0.3750-24-D-N	2

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APPLICATION		DO NOT SCALE DRAWING				SCALE: 1:50 WEIGHT: SHEET 1 OF 1

Appendix C – Interface Tolerance Analysis

Rim to Backboard (4-bolt Pattern)

Fastener Condition = Floating

Rim Hole Pattern:

$$\text{Hole Size} = 0.40 \pm 0.01$$

$$\text{Hole MMC Size} = 0.40 - 0.01 = 0.39$$

$$\text{Position Tolerance} = 0.005$$

Backboard Hole Pattern:

$$\text{Hole Size} = 0.40 \pm 0.01$$

$$\text{Hole MMC Size} = 0.40 - 0.01 = 0.39$$

$$\text{Position Tolerance} = 0.005$$

$$T(0.010) < H(0.39) - F(0.375)$$

Small Pole to Base Anchor (Single Bolt)

Fastener Condition = Floating

Small Pole Hole:

$$\text{Hole Size} = 0.50 \pm 0.05$$

$$\text{Hole MMC Size} = 0.50 - 0.05 = 0.45$$

$$\text{Position Tolerance} = 0.01$$

Large Pole Hole:

$$\text{Hole Size} = 0.50 \pm 0.05$$

$$\text{Hole MMC Size} = 0.50 - 0.05 = 0.45$$

$$\text{Position Tolerance} = 0.01$$

$$T(0.02) < H(0.45) - F(0.375)$$

Small Pole to Base Anchor (Single Bolt)

Fastener Condition = Floating

Small Pole Hole:

$$\text{Hole Size} = 0.50 \pm 0.05$$

$$\text{Hole MMC Size} = 0.50 - 0.05 = 0.45$$

$$\text{Position Tolerance} = 0.01$$

Large Pole Hole:

$$\text{Hole Size} = 0.50 \pm 0.05$$

$$\text{Hole MMC Size} = 0.50 - 0.05 = 0.45$$

$$\text{Position Tolerance} = 0.01$$

$$T(0.02) < H(0.45) - F(0.375)$$

Attachment Between the Large Pole and the Backboard

$$\text{Large Pole Lip} = 2.7 \text{ length} \pm 0.1 \text{ in}$$

$$\text{Backboard Lip} = 2.5 \text{ length} \pm 0.1 \text{ in}$$

$$\text{Largest Backboard Lip } 2.6 \text{ in} \leq \text{Smallest Large Pole Lip } 2.6 \text{ in}$$

Inner Rim Diameter

$$\text{Rim Diameter} = 18.00 \text{ in} \pm 0.1 \text{ in}$$

$$\text{Largest Basketball Diameter} = 9.51 \text{ in}$$

$$\text{Largest Basketball Diameter } 9.51 \text{ in} \leq \text{Smallest Rim Diameter } 17.9 \text{ in}$$

Appendix D – Drawing Checklist

Part Drawing – Small Pole

Checked (Y/N)	Item
Y	Does the drawing meet all Dimensioning Guidelines in this Presentation?
N	Does the drawing have any duplicate dimensions?
Y	Does the drawing control the size of the interface with the other parts in the assembly?
N/A	Does the drawing have a True Positional tolerance for any 4-bolt patterns?
N/A	Does the drawing tell the user what size bolts will go through the 4-bolt pattern?
Y	Does the drawing use standard hole sizes and tolerances of hole sizes?
Y	Does the drawing have enough views to show all aspects of the design?
Y	Does the drawing have the name of the part shown on the drawing?

Part Drawing – Large Pole

Checked (Y/N)	Item
Y	Does the drawing meet all Dimensioning Guidelines in this Presentation?
N	Does the drawing have any duplicate dimensions?
Y	Does the drawing control the size of the interface with the other parts in the assembly?
N/A	Does the drawing have a True Positional tolerance for any 4-bolt patterns?
N/A	Does the drawing tell the user what size bolts will go through the 4-bolt pattern?
Y	Does the drawing use standard hole sizes and tolerances of hole sizes?
Y	Does the drawing have enough views to show all aspects of the design?
Y	Does the drawing have the name of the part shown on the drawing?

Part Drawing – Base Anchor

Checked (Y/N)	Item
Y	Does the drawing meet all Dimensioning Guidelines in this Presentation?
N	Does the drawing have any duplicate dimensions?
Y	Does the drawing control the size of the interface with the other parts in the assembly?
N/A	Does the drawing have a True Positional tolerance for any 4-bolt patterns?
N/A	Does the drawing tell the user what size bolts will go through the 4-bolt pattern?
Y	Does the drawing use standard hole sizes and tolerances of hole sizes?
Y	Does the drawing have enough views to show all aspects of the design?
Y	Does the drawing have the name of the part shown on the drawing?

Part Drawing – Rim

Checked (Y/N)	Item
<input type="text" value="Y"/>	Does the drawing meet all Dimensioning Guidelines in this Presentation?
<input type="text" value="N"/>	Does the drawing have any duplicate dimensions?
<input type="text" value="Y"/>	Does the drawing control the size of the interface with the other parts in the assembly?
<input type="text" value="Y"/>	Does the drawing have a True Positional tolerance for any 4-bolt patterns?
<input type="text" value="Y"/>	Does the drawing tell the user what size bolts will go through the 4-bolt pattern?
<input type="text" value="Y"/>	Does the drawing use standard hole sizes and tolerances of hole sizes?
<input type="text" value="Y"/>	Does the drawing have enough views to show all aspects of the design?
<input type="text" value="Y"/>	Does the drawing have the name of the part shown on the drawing?

Part Drawing – Backboard

Checked (Y/N)	Item
<input type="text" value="Y"/>	Does the drawing meet all Dimensioning Guidelines in this Presentation?
<input type="text" value="N"/>	Does the drawing have any duplicate dimensions?
<input type="text" value="Y"/>	Does the drawing control the size of the interface with the other parts in the assembly?
<input type="text" value="Y"/>	Does the drawing have a True Positional tolerance for any 4-bolt patterns?
<input type="text" value="Y"/>	Does the drawing tell the user what size bolts will go through the 4-bolt pattern?
<input type="text" value="Y"/>	Does the drawing use standard hole sizes and tolerances of hole sizes?
<input type="text" value="Y"/>	Does the drawing have enough views to show all aspects of the design?
<input type="text" value="Y"/>	Does the drawing have the name of the part shown on the drawing?

Installation Drawing

Checked (Y/N)	Item
<input type="checkbox"/>	Does the drawing have a Bill of Materials?
<input type="checkbox"/>	Is each item number shown in the exploded view?
<input type="checkbox"/>	Does the exploded view clearly show each part?
<input type="checkbox"/>	Does the drawing have the name of the assembly shown on the drawing?