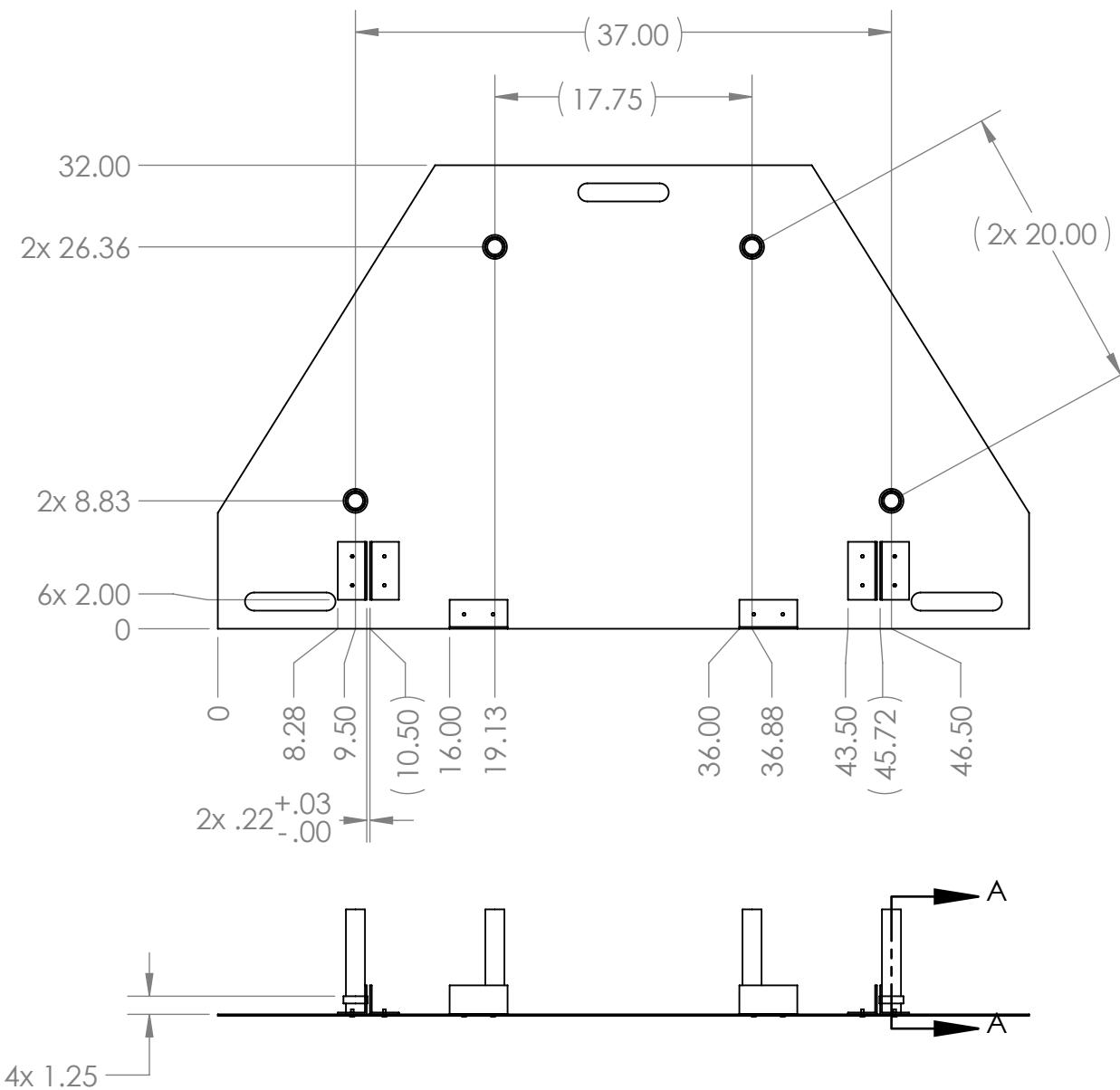


4

3

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1



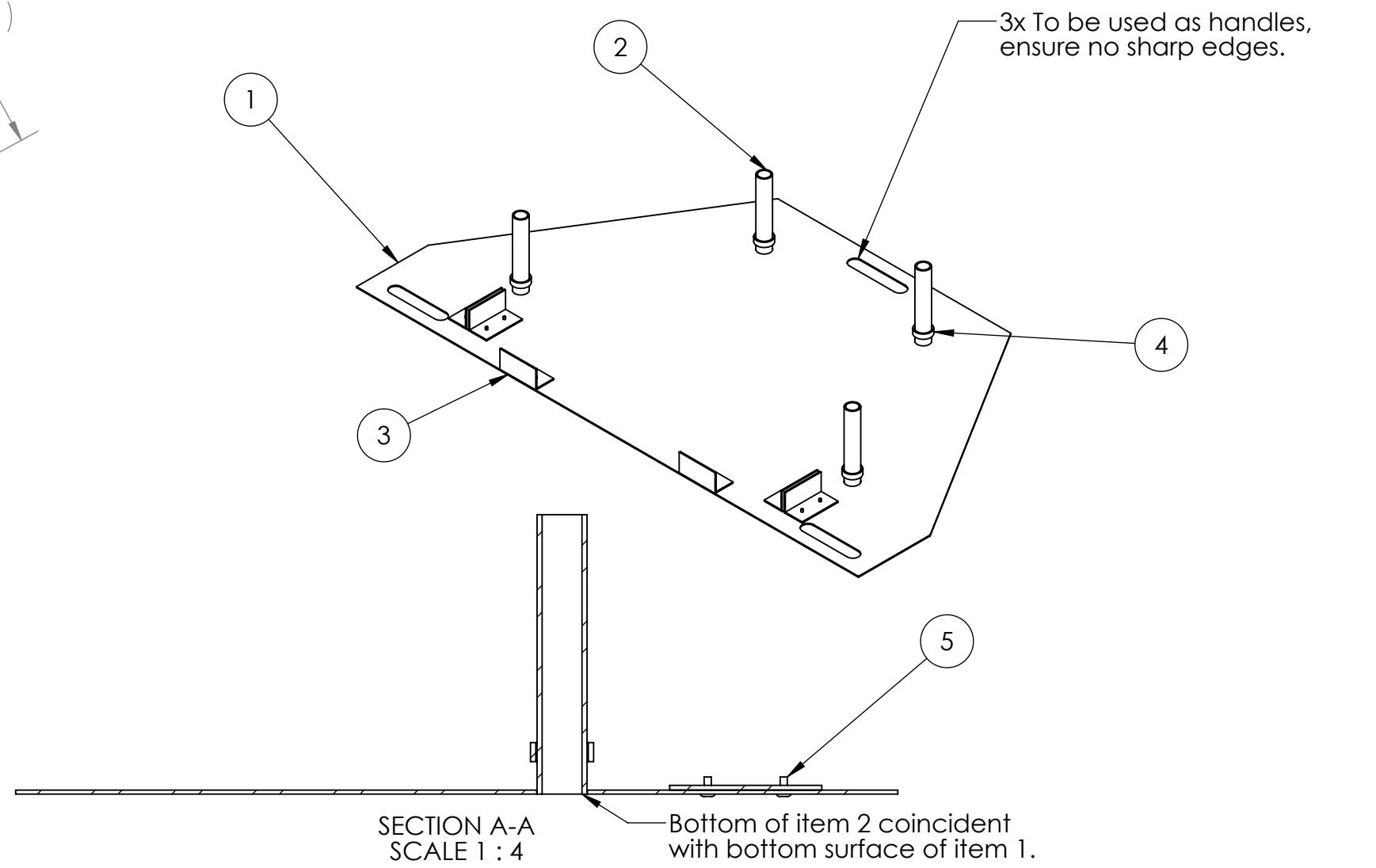
## Notes:

- 1. Remove all burrs and sharp edges.
- 2. Powder coated black.
- 3. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19015-01	12 gauge A-366/1008 Cold Roll Steel	1
2	GE-19015-02	1" Schedule 40 A500 Steel	4
3	GE-19015-03	2" x 2" x .125" thk. A-36 Steel Angle	6
4	GE-19015-04	1.25" Schedule 40 A500 Steel	4
5	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	12

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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	Initial Release	9/24/2018	CPO
A4, 2-A4, 2-B1, 3-A3, 3-B4	B	Changes made to rivet GE-19015-03 instead of welding. Material painting specified. Weld for GE-19015-04 changed.	12/11/2018	CPO



SECTION A-A  
SCALE 1 : 4

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** SOLIDWORKS Modeling Solutions Partner

**TITLE:** Rocket Base

**SIZE** DWG. NO. REV  
**B** GE-19015 **B**

SCALE: 1:12 WEIGHT: SHEET 1 OF 3

4

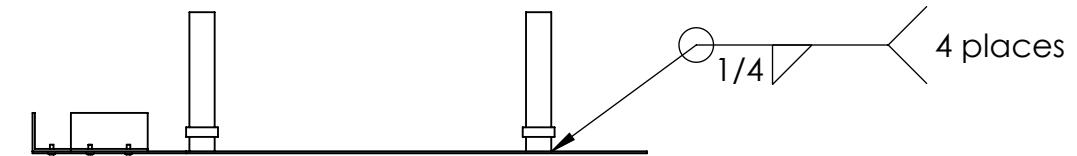
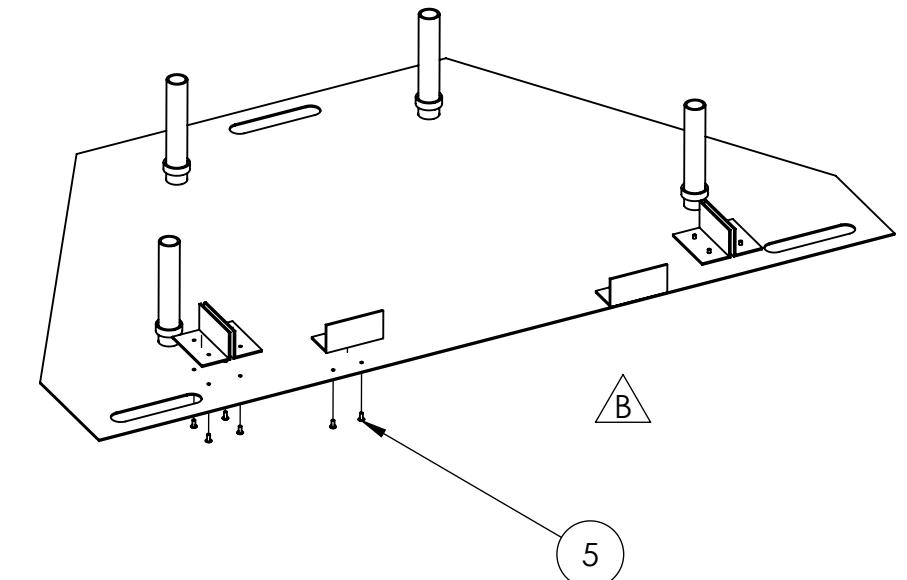
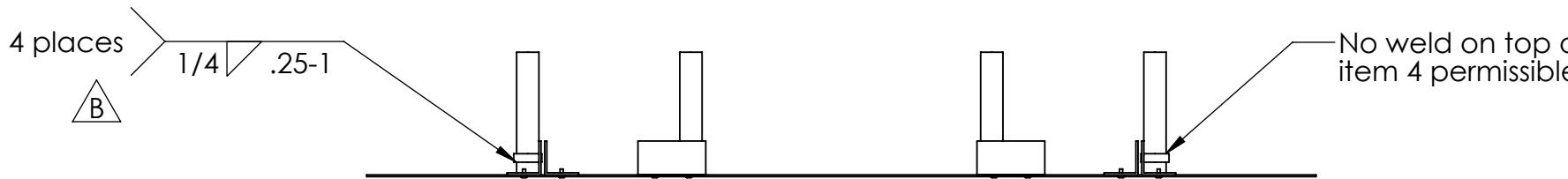
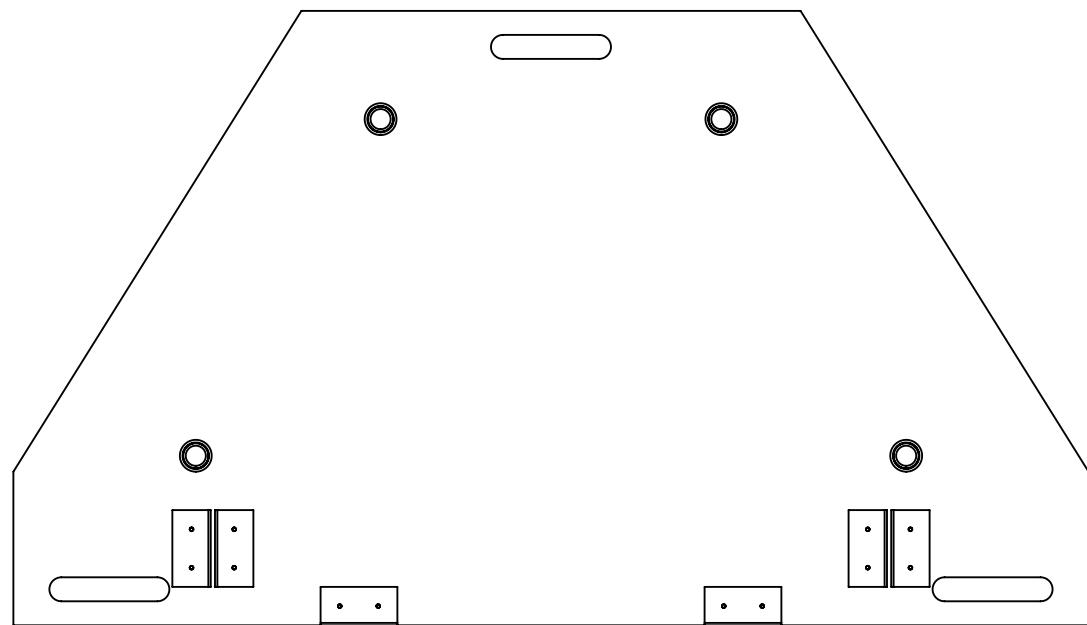
3

2

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B

B



A

A

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL: $\pm 1/16$				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$				
INTERPRET GEOMETRIC TOLERANCING PER:				
MATERIAL				
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:  
**Rocket Base**

SIZE **B** DWG. NO. **GE-19015** REV **B**

SCALE: 1:10 WEIGHT: SHEET 2 OF 3

4

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2

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4

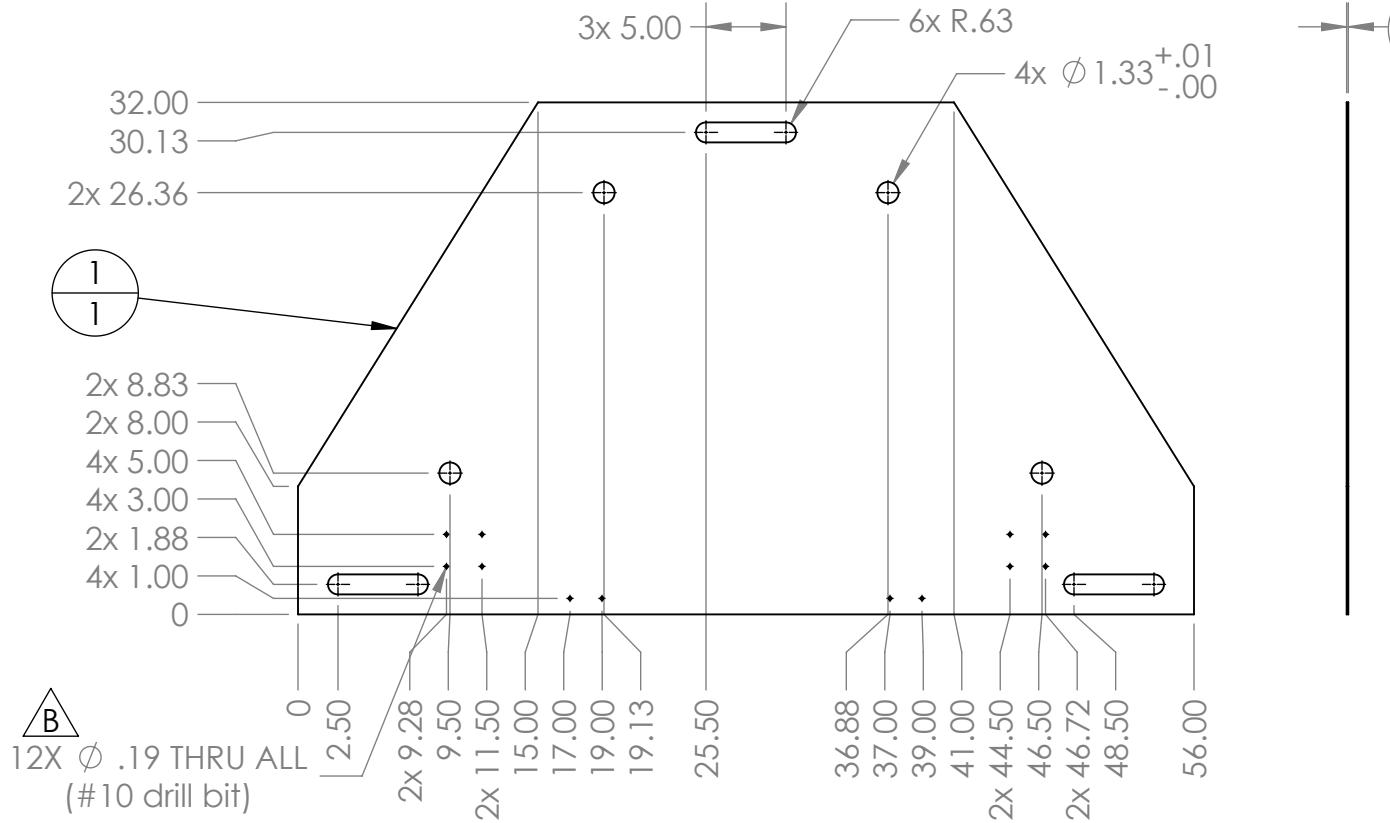
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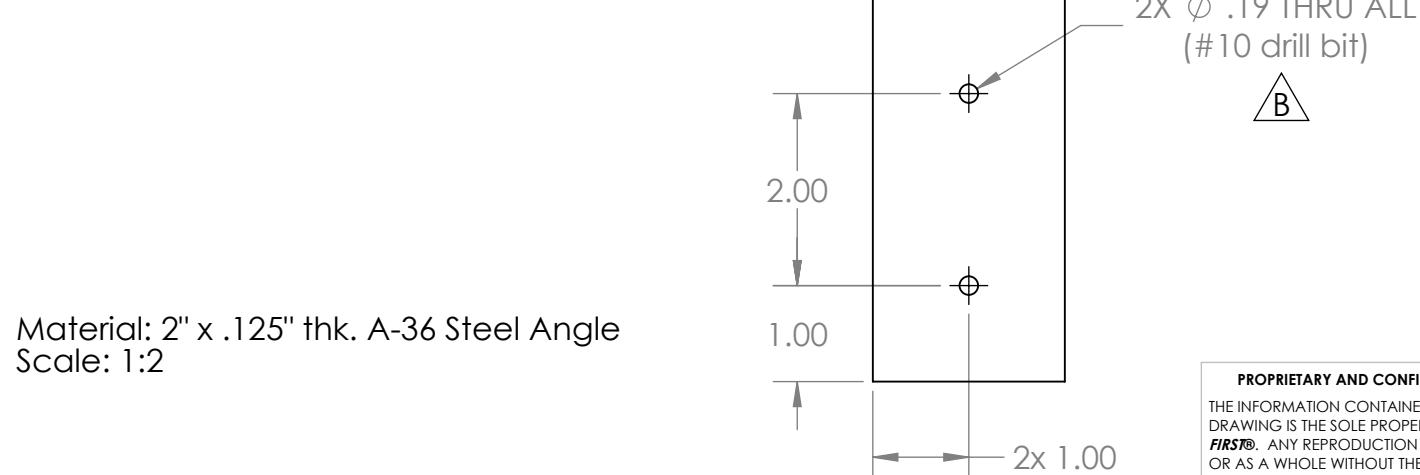
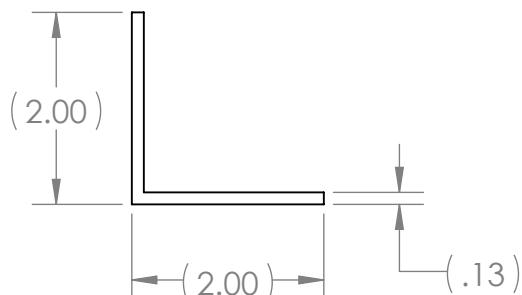
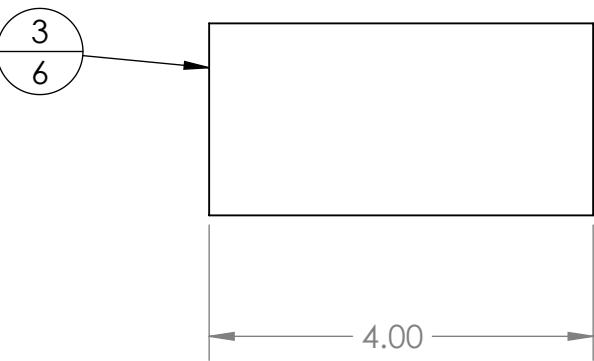
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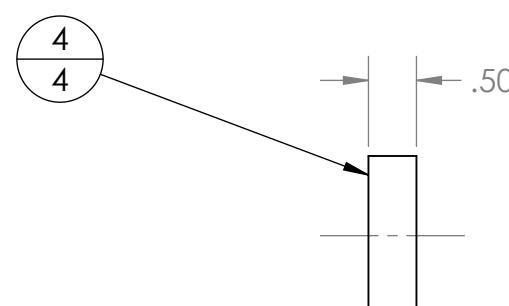
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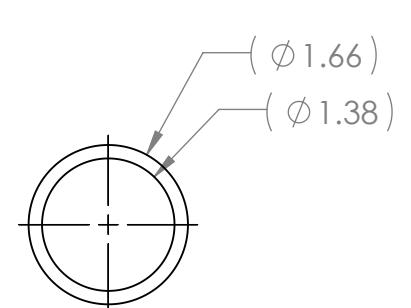
Material: 1" Schedule 40 A500 Steel  
Scale: 1:2



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Material: 1.25" Schedule 40 A500 Steel  
Scale: 1:2



		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	MATERIAL		
		FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Rocket Base**

**SIZE** **DWG. NO.**  
**B** **GE-19015** **REV**  
**B**

**WEIGHT:** **SHEET 3 OF 3**

4

3

2

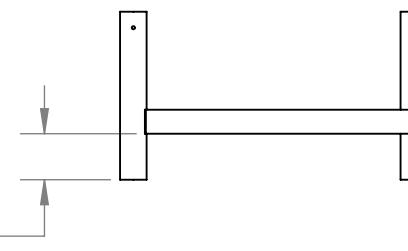
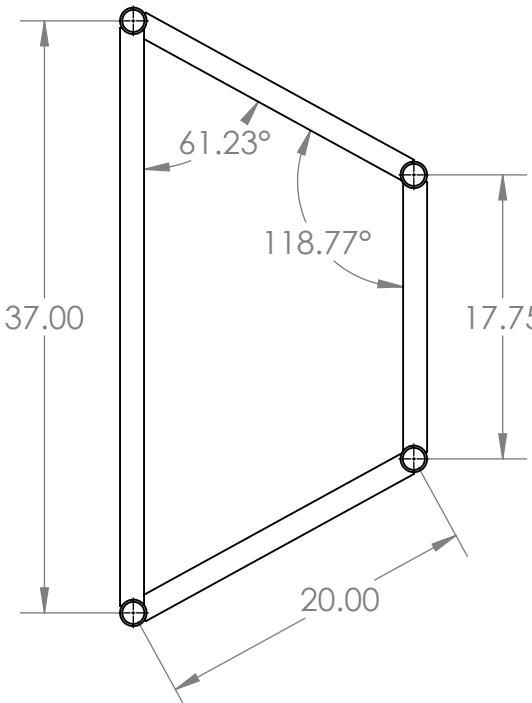
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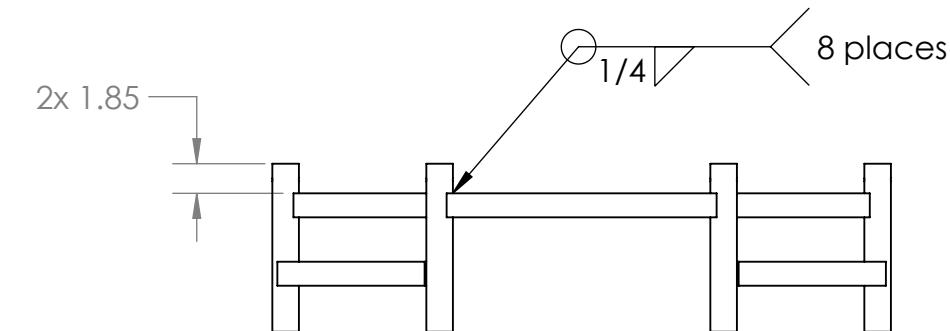
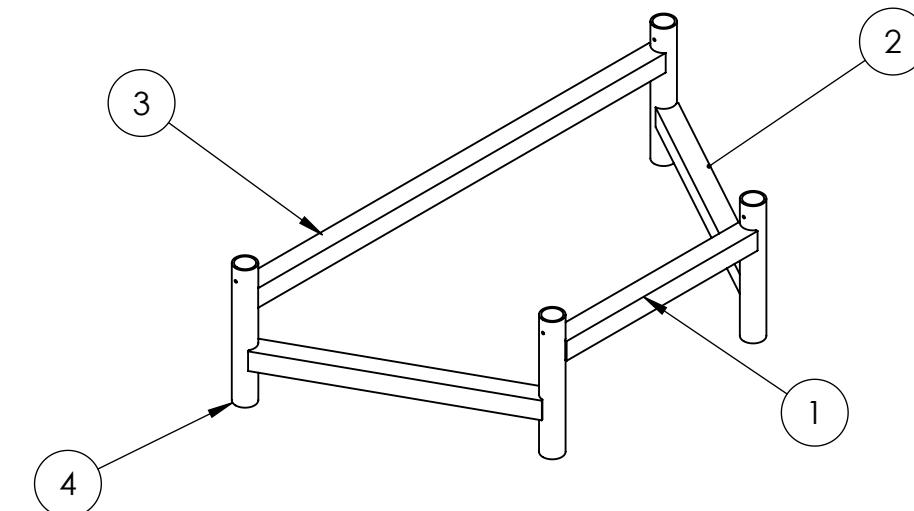
No weld penetration on inside of round tubes.

Notes:

1. Tag or label with part number.
2. Remove burrs and sharp edges.

ITEM NO.	PART NUMBER	DESCRIPTION	Default/ QTY.
1	GE-19016-01	1.5" x .125" thk. Square Tube, 6063 Aluminum	1
2	GE-19016-02	1.5" x .125" thk. Square Tube, 6063 Aluminum	2
3	GE-19016-03	1.5" x .125" thk. Square Tube, 6063 Aluminum	1
4	GE-19016-04	1.25" Schedule 40 Pipe, 6061 Aluminum	4

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
DRAWN				
CHECKED				
ENG APPR.				
MFG APPR.				
Q.A.				
COMMENTS:				
NEXT ASSY	USED ON	MATERIAL		
		FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:12	WEIGHT:	SHEET 1 OF 2		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Frame Slice**

**B** **GE-19016**

4

3

2

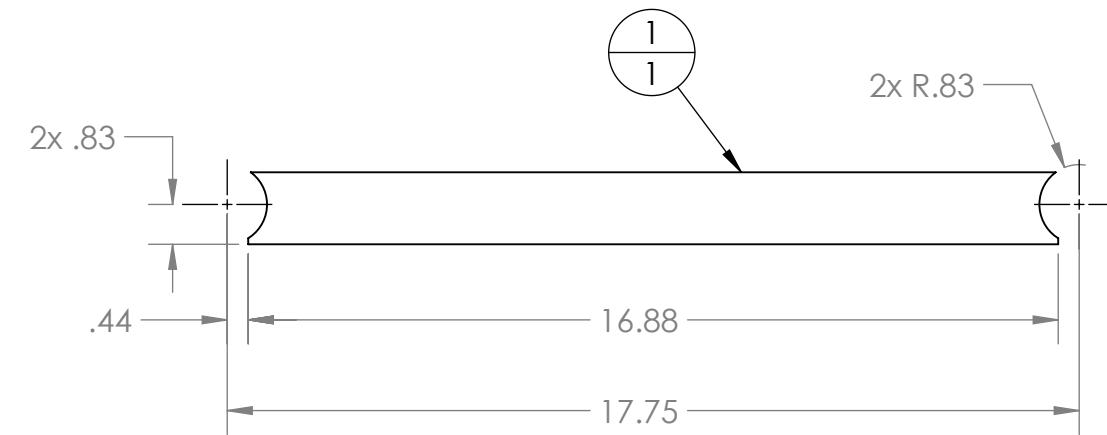
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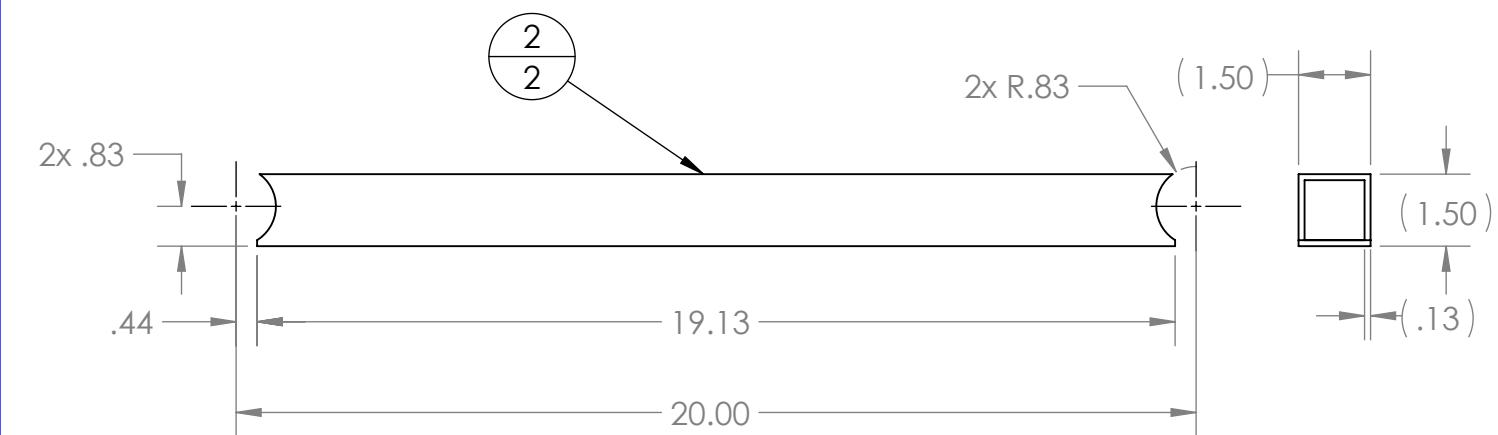
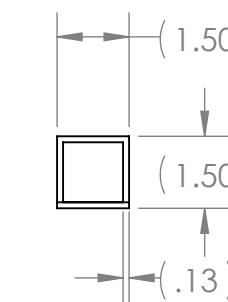
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2

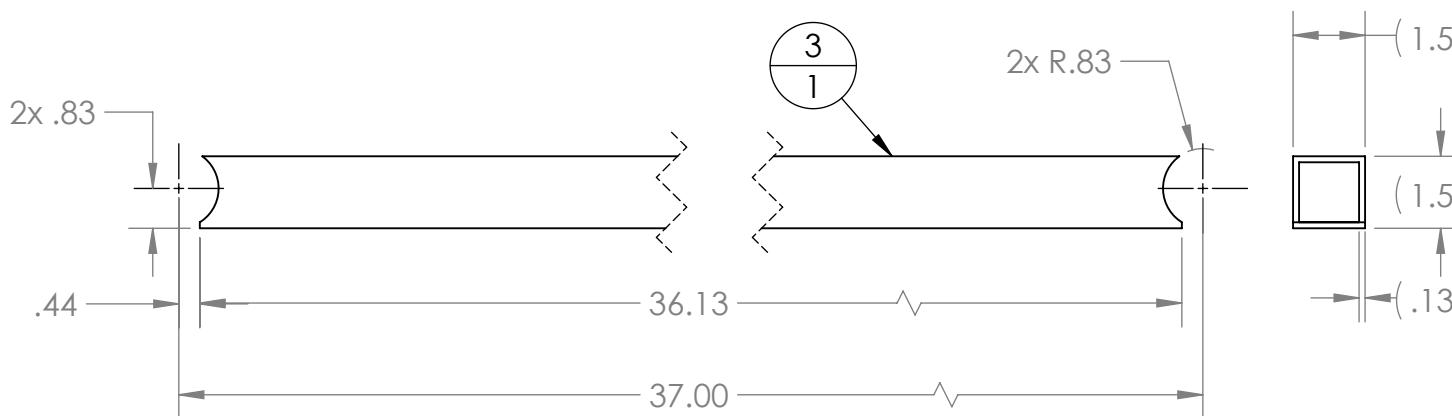
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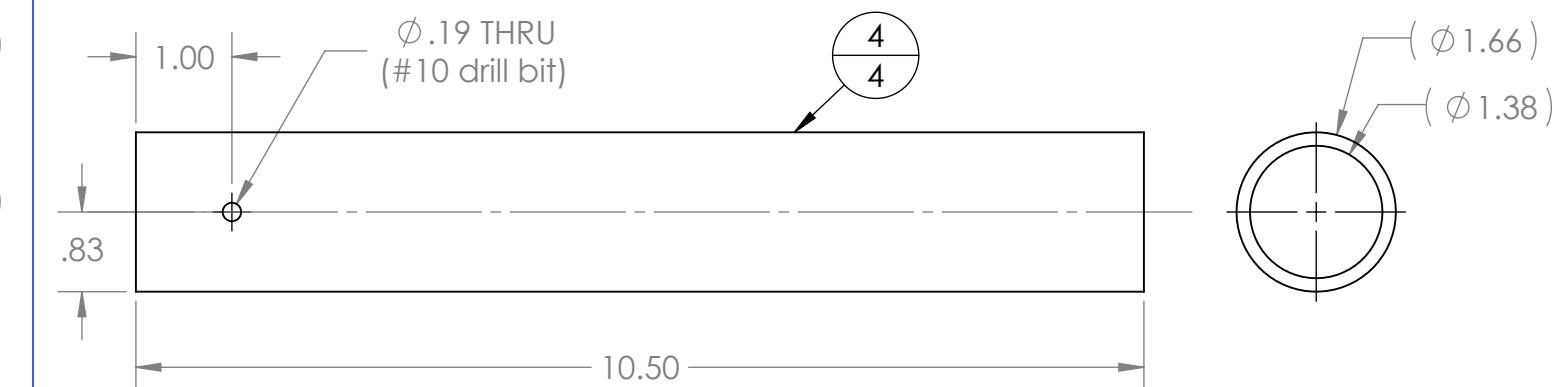
Material: 1.5" x .125" thk. Square Tube, 6063 Aluminum  
Scale: 1:4



Material: 1.5" x .125" thk. Square Tube, 6063 Aluminum  
Scale: 1:4



Material: 1.5" x .125" thk. Square Tube, 6063 Aluminum  
Scale: 1:4



Material: 1.25" Schedule 40 Pipe, 6061 Aluminum  
Scale: 1:2

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	MATERIAL		
APPLICATION		FINISH		
		DO NOT SCALE DRAWING		
SIZE	DWG. NO.		REV	
<b>B</b>	<b>GE-19016</b>			
SCALE: 1:4	WEIGHT:	SHEET 2 OF 2		

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:

**Rocket Frame  
Slice**

4

3

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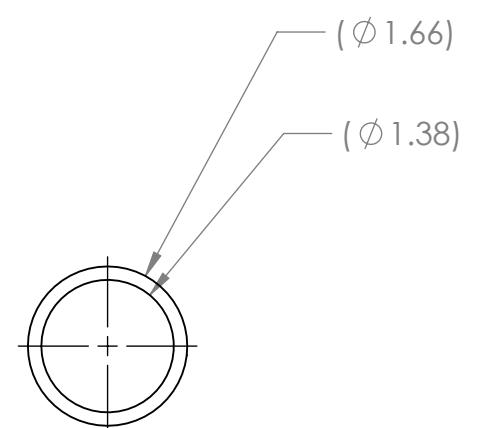
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B



## Notes:

1. Material: 1.25" Schedule 40 Pipe, 6061 Aluminum
2. Remove all burrs and sharp edges
3. Tag or label with part number.

4

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Rocket Support**  
**Tube**

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19017</b>	
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1

4

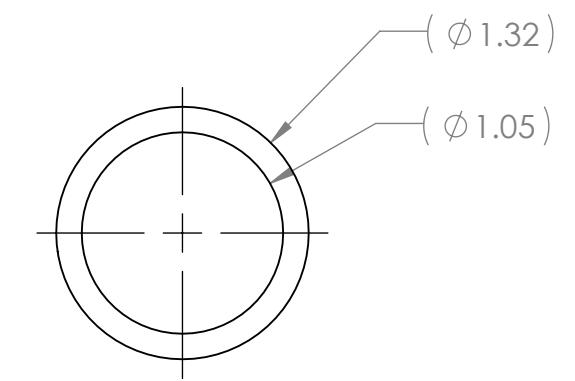
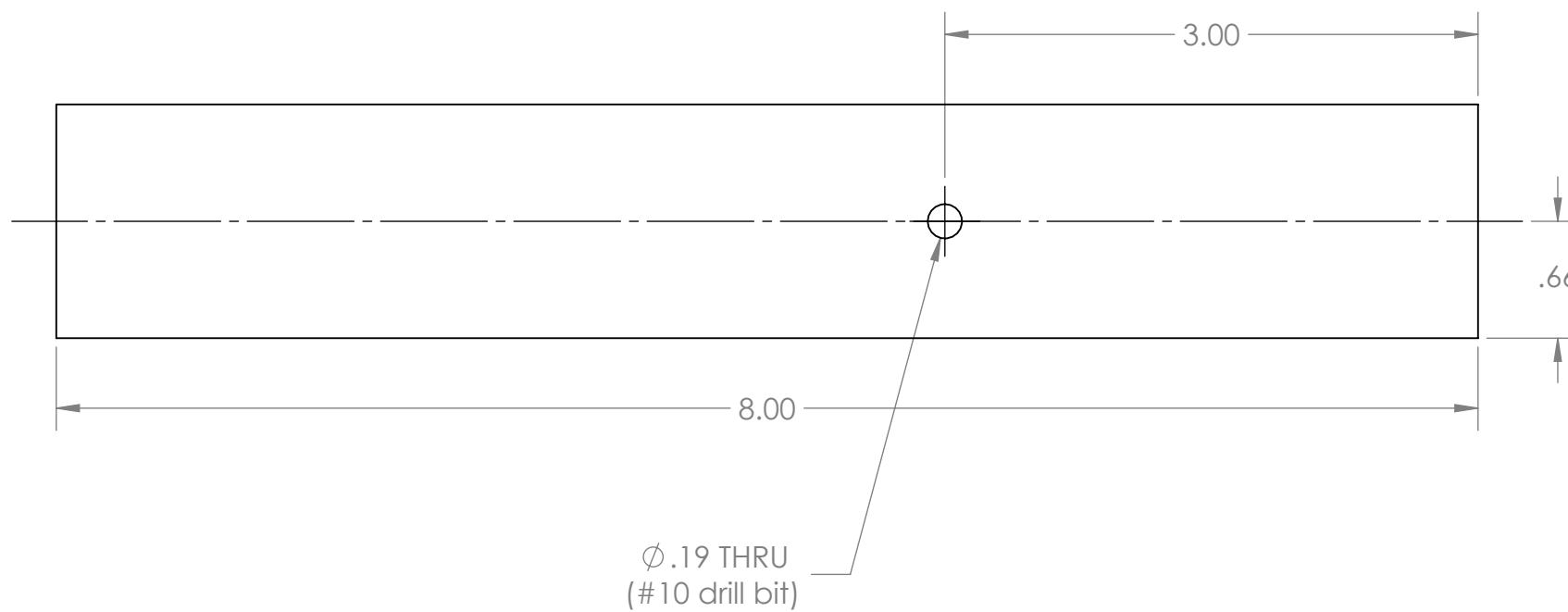
3

2

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B

B

**Notes:**

1. Material: 1" Schedule 40 Pipe, 6061 Aluminum.
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

A

A

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Rocket Insert Tube

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19018</b>	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1

4

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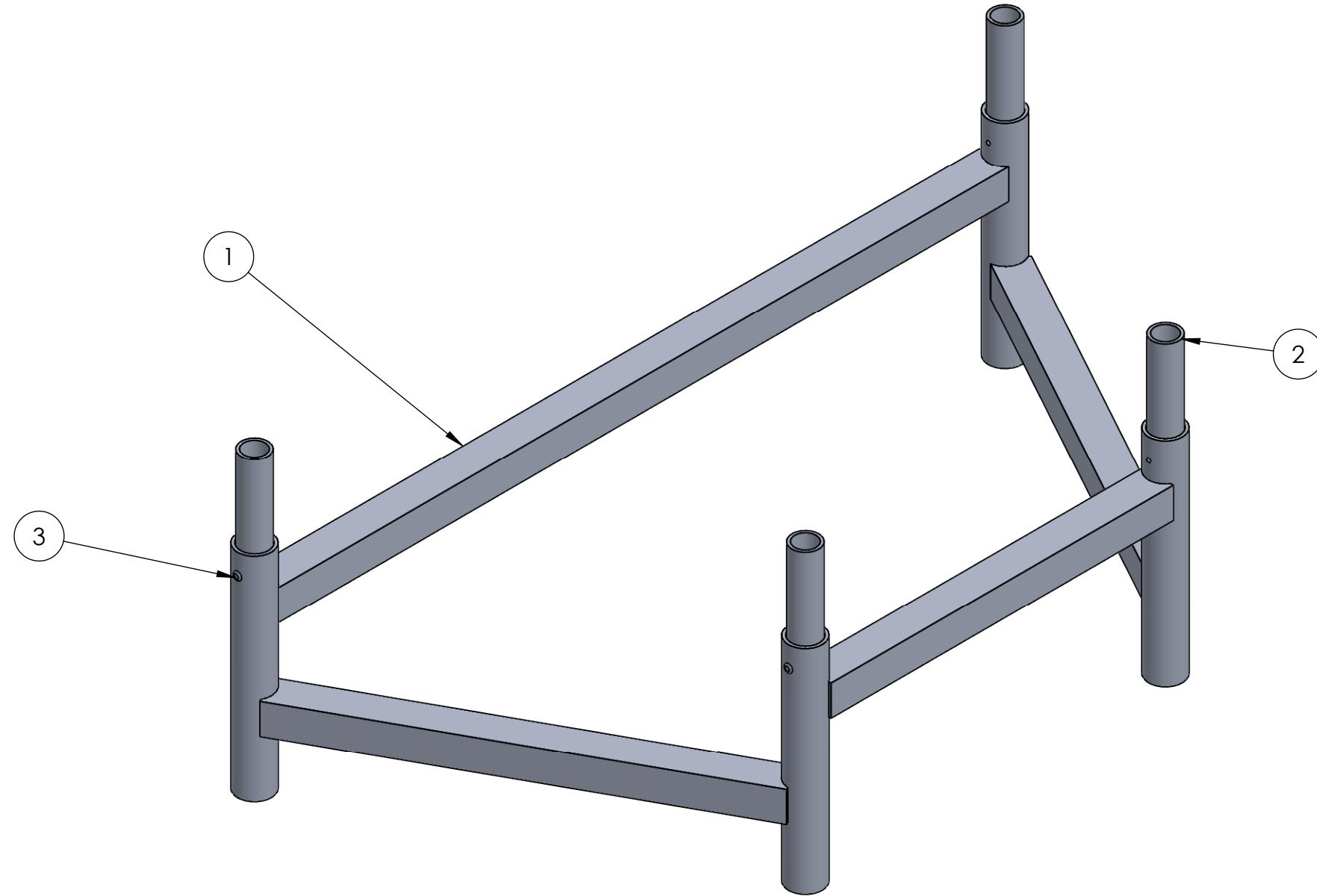
3

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B

B



ITEM NO.	PART NUMBER	DESCRIPTION	Default/ QTY.
1	GE-19016	Rocket Frame Slice	1
2	GE-19018	Rocket Insert Tube	4
3	rivet_.1875_.251-.375	3/16" Aluminum Rivet, .251-.375 Grip Range	4

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES: FRACTIONAL $\pm 1/16$	CHECKED		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	ENG APPR.		
		TWO PLACE DECIMAL $\pm .01$	MFG APPR.		
		THREE PLACE DECIMAL $\pm .001$	Q.A.		
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:		
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV			
<b>B</b>	<b>GE-19019</b>				
SCALE: 1:5	WEIGHT:	SHEET 1 OF 2			

 **FIRST**  
ROBOTICS  
COMPETITION

 **SOLIDWORKS**  
Modeling Solutions Partner

TITLE:

# Rocket Frame Slice Assembly

SIZE DWG. NO. REV

**B** **GE-19019**

SCALE: 1:5 WEIGHT: SHEET 1 OF 2

4

3

2

1

4

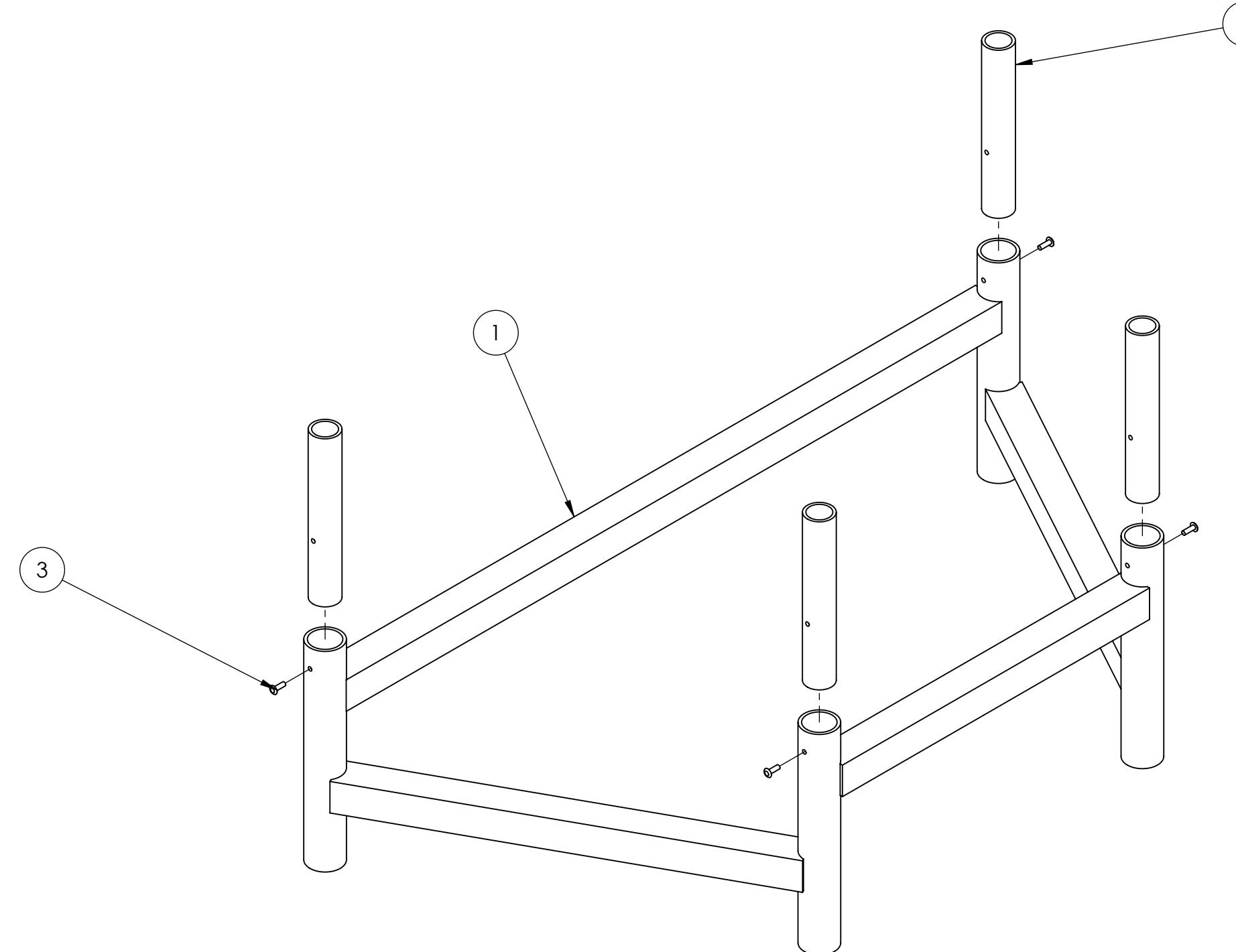
3

2

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B

B



## Notes:

- Fasten Item 2 (qty: 4) to Item 1, using item 3 (qty: 4).

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
NEXT ASSY		FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Rocket Frame Slice Assembly

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19019</b>	
SCALE: 1:5	WEIGHT:	SHEET 2 OF 2

4

3

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4

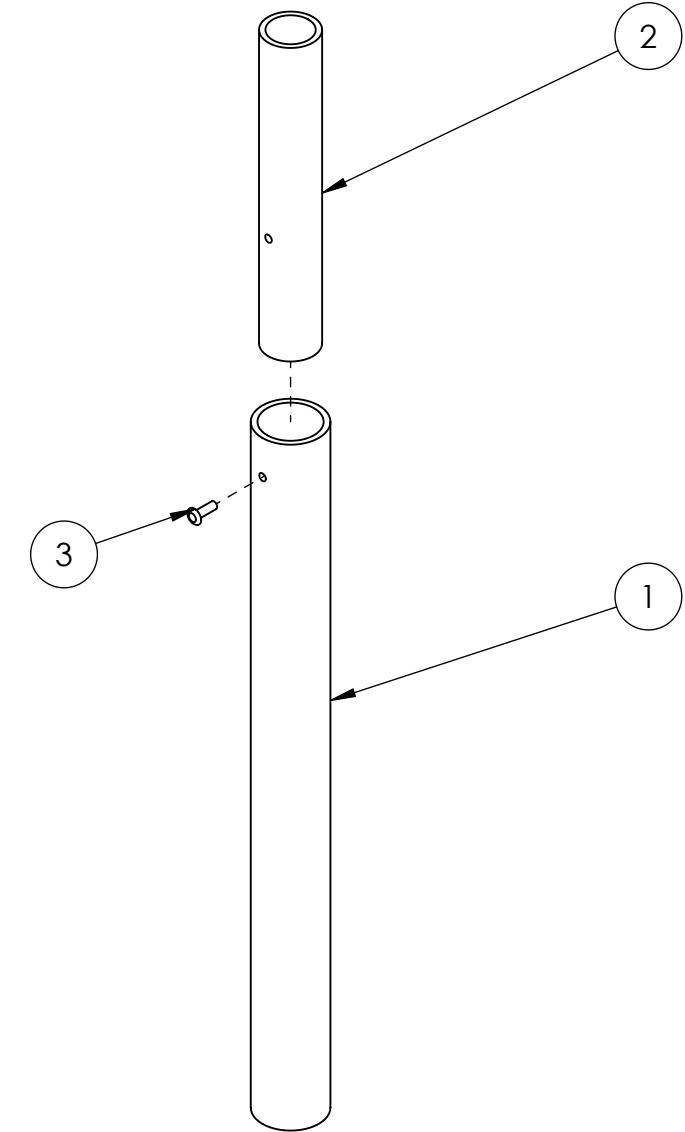
3

2

1

B

B



## Notes:

- Fasten Item 2 to Item 1, using Item 3.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19017	Rocket Support Tube	1
2	GE-19018	Rocket Insert Tube	1
3	rivet_.1875_.251-.375	3/16" Aluminum Rivet, .251-.375 Grip Range	1

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL: ±1/16				
ANGULAR: MACH ±1° BEND ±1°				
TWO PLACE DECIMAL: ±.01				
THREE PLACE DECIMAL: ±.001				
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:	
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Rocket Support Tube Assembly

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19024</b>	
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

4

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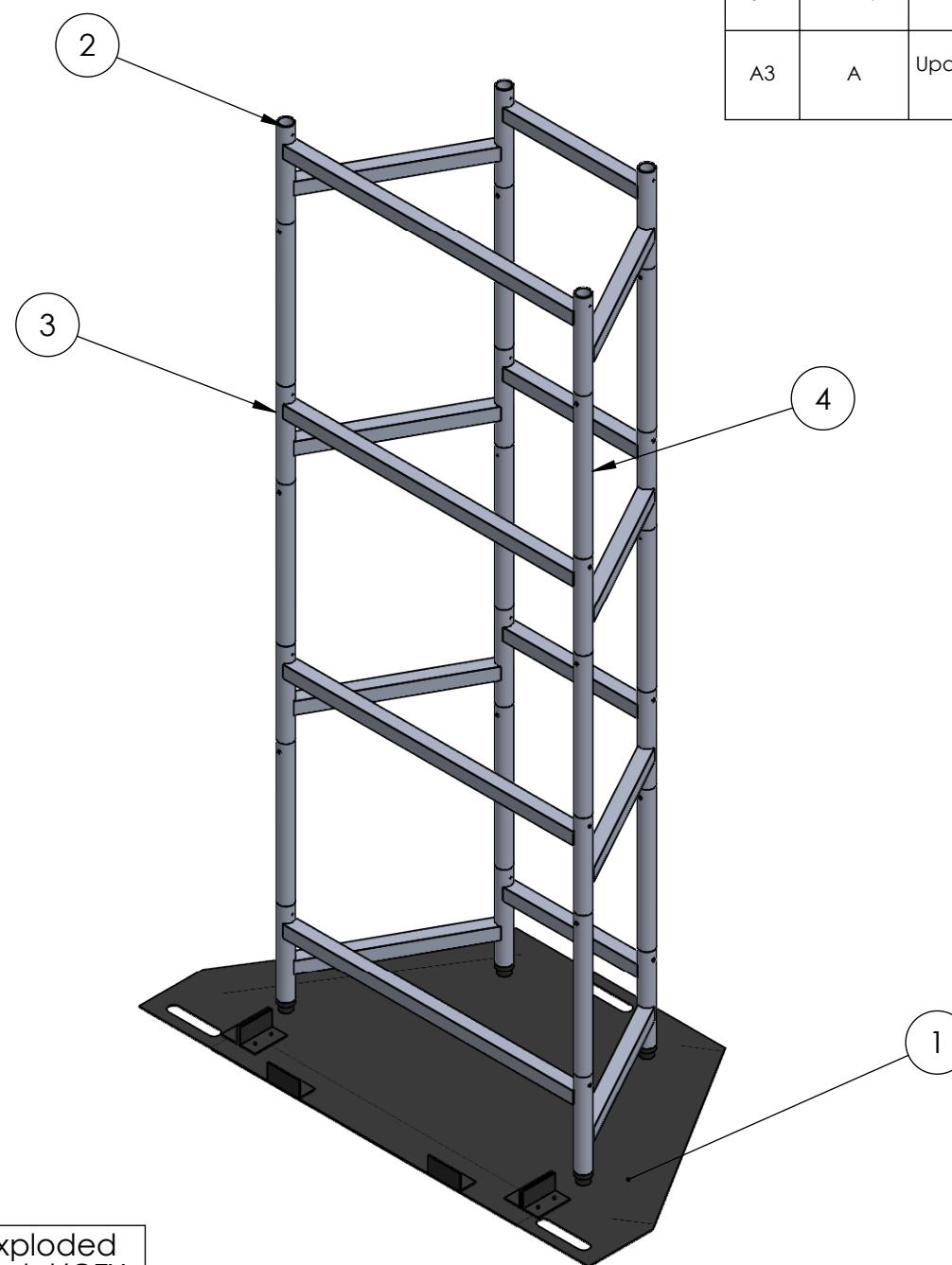
3

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## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A3	A	Updated assembly to use GE-19016 at otp of assembly instead of GE-19019.	12/26/2018	CPO



ITEM NO.	PART NUMBER	DESCRIPTION	Exploded Model/QTY.
1	GE-19015	Rocket Base	1
2	GE-19016	Rocket Frame Slice	1
3	GE-19019	Rocket Frame Slice Assembly	3
4	GE-19024	Rocket Support Tube Assembly	12
5	Hook_4_27	4" x 27" Hook, Adhesive Backed	2
6	Hook_4_38	4" x 38" Hook, Adhesive Backed	1

A

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		UNLESS OTHERWISE SPECIFIED:	NAME _____ DATE _____
		DIMENSIONS ARE IN INCHES	
		TOLERANCES:	
		FRACTIONAL: ±1/16	
		ANGULAR: MACH ±1° BEND ±1°	
		TWO PLACE DECIMAL: ±.01	
		THREE PLACE DECIMAL: ±.001	
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:
		MATERIAL	
		FINISH	
NEXT ASSY	USED ON		
APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Frame Assembly**

**B** **GE-19025** **A**

SIZE DWG. NO. REV.  
SCALE: 1:16 WEIGHT: SHEET 1 OF 2

4

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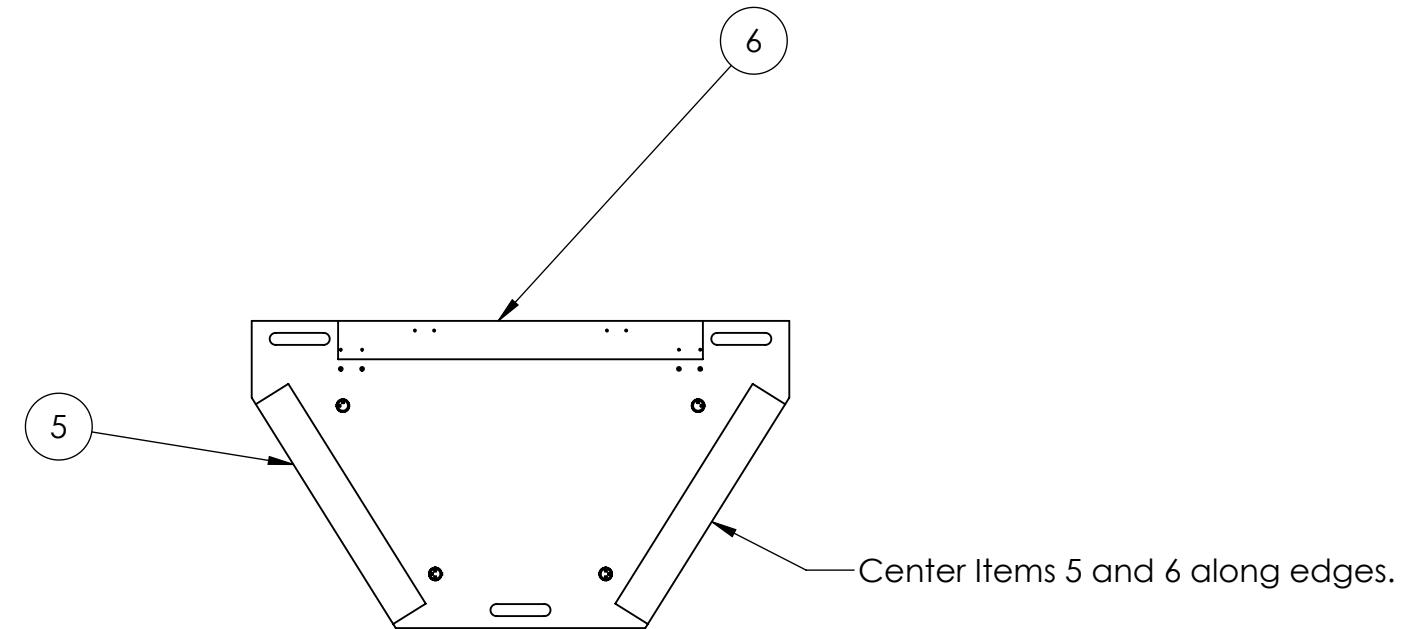
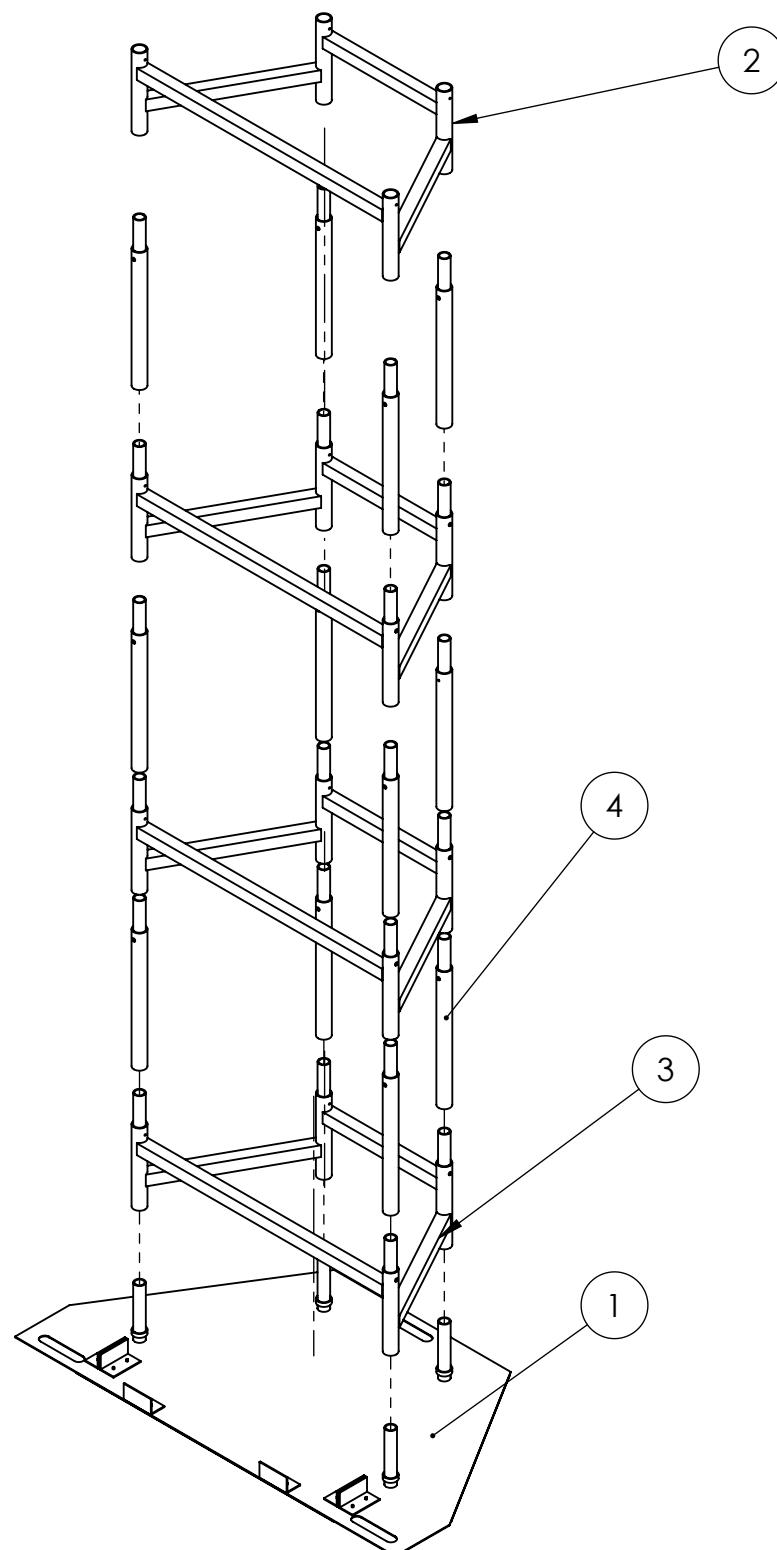
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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL: $\pm 1/16$				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$				
INTERPRET GEOMETRIC TOLERANCING PER:		Q.A.	COMMENTS:	
MATERIAL				
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST**  
**ROBOTICS**  
**COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Frame  
Assembly**

**SIZE DWG. NO. REV**  
**B GE-19025 A**

**SCALE: 1:20 WEIGHT: SHEET 2 OF 2**

4

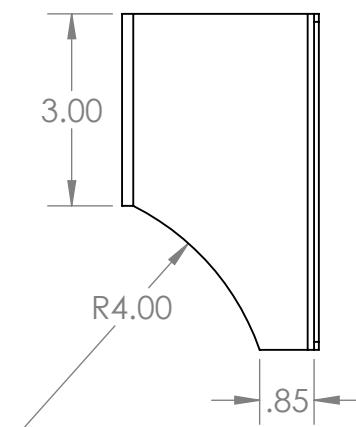
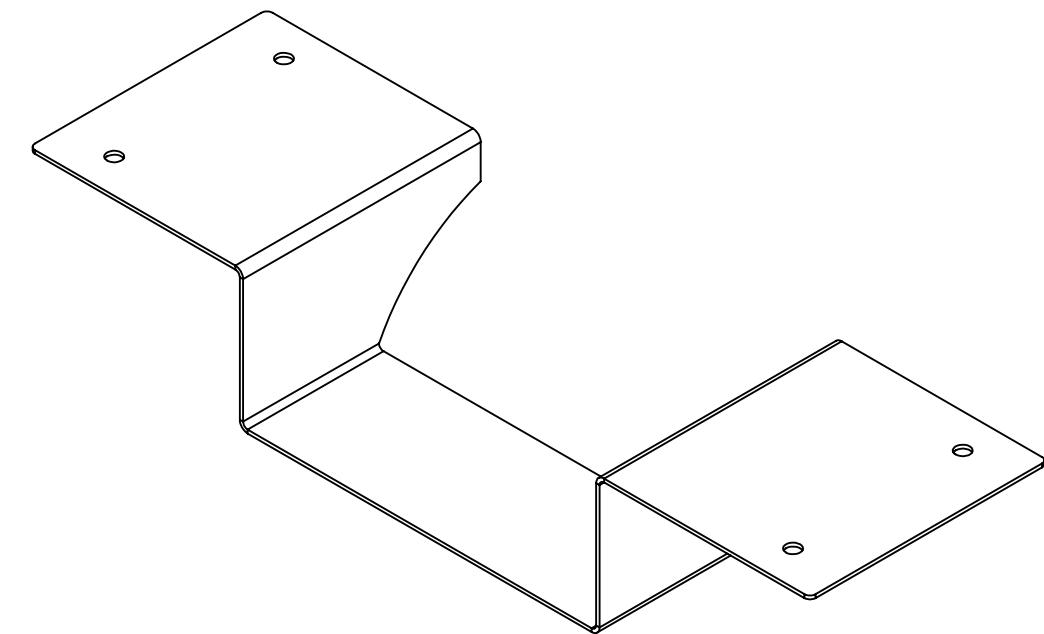
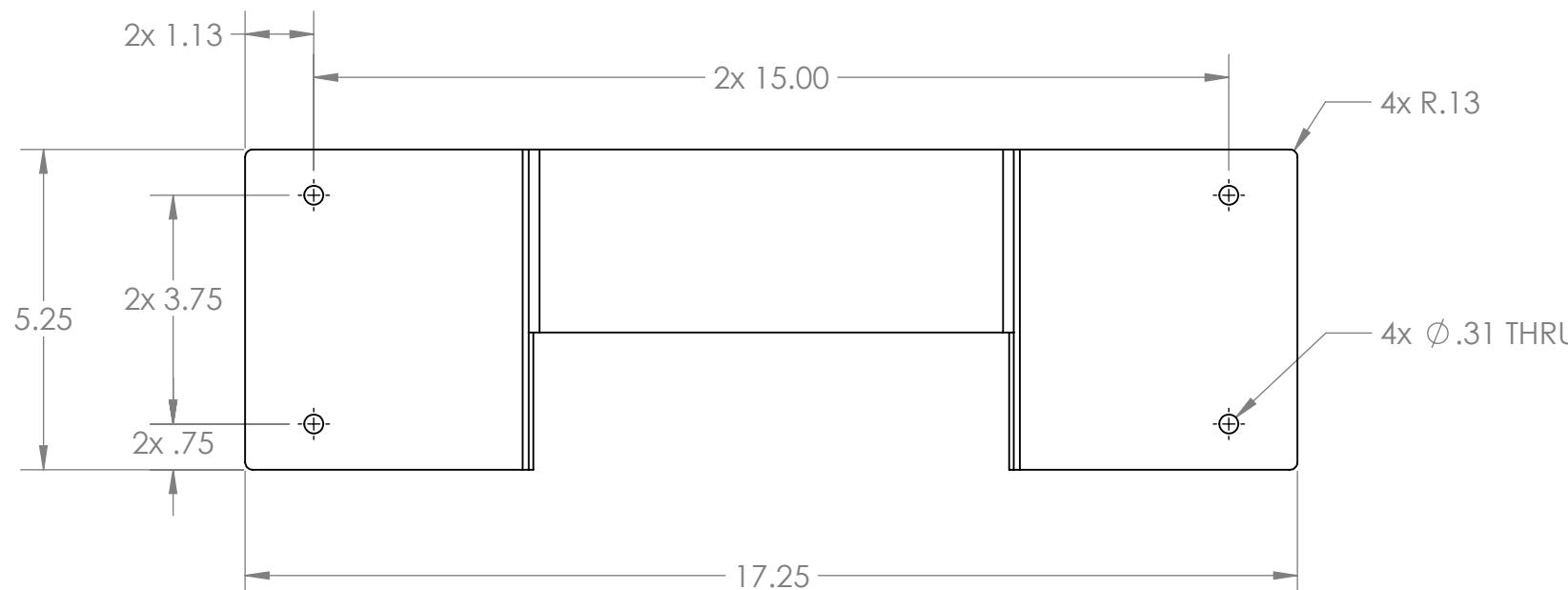
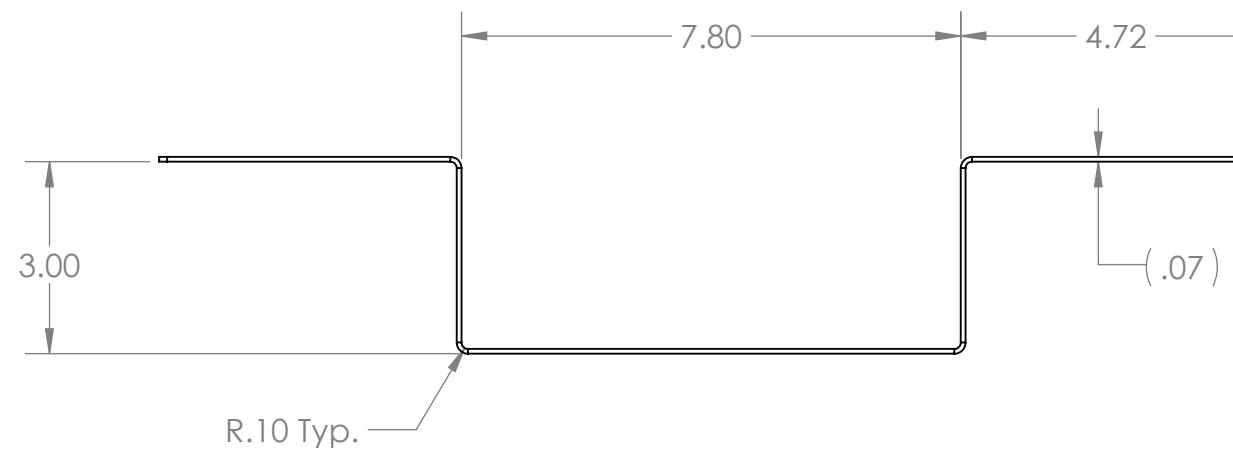
3

2

1

B

B



- Notes:
1. Material: 14 gauge A-366/1008 Pre-Plated Steel.
  2. Remove all burrs and sharp edges.
  3. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	MATERIAL		
APPLICATION		FINISH		
		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Keyhole Insert**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19026</b>	<b>A</b>
SCALE: 1:3	WEIGHT:	SHEET 1 OF 1

4

3

2

1

4

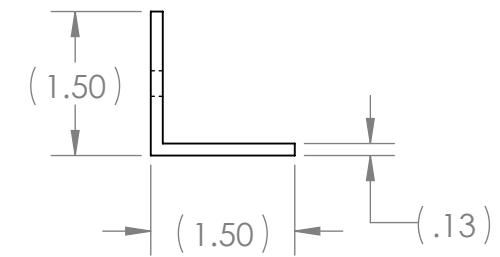
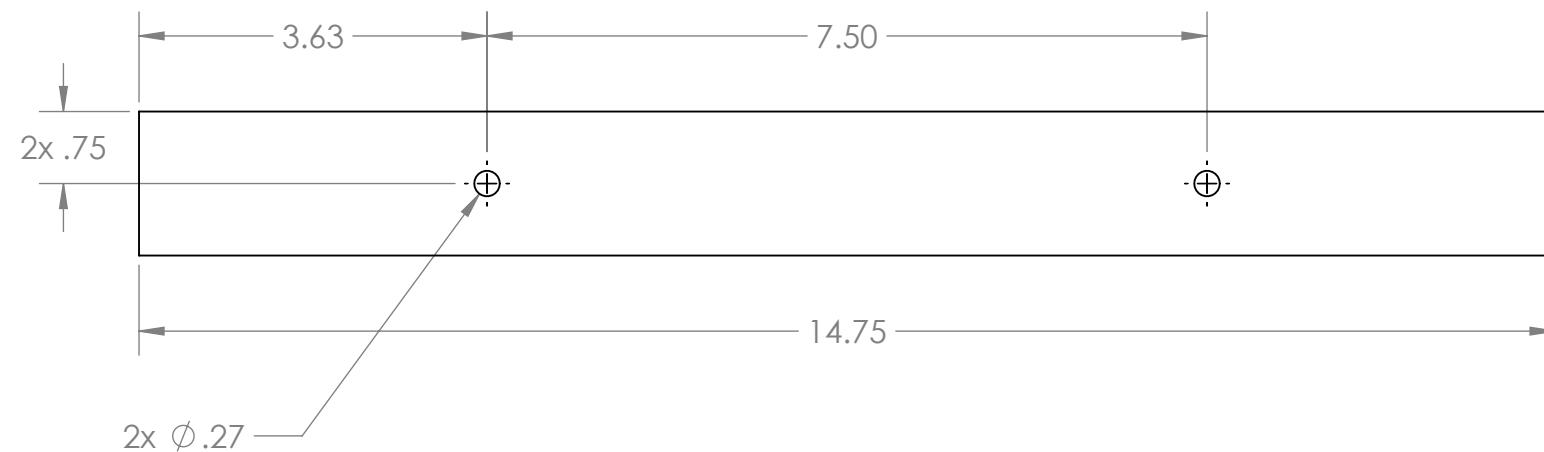
3

2

1

B

B



#### Notes:

1. Material: 1.5" x 1.5" x .125" thk. Angle, 6061 Aluminum.
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

4

3

2

1

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Rocket Ramp Support Back

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19028</b>	
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1

4

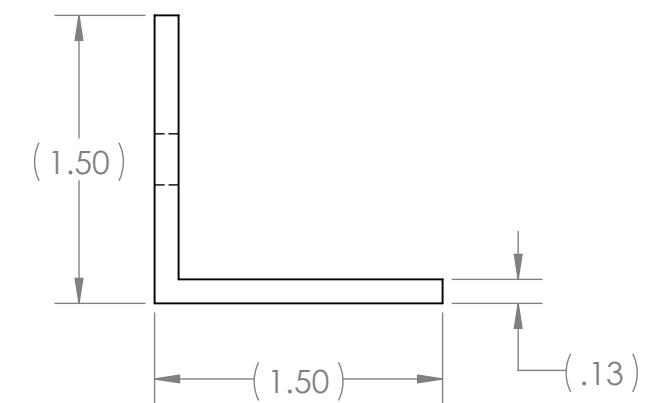
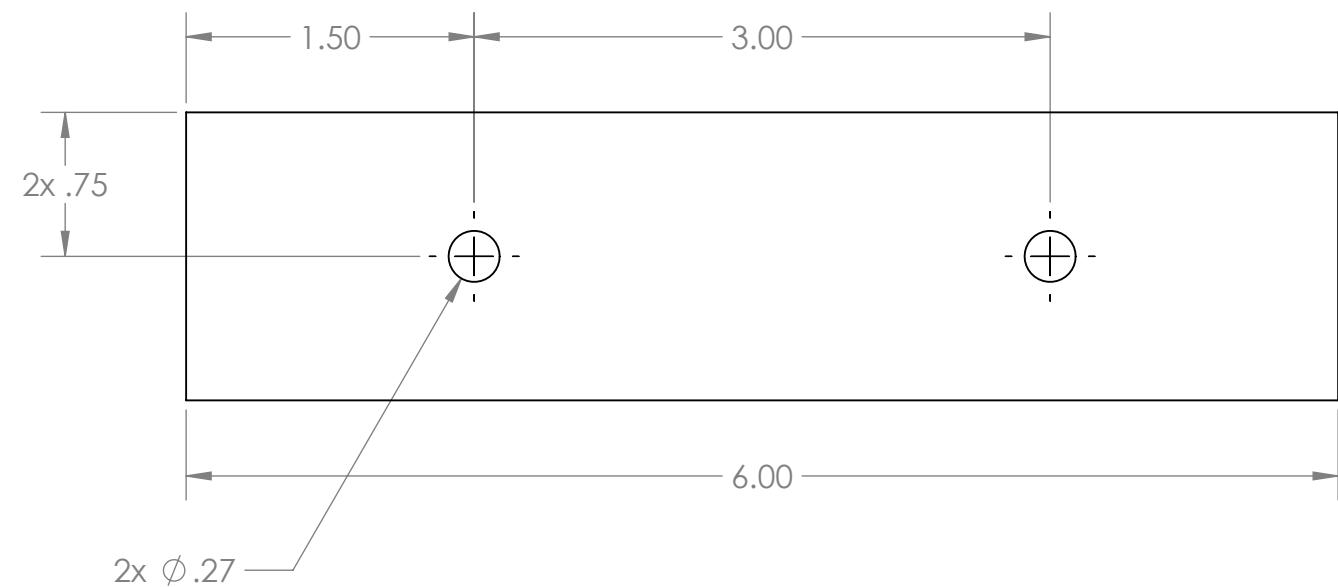
3

2

1

B

B



## Notes:

1. Material: 1.5" x 1.5" x .125" thk. Angle, 6061 Aluminum.
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
 Modeling Solutions Partner

**TITLE:** Rocket Ramp Support Front

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19029</b>	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1

4

3

2

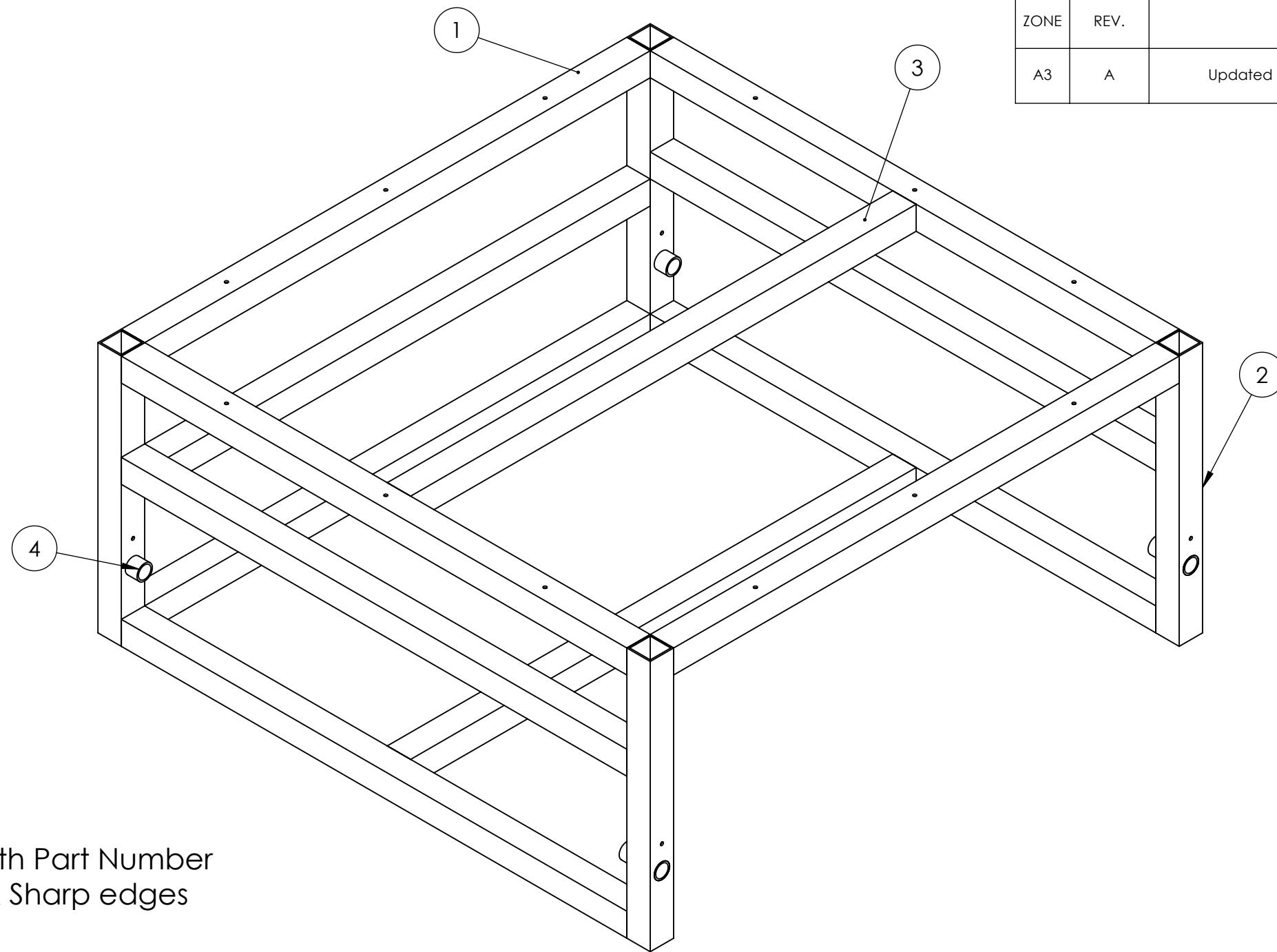
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4

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1



Notes:  
Tag or Label With Part Number  
Remove Burrs & Sharp edges

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19030-01	2"x.125" Thick 6061 Aluminum Square Tube	4
2	GE-19030-02	2"x.125" Thick 6061 Aluminum Square Tube	4
3	GE-19030-03	2"x .125" Thick 6061 Aluminum Square Tube	8
4	GE-19030-04	1" Schedule 40 Pipe 6061 Aluminum	4

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A

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
A3	A	Updated Material on BOM and Page 6	10/22/2018	MXS

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL: ±1/16	ENG APPR.		
		ANGULAR: MACH ±1° BEND ±1°	MFG APPR.		
		TWO PLACE DECIMAL ±.01	Q.A.		
		THREE PLACE DECIMAL ±.001	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION	DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
 Modeling Solutions Partner

**HAB Level 3 Frame**

SIZE **B** DWG. NO. **GE-19030** REV. **A**  
 SCALE: 1:8 WEIGHT: SHEET 1 OF 6

4

3

2

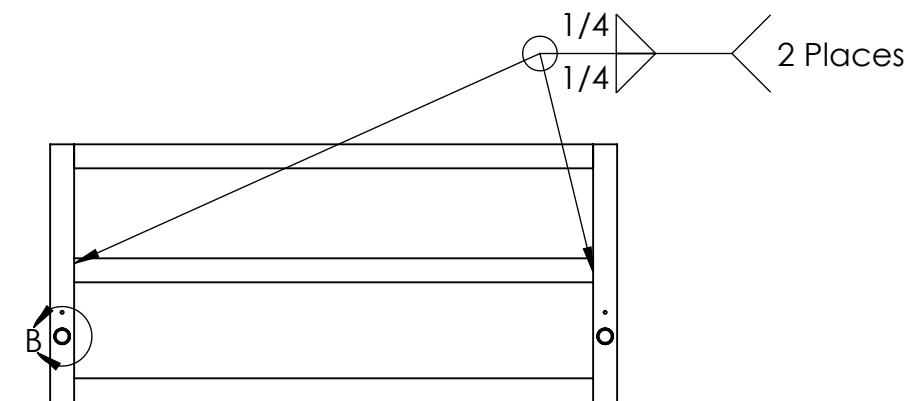
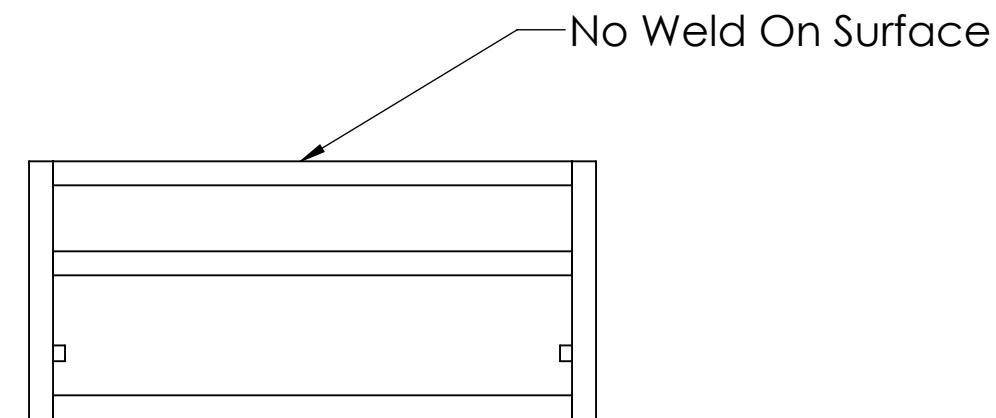
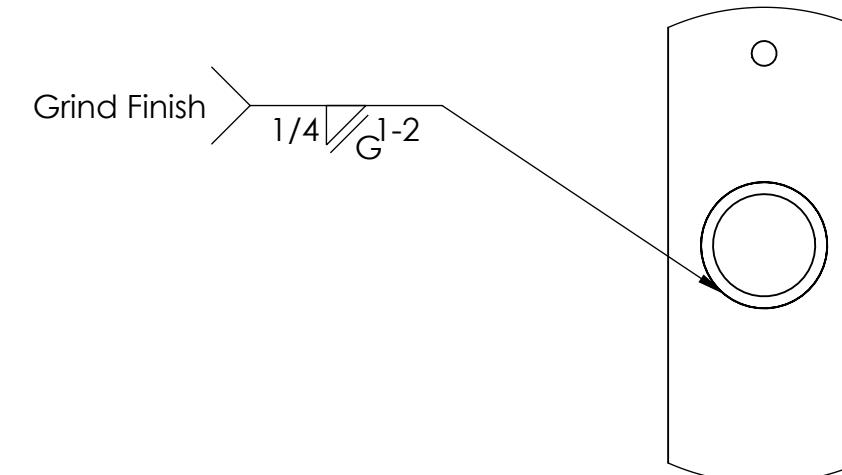
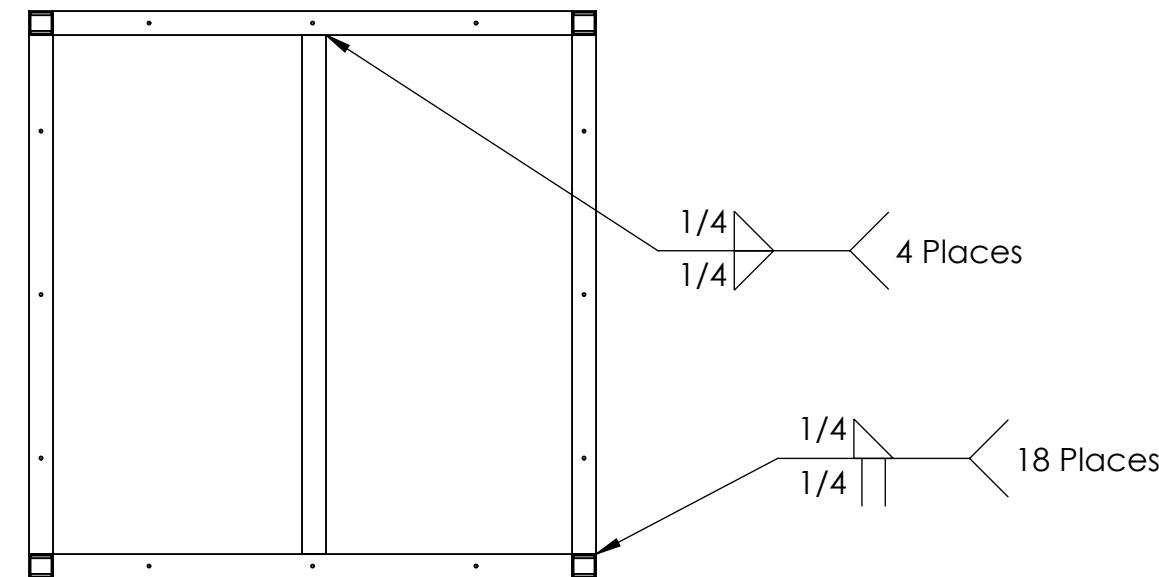
1

4

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Notes:  
Remove Burrs & Sharp edges

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL: $\pm 1/16$				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$				
INTERPRET GEOMETRIC TOLERANCING PER:				
MATERIAL				
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:16		WEIGHT:	SHEET 2 OF 6	

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE: HAB Level 3  
Frame

SIZE DWG. NO. REV  
**B** GE-19030 **A**

4

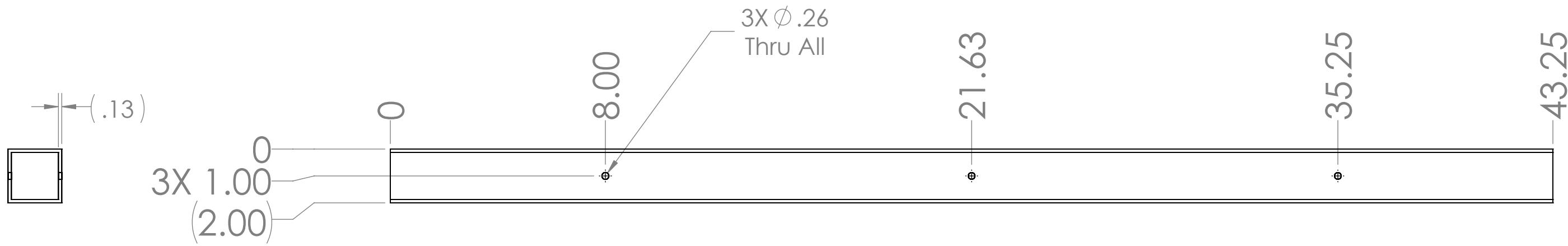
3

2

1

B

B



## Notes:

Part: GE-19030-01

Material: 2"x .125" 6061 Thick Aluminum Square Tube

Remove Burrs &amp; Sharp Edges

4

3

2

1

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**HAB Level 3 Frame**

<b>B</b>	<b>GE-19030</b>	<b>A</b>
SIZE	DWG. NO.	REV
SCALE: 1:8	WEIGHT:	SHEET 3 OF 6

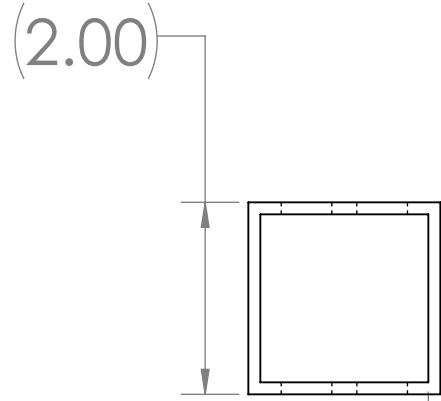
4

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B



2X 1.00

0

 $\phi .26$  Thru All

14.00

16.00

21.50

 $\phi 1.32$  Thru All

B

## Note:

Part: GE-19030-02

Material: 2"x .125" Thick 6061 Aluminumn Square Tube

Remove Burrs &amp; Sharp Edges

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**HAB Level 3 Frame**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19030</b>	<b>A</b>
SCALE: 1:2	WEIGHT:	SHEET 4 OF 6

4

3

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4

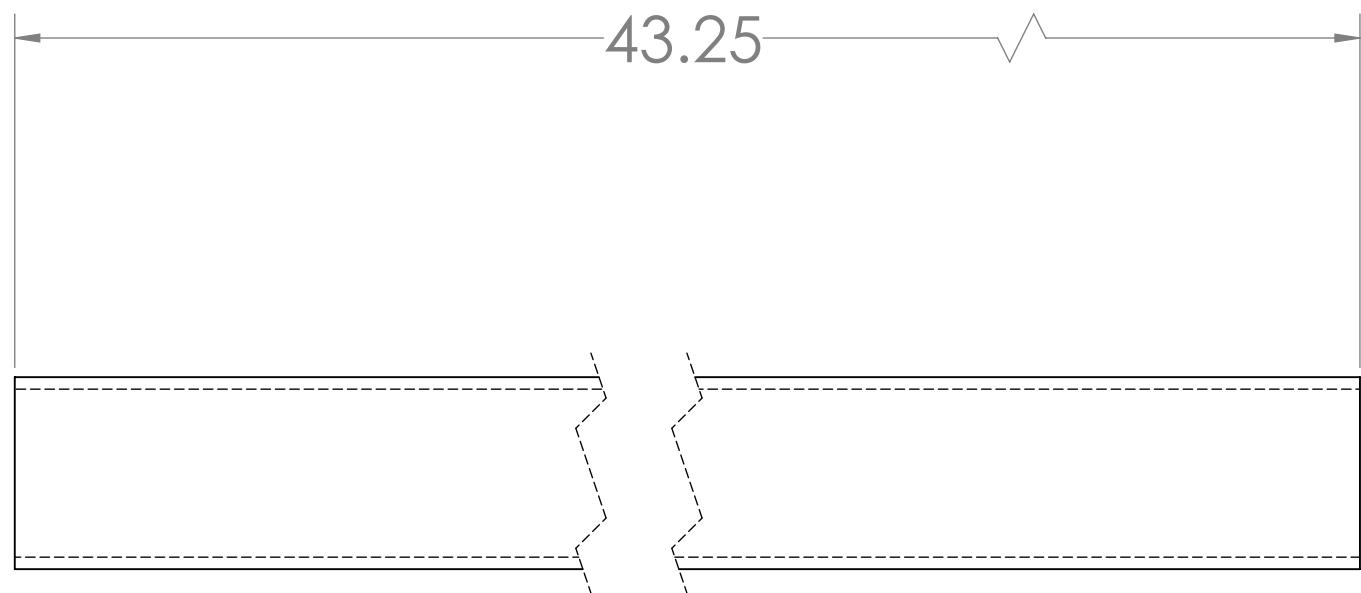
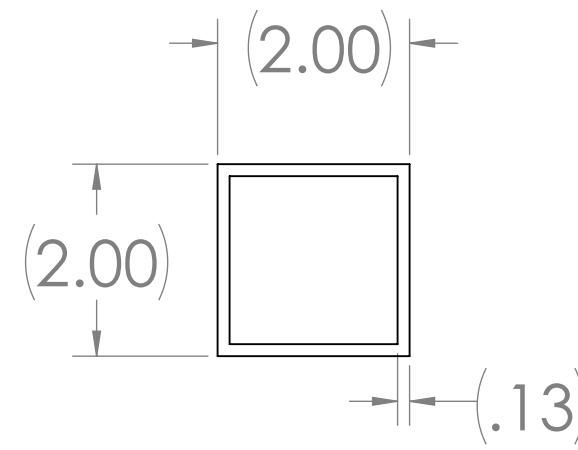
3

2

1

B

B



### Notes:

Part Number: GE-19030-03

Material: 2"x .125" Thick 6061 Aluminum Square Tube

Remove Burrs & Sharp Edges

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
	APPLICATION	DO NOT SCALE DRAWING			
<b>B</b>	<b>GE-19030</b>	<b>A</b>			
SCALE: 1:2	WEIGHT:	SHEET 5 OF 6			

 **FIRST  
ROBOTICS  
COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

**HAB Level 3  
Frame**

4

3

2

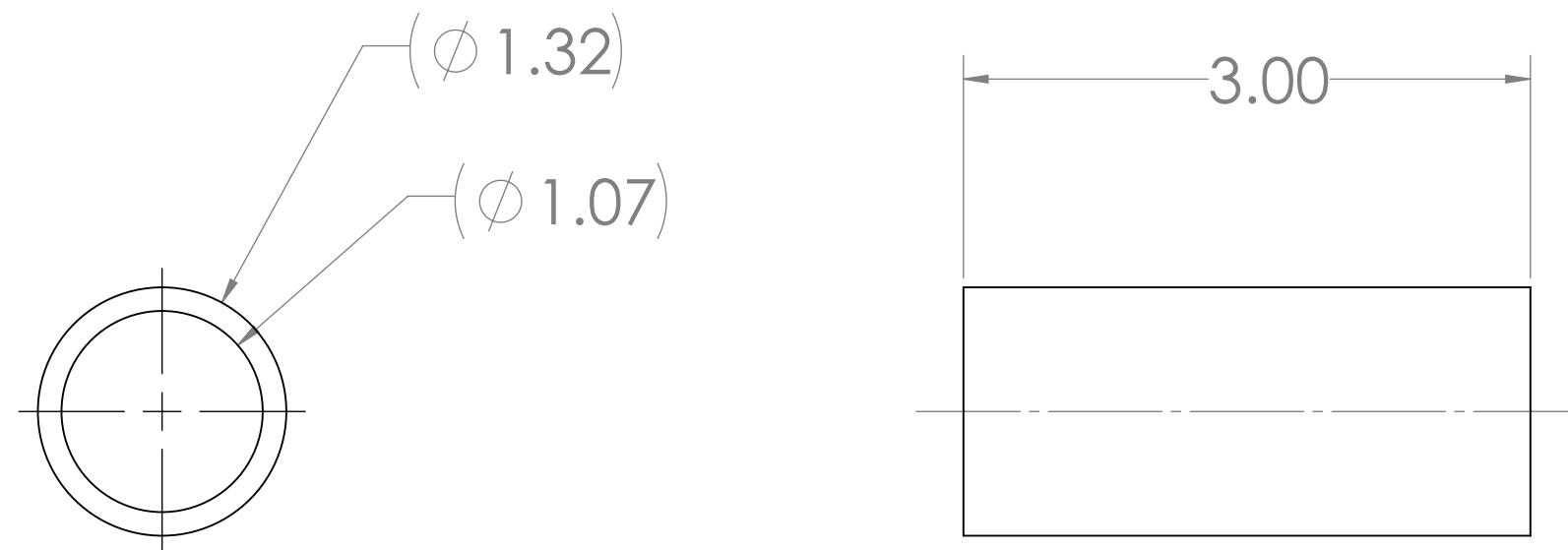
1

4

3

2

1



B

B

A

A

Notes:

Part Number: GE-19030-04

Material: 1" Schedule 40 Pipe 6061 Aluminum

Remove Burrs & Sharp Edges

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
		APPLICATION	DO NOT SCALE DRAWING		
<b>TITLE:</b>	<b>HAB Level 3 Frame</b>				
<b>SIZE</b>	<b>DWG. NO.</b>		<b>REV</b>		
<b>B</b>	<b>GE-19030</b>		<b>A</b>		
SCALE: 1:1	WEIGHT:		SHEET 6 OF 6		

4

3

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1

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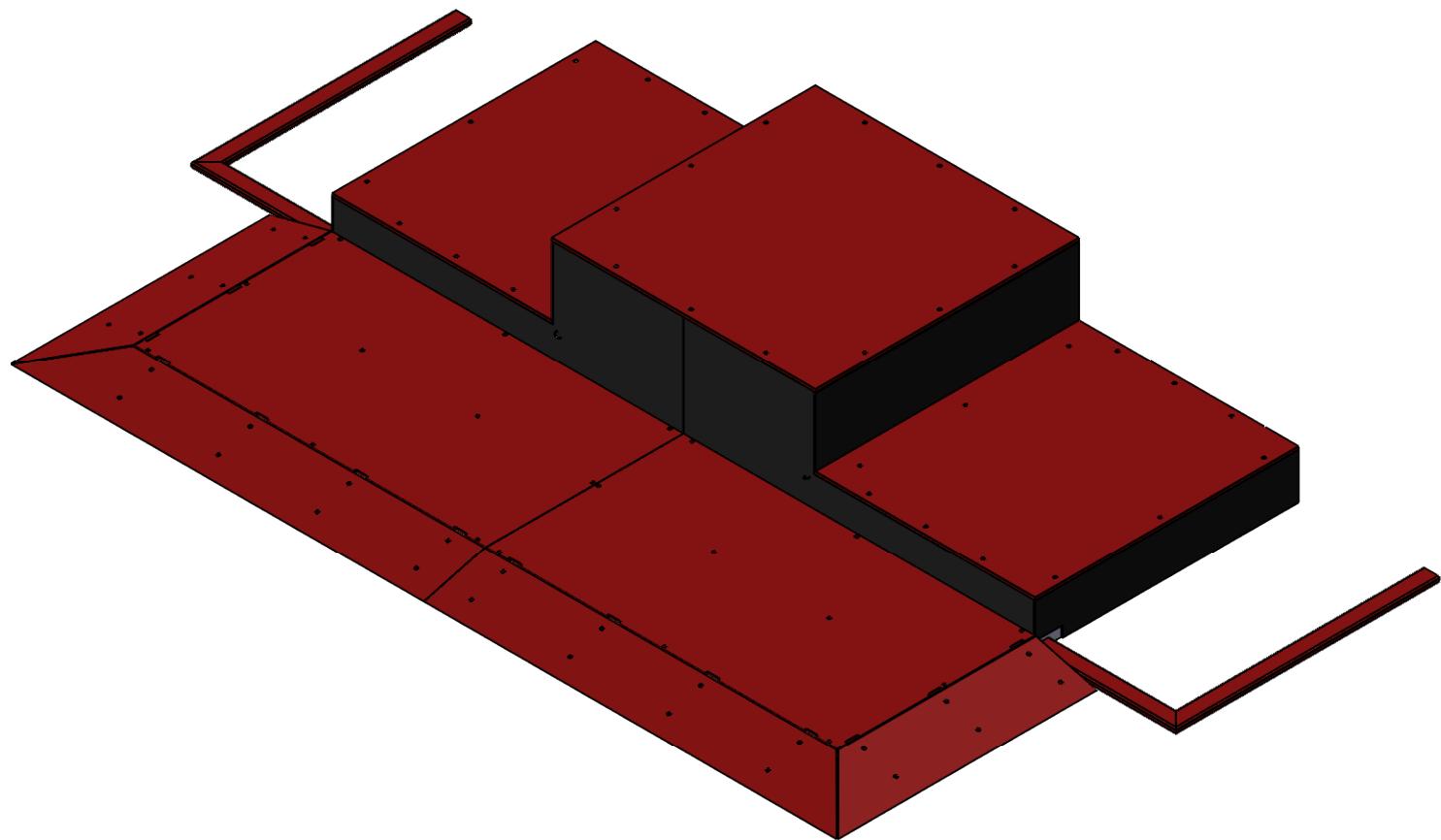
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19033	HAB Front Plastic	2
2	GE-19037	Level 3 Side	2
3	GE-19044	Level 2 Side	2
4	GE-19062	Level 1 - Assembly	1
5	GE-19069	Hab 3 Fastener Assembly	1
6	GE-19167	Corral Tube Left Small Fastener Assembly	1
7	GE-19168	Corral Tube Right Fastener Assembly	1
8	GE-19169	Corral Tube Right Small Fastener Assembly	1
9	GE-19176	Hab 2 Fastener Assembly	2
10	GE-19182	Corral Tube Left Fastener Assembly	1
11	Loop_1_23	1" Loop, 23" Long	4
12	Loop_1_36	1" x 36" Loop Fastener, Adhesive Backed	2
13	Loop_1_46	1" x 46" Loop Fastener, Adhesive Backed	6
14	pin_quick_ring_.25_2.5	SS Ring-Grip Quick-Release Pin, 1/4" diameter, 2.5" long	2

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
 Modeling Solutions Partner  
 TITLE: Full Hab Assembly  
 SIZE B DWG. NO. GE-19031 REV  
 SCALE: 1:24 WEIGHT: SHEET 1 OF 4

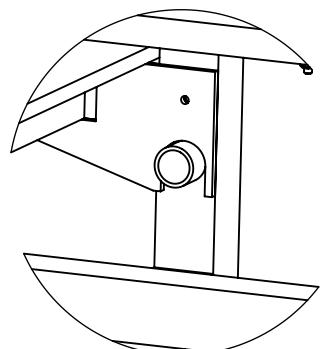
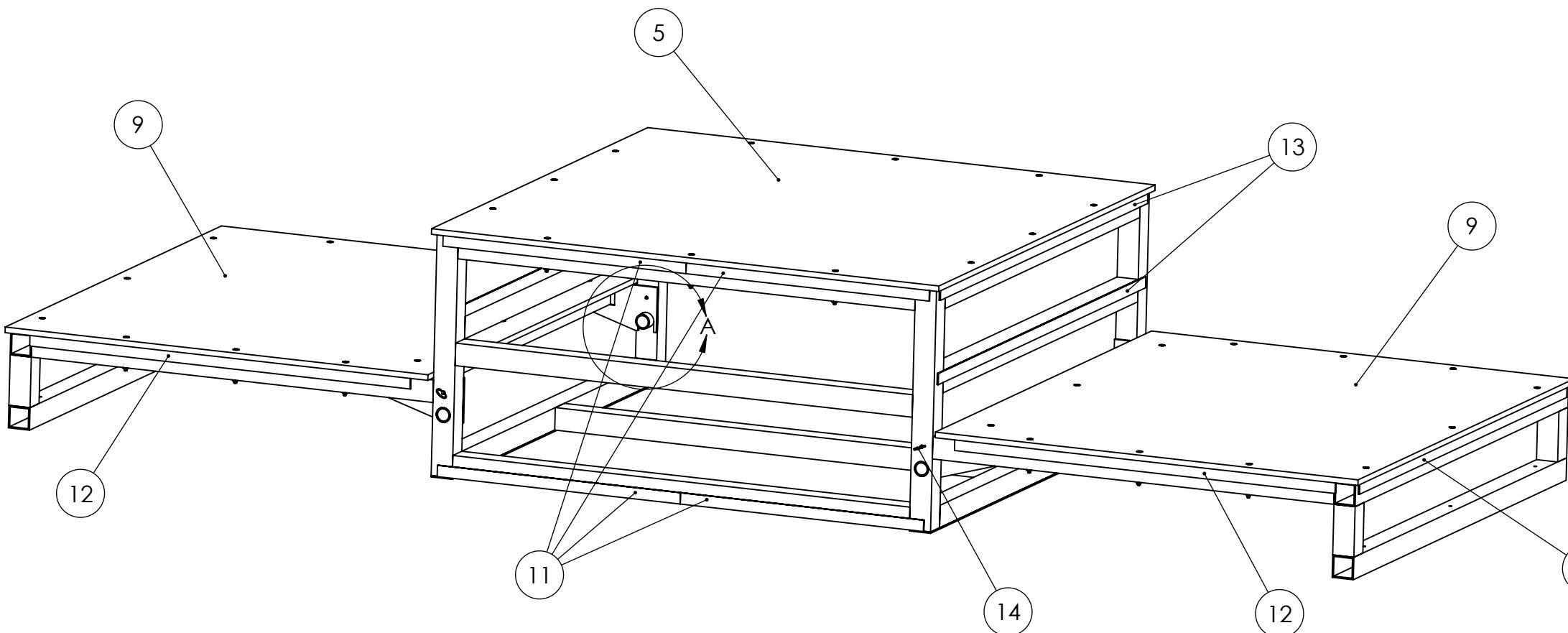
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4

3

2

1



DETAIL A  
SCALE 1 : 6

13 Repeat on opposite end

1. Place Item 9 so that the grooves in the plates are resting on the pipes in Item 5 as shown in Detail A. Secure with Item 14 at two locations.
2. Attach loop fastener as shown. Peel off the protective backing.

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		DIMENSIONS ARE IN INCHES		DRAWN	
		TOLERANCES:		CHECKED	
		FRACTIONAL $\pm 1/16$		ENG APPR.	
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		MFG APPR.	
		TWO PLACE DECIMAL $\pm .01$		Q.A.	
		THREE PLACE DECIMAL $\pm .001$		COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
		APPLICATION	DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Full Hab Assembly**

**SIZE** DWG. NO. REV  
**B** **GE-19031**

SCALE: 1:48 WEIGHT: SHEET 2 OF 4

4

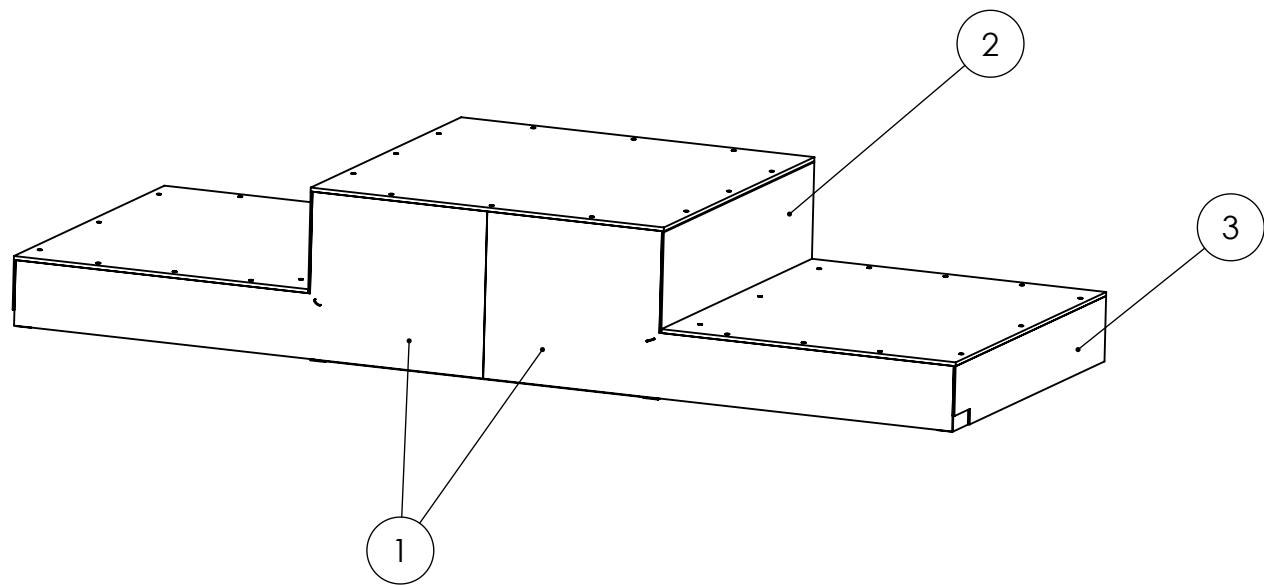
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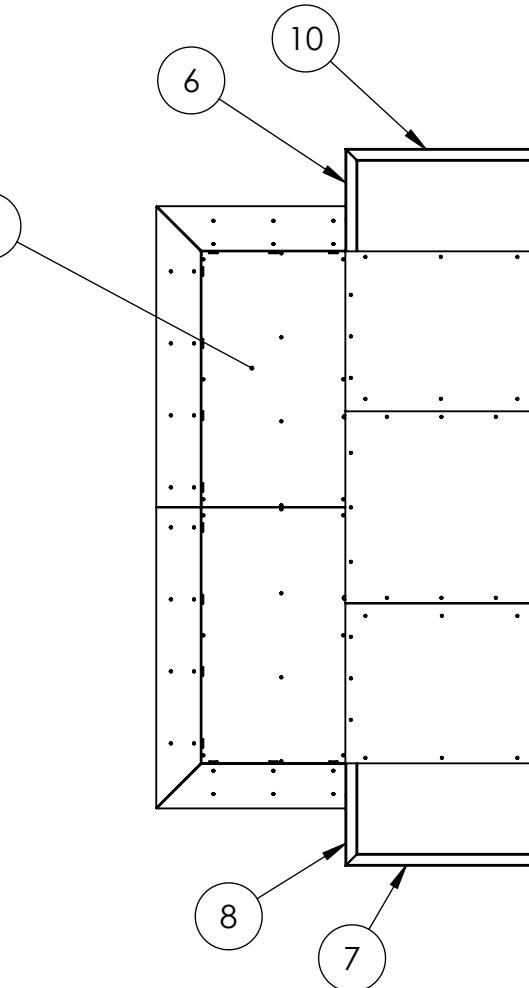
1

B

A



3. Place Items 1, 3, 2 as shown. Press firmly to ensure the loop fastener adheres to plastic.



4. Place Items 4, 6, 10, 7, 8 as shown.

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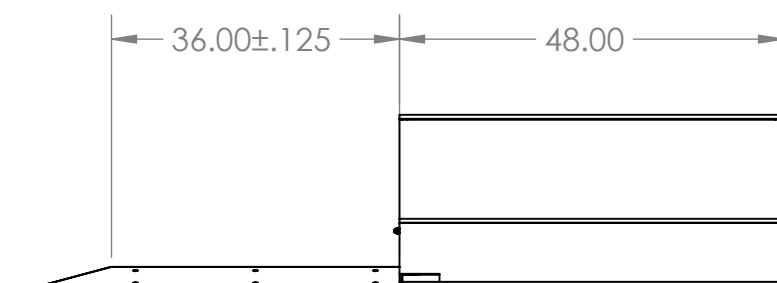
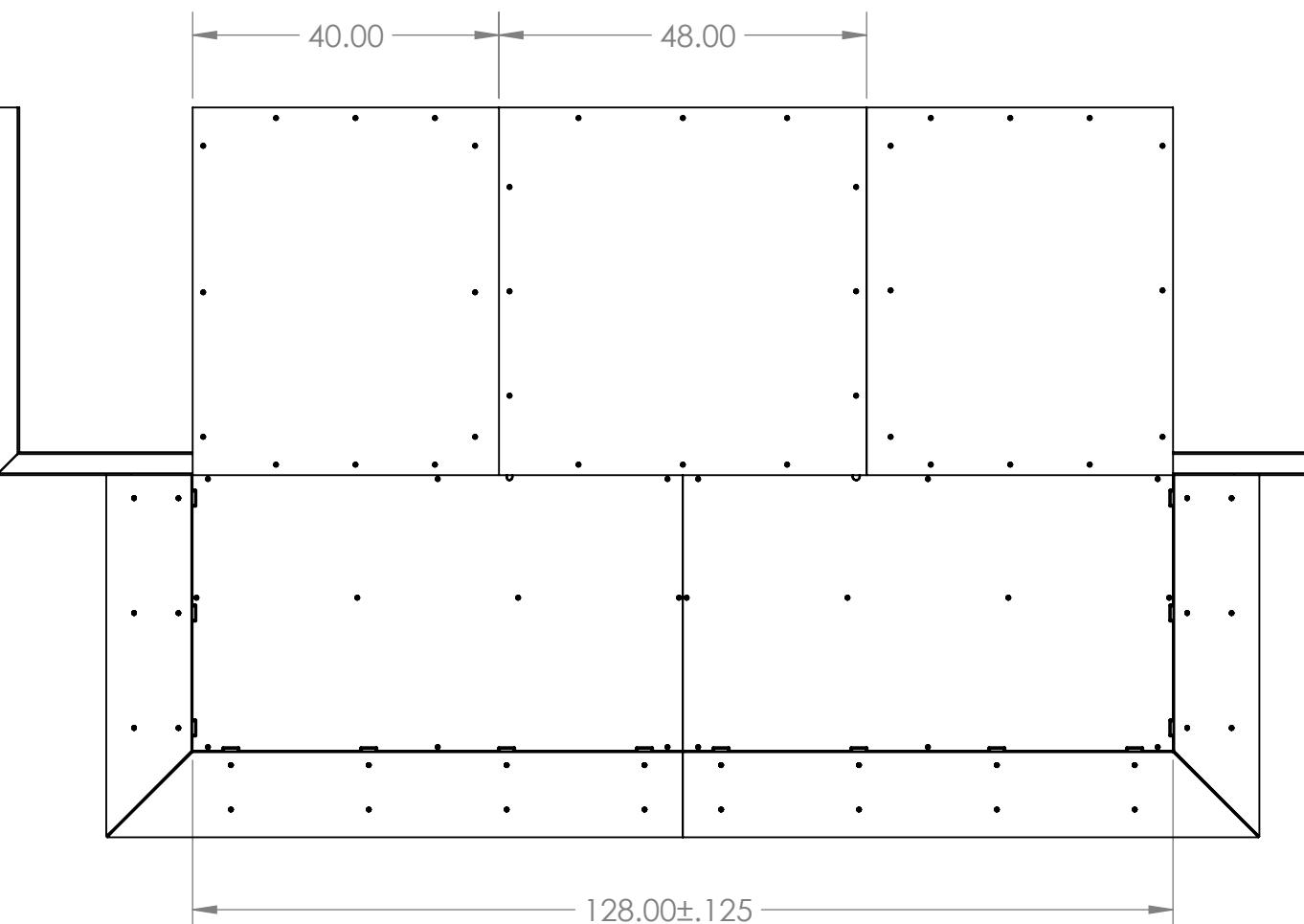
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b>  
		DIMENSIONS ARE IN INCHES	DRAWN			
		TOLERANCES: FRACTIONAL $\pm 1/16$	CHECKED			
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	ENG APPR.			
		TWO PLACE DECIMAL $\pm .01$	MFG APPR.			
		THREE PLACE DECIMAL $\pm .001$	Q.A.			
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:			
		MATERIAL				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
NEXT ASSY	USED ON	MATERIAL		
APPLICATION		FINISH		
		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Full Hab Assembly

**SIZE** DWG. NO. REV  
**B** GE-19031

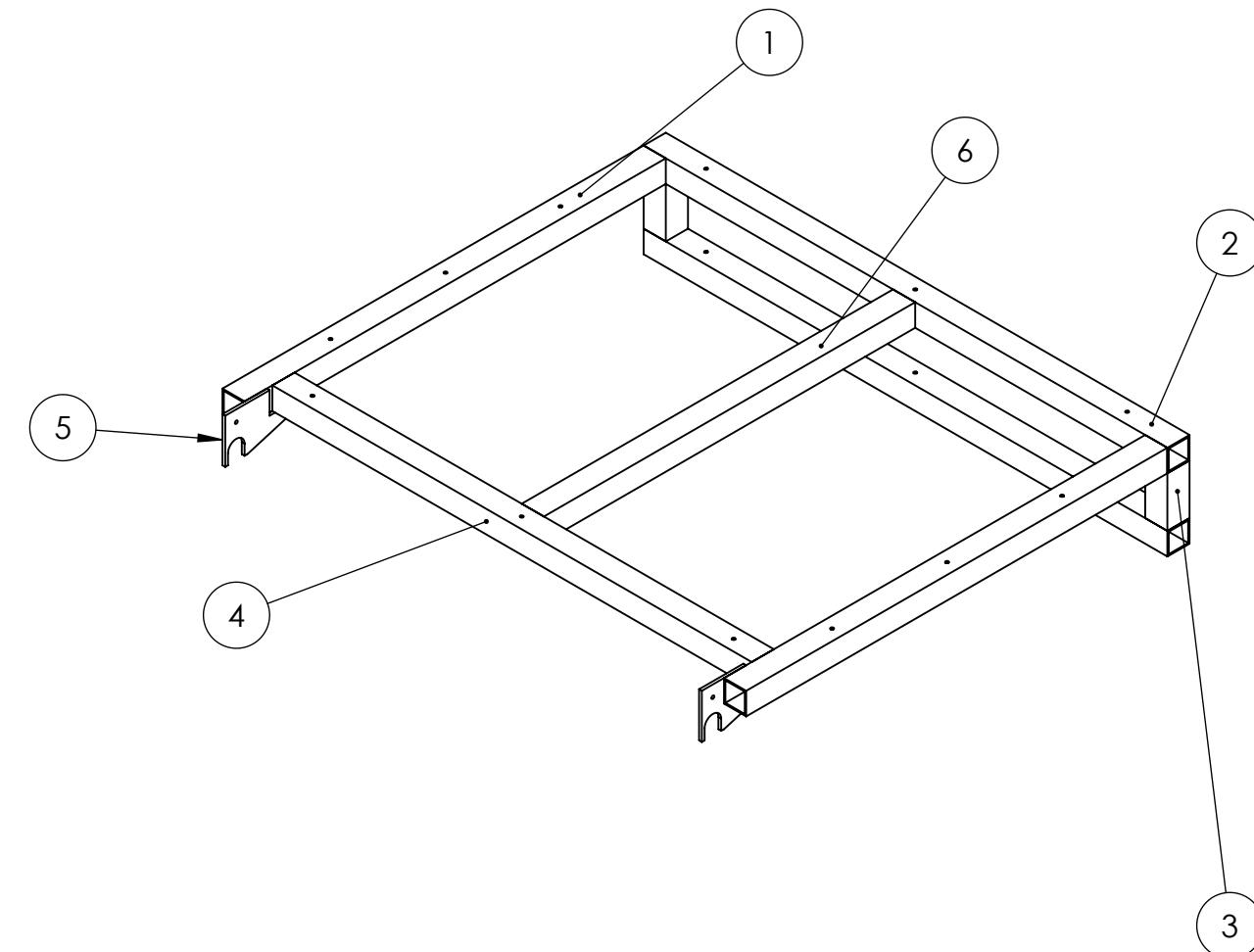
SCALE: 1:48 WEIGHT: SHEET 4 OF 4

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
2-B3, 4-A3, 5-A3	E	Added 8.75 dimension, $\phi 0.26$ was $\phi 0.25$ , added detail view of GE-19032-06.	10/19/2018	DAF

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19032-01	2"x .125" Thick 6061 Aluminium Square Tube	2
2	GE-19032-02	2"x .125" Thick 6061 Aluminium Square Tube	2
3	GE-19032-03	2"x .125" Thick 6061 Aluminium Square Tube	2
4	GE-19032-04	2"x .125" Thick 6061 Aluminium Square Tube	1
5	GE-19032-05	.25" Thick 6061 Aluminum Plate	2
6	GE-19032-06	2"x .125" Thick 6061 Aluminium Square Tube	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	
SIZE	DWG. NO.			REV	
<b>B</b>	<b>GE-19032</b>			<b>E</b>	
SCALE: 1:12	WEIGHT:			SHEET 1 OF 5	

**FIRST  
ROBOTICS  
COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

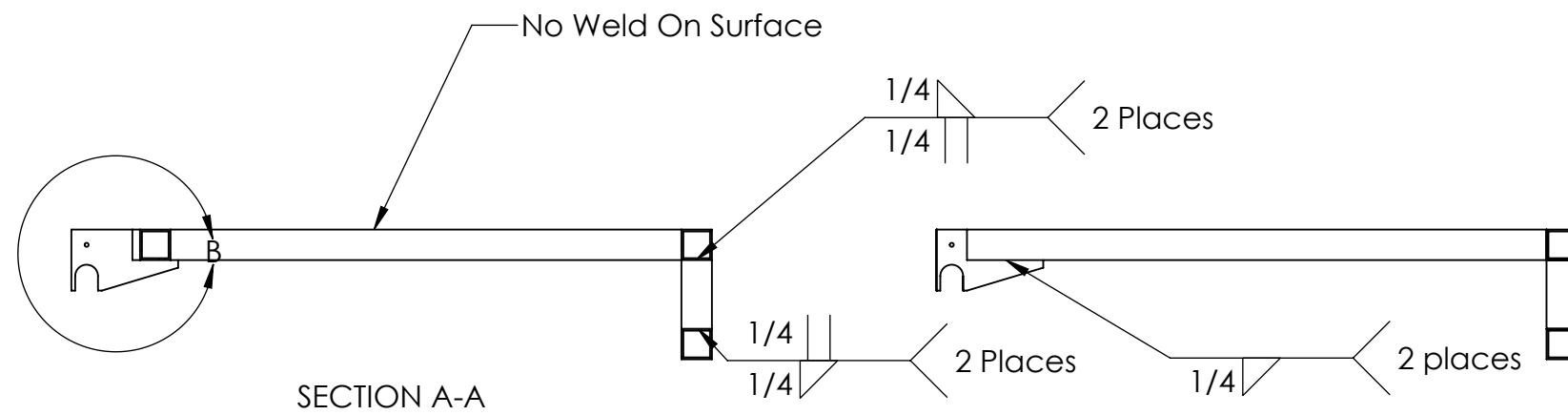
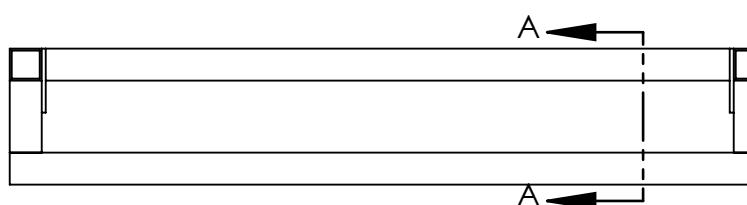
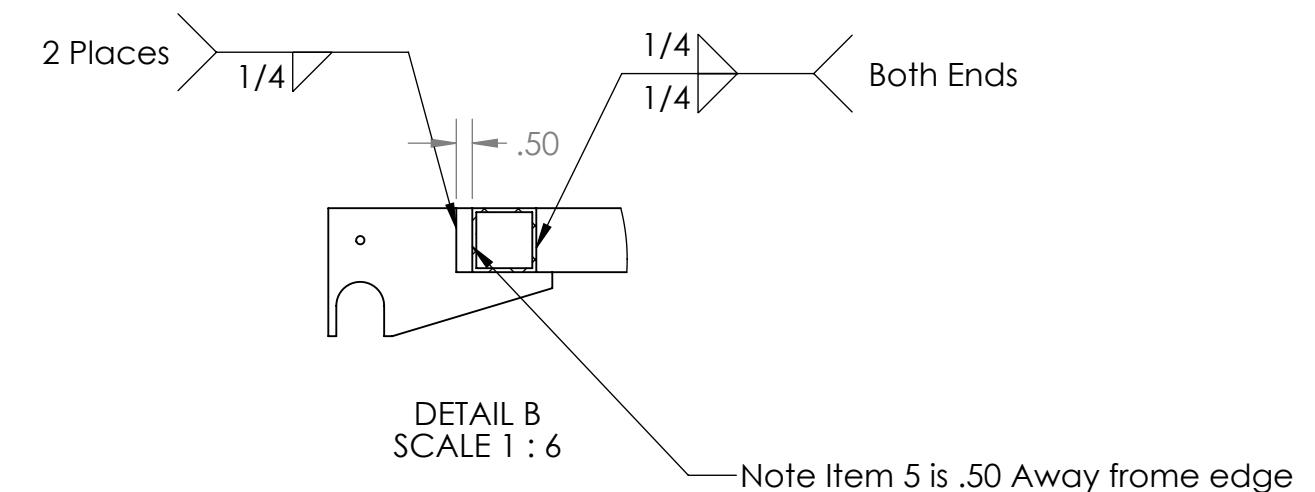
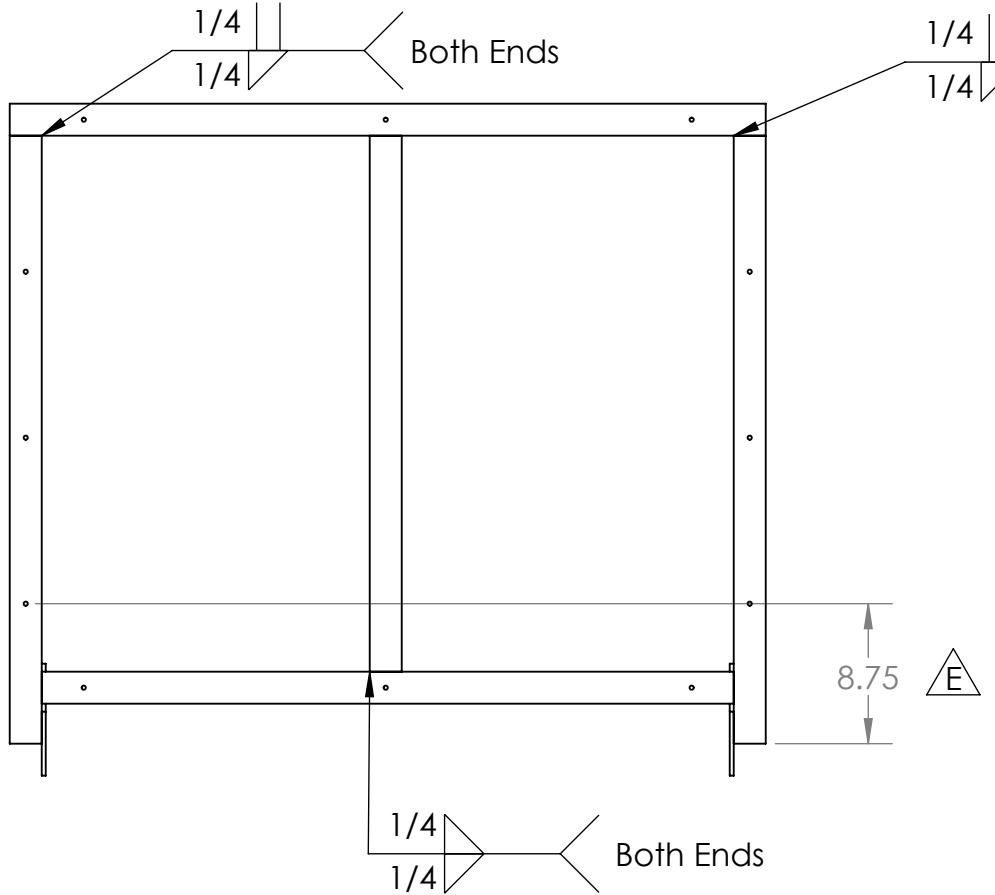
**HAB Level 2  
Frame**

4

3

2

1



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DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL $\pm 1/16$				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$				
INTERPRET GEOMETRIC TOLERANCING PER:				
MATERIAL				
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**HAB Level 2 Frame**

**SIZE DWG. NO. REV**  
**B GE-19032 E**

SCALE: 1:12 WEIGHT: SHEET 2 OF 5

4

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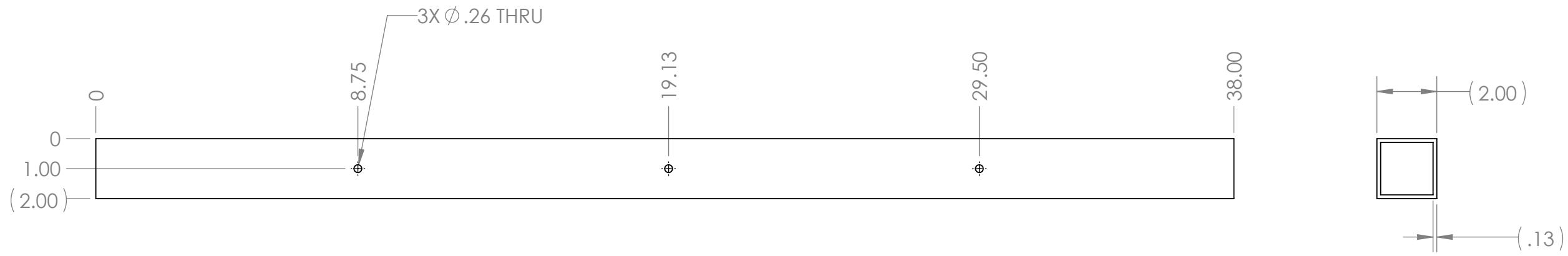
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2

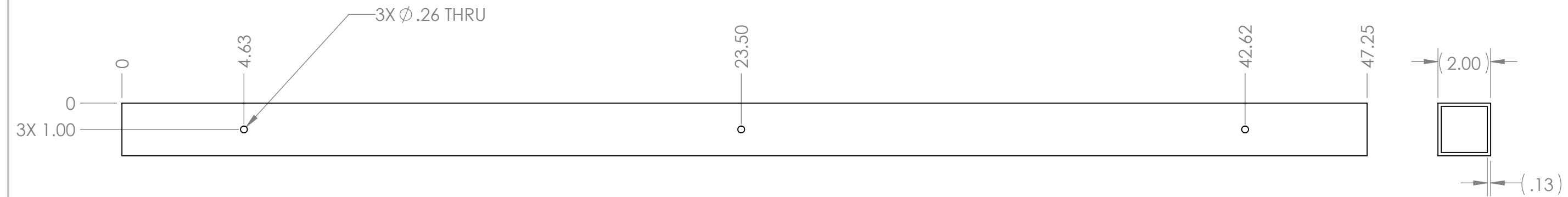
1

B

B



Notes:  
 Part Material: GE-19032-01  
 Material: 2"x .125" Thick 6061 Aluminum Square Tube



Notes:  
 Part Material: GE-19032-02  
 Material: 2"x .125" Thick 6061 Aluminum Square Tube

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DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL $\pm 1/16$				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$				
INTERPRET GEOMETRIC TOLERANCING PER:		Q.A.	COMMENTS:	
MATERIAL		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**HAB Level 2 Frame**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19032</b>	<b>E</b>
SCALE: 1:8	WEIGHT:	SHEET 3 OF 5

4

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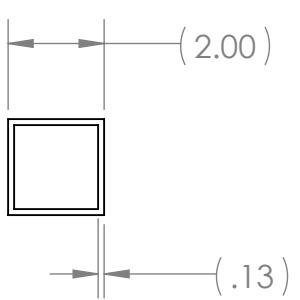
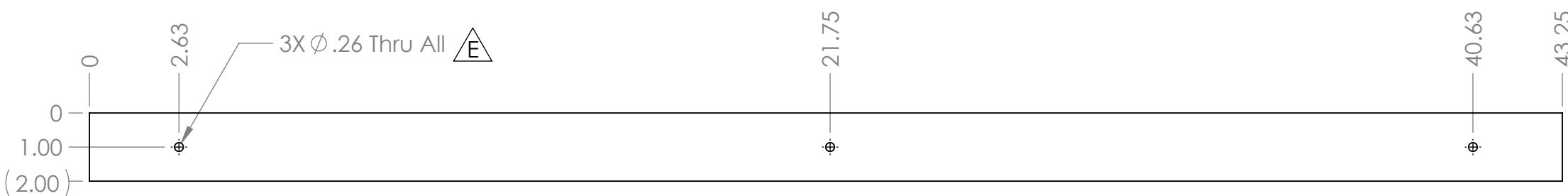
2

1

**Notes:**

Part Material: GE-19032-03

Material: 2"x .125" Thick 6061 Aluminumn Square Tube

**Notes:**

Part Material: GE-19032-04

Material: 2"x .125" Thick 6061 Aluminumn Square Tube

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**HAB Level 2 Frame**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19032</b>	<b>E</b>
SCALE: 1:4	WEIGHT:	SHEET 4 OF 5

4

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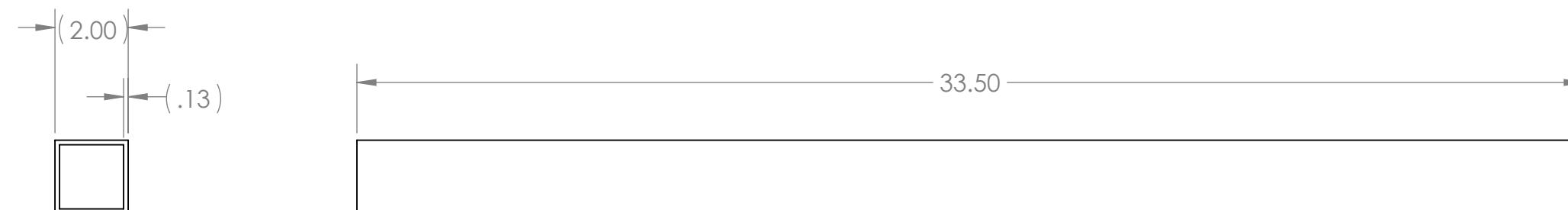
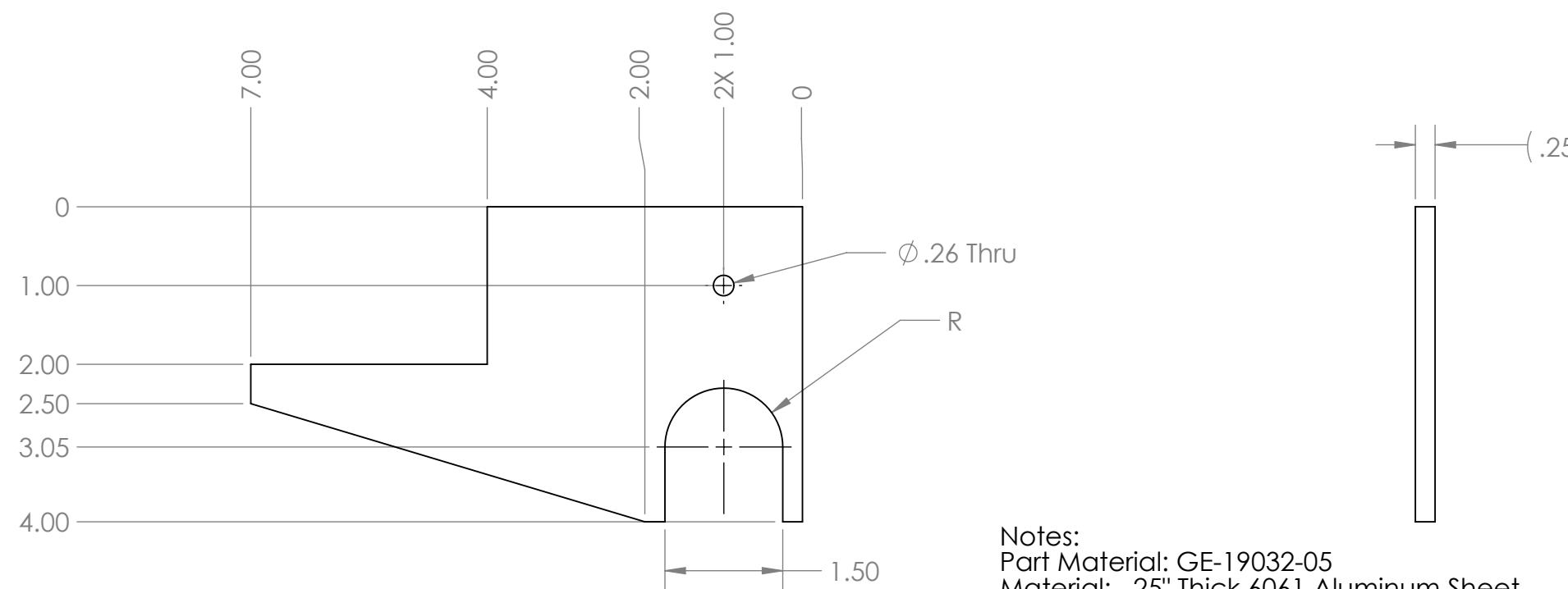
3

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B

B



Notes:  
Part Material: GE-19032-06  
Material: 2"x .125" Thick 6061 Aluminum Square Tube

A

A

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		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL $\pm 1/16$			
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$			
		TWO PLACE DECIMAL $\pm .01$			
		THREE PLACE DECIMAL $\pm .001$			
		INTERPRET GEOMETRIC		Q.A.	
		TOLERANCING PER:		COMMENTS:	
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
	APPLICATION		DO NOT SCALE DRAWING		

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**HAB Level 2**  
**Frame**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19032</b>	<b>E</b>
SCALE: 1:4	WEIGHT:	SHEET 5 OF 5

4

3

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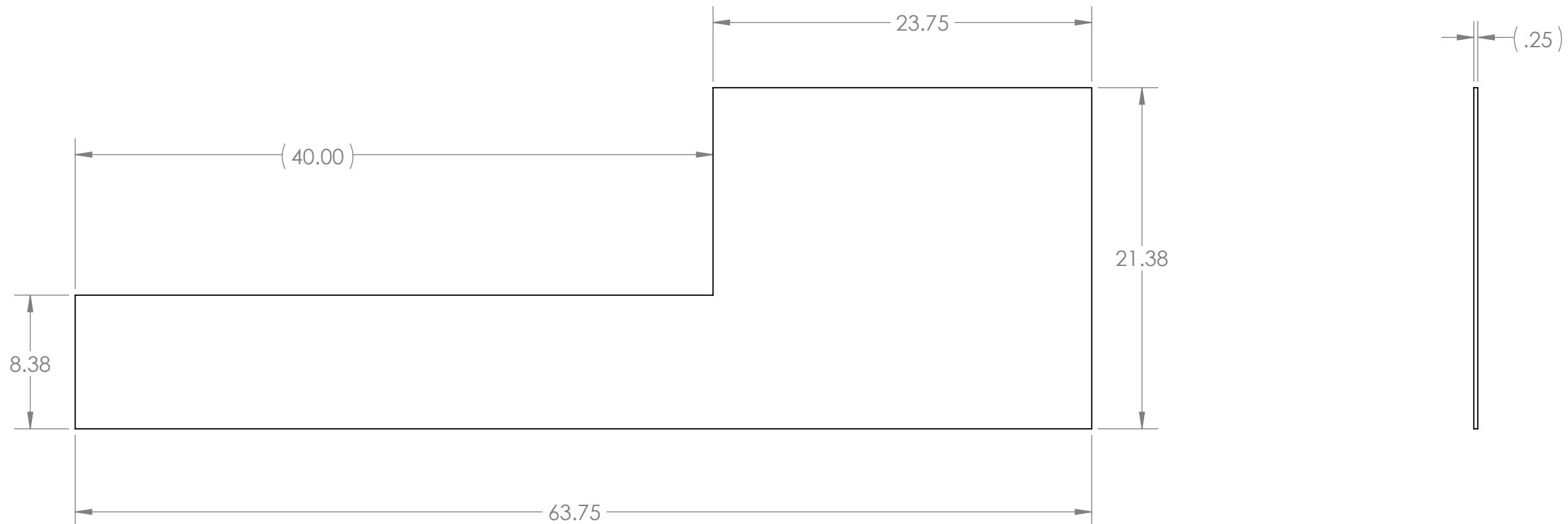
3

2

1

B

B



A

A

Note:  
 Material: 1/4" Thick HDPE Sheet, Black  
 Finish: Orange Peel  
 Remove Sharp Edges and Burrs  
 Tag Or Label With Part Number

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		DIMENSIONS ARE IN INCHES		
		TOLERANCES:		
		FRACTIONAL $\pm 1/16$		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		
		TWO PLACE DECIMAL $\pm .01$		
		THREE PLACE DECIMAL $\pm .001$		
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**HAB Front Plastic**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19033</b>	<b>A</b>
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

4

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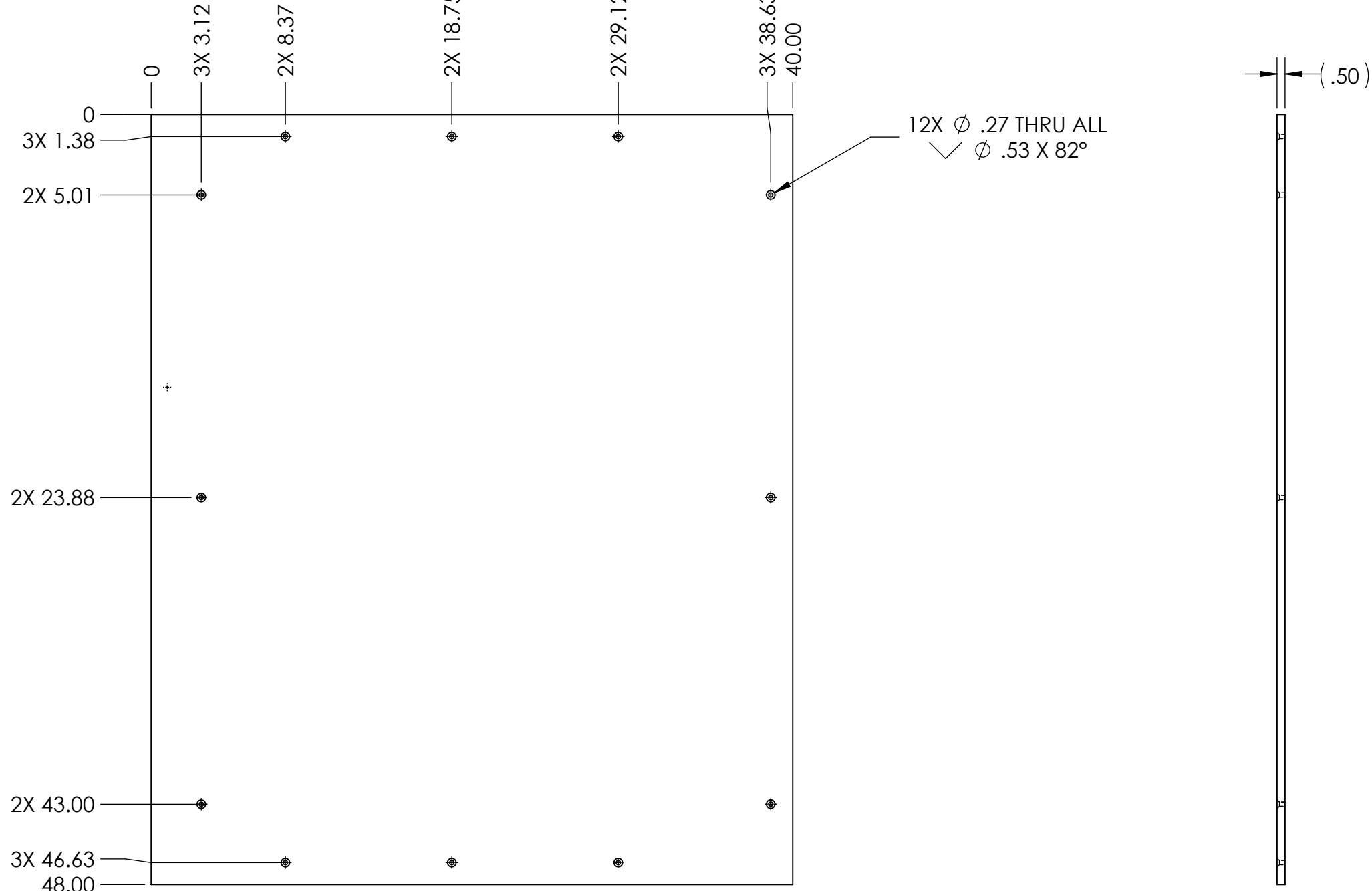
3

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B

B



Note:  
Material: 1/2" Thick HDPE Sheet  
Finish: Orange Peel  
Tag Or Label With Part Number  
Remove Sharp Edges Or Burrs

Part Number	Color
GE-19035-BLK	BLACK
GE-19035-RED	RED
GE-19035-BLU	BLUE

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		DIMENSIONS ARE IN INCHES	DRAWN		
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		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV			
<b>B</b>	<b>GE-19035</b>				
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1			

4

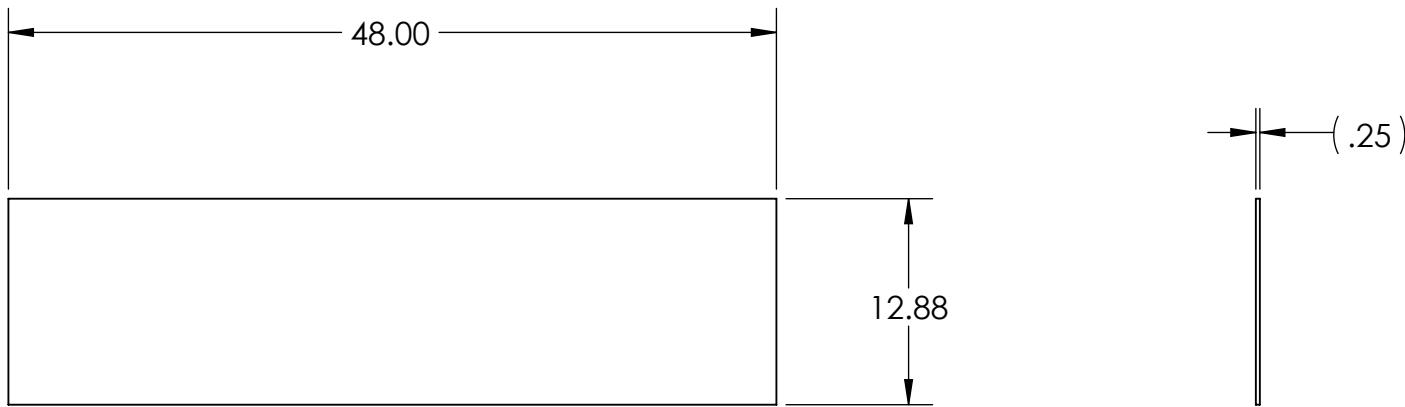
3

2

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B

B

**Note:**

Material: 1/4" Thick HDPE Black  
 Finish: Orange Peel  
 Tag Or Label With Part Number  
 Remove Sharp Edges and Burrs

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		INTERPRET GEOMETRIC TOLERANCING PER:  MATERIAL	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
			Q.A.		
		COMMENTS:			
NEXT ASSY	USED ON	FINISH	SIZE	DWG. NO.	REV
		DO NOT SCALE DRAWING	A	GE-19037	
APPLICATION			SCALE: 1:12	WEIGHT:	SHEET 1 OF 1



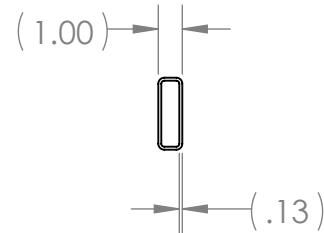
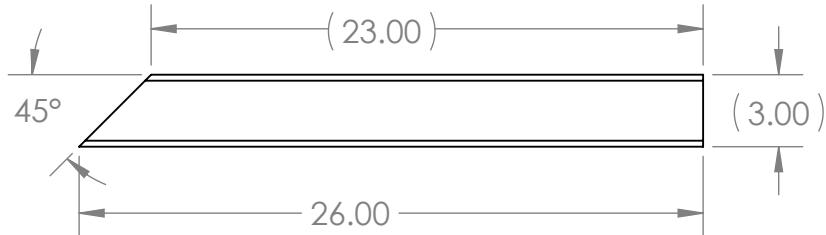
Level 3 Side

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A2	A	FIXED MATERIAL CALLOUT	12/26/2018	DAF

B

B



Notes:  
Material: 1" x 3" x .125" A513 Rectangular Tube  
Finish: Tiger Drylac Powder Coating, Or Equivalent  
Remove All Sharp Edges and Burrs



Part Number	Color
GE-19038-RED	Bengal Red 49/33333
GE-19038-BLU	Mercury Blue 59/40653

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		UNLESS OTHERWISE SPECIFIED:			
		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL 1/16			
		ANGULAR: MACH 1° BEND 1°			
		TWO PLACE DECIMAL .01			
		THREE PLACE DECIMAL .001			
		INTERPRET GEOMETRIC			
		TOLERANCING PER:			
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

DRAWN	NAME	DATE
CHECKED		
ENG APPR.		
MFG APPR.		
Q.A.		
COMMENTS:		



TITLE:

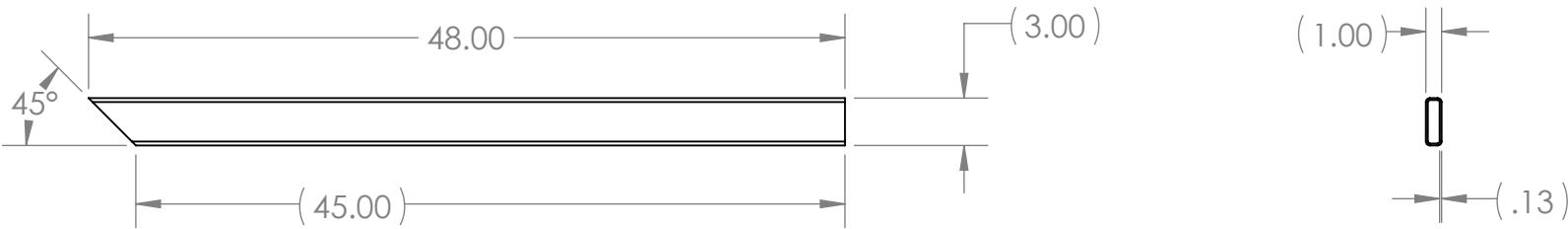
Corral Tube  
Small

SIZE	DWG. NO.	REV
A	GE-19038	A
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
A2	A	FIXED MATERIAL CALLOUT	12/26/2018	DAF

B

B



## Notes:

GE-19039

Material: 1"x 3" x .125" A513 Rectangular Tube  
 Finish: Tiger Drylac Powder Coating, Or Equivalent  
 Remove Burrs and Sharp Edges

A

Part Number	Color
GE-19039-Blu	Bengal Red 49/33333
GE-19039-Red	Mercury Blue 59/40653

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		UNLESS OTHERWISE SPECIFIED:			
		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL 1/16			
		ANGULAR: MACH 1° BEND 1°			
		TWO PLACE DECIMAL .01			
		THREE PLACE DECIMAL .001			
		INTERPRET GEOMETRIC			
		TOLERANCING PER:			
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

Part Number

GE-19039-Blu

Color

Bengal Red 49/33333

Part Number

GE-19039-Red

Color

Mercury Blue 59/40653


**SOLIDWORKS**  
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TITLE:

# Corral Tube Long

SIZE	DWG. NO.	REV
A	GE-19039	A
SCALE: 1:12	WEIGHT:	SHEET 1 OF 1

4

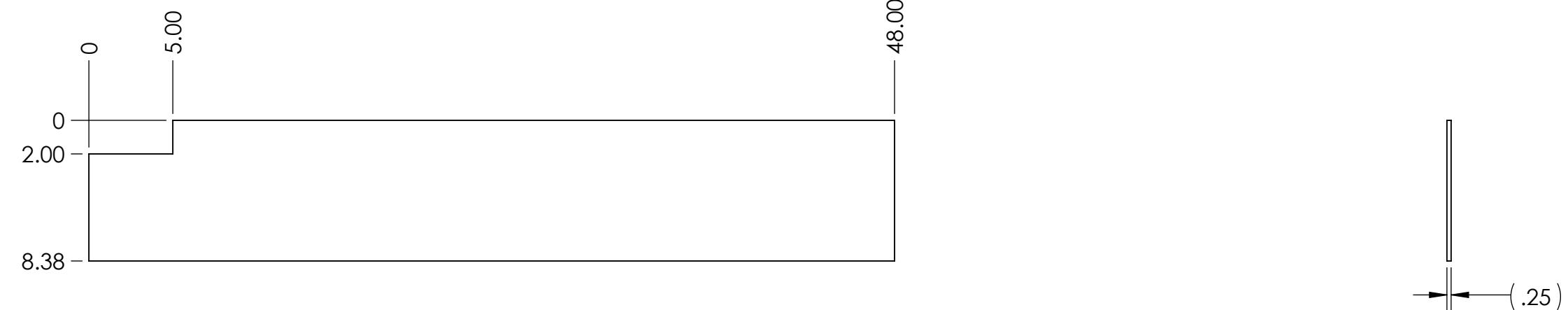
3

2

1

B

B



Notes:  
 Material: 1/4" Thick HDPE Black  
 Finish: Orange Peel  
 Tag Or Label With Part Number  
 Remove Sharp Edges And Burrs

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		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
	APPLICATION		DO NOT SCALE DRAWING		
	TITLE: Level 2 Side				
	SIZE <b>B</b>	DWG. NO. <b>GE-19044</b>	REV		
	SCALE: 1:8				
	WEIGHT:				
	SHEET 1 OF 1				



SOLIDWORKS  
Modeling Solutions Partner

4

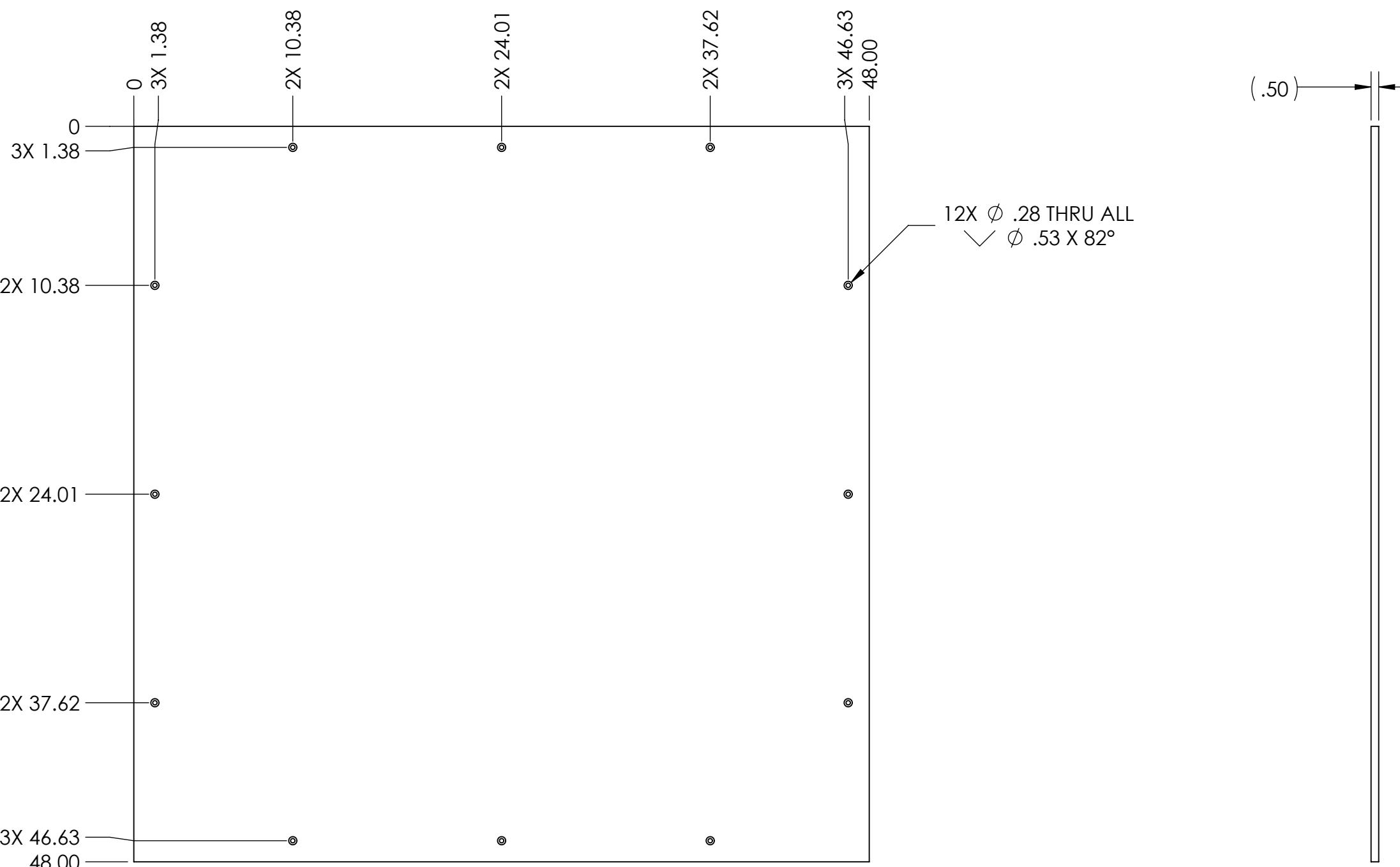
3

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Notes:  
Material: 1/2" HDPE Sheet  
Finish: Orange Peel  
Tag Or Label With Part Number  
Remove Sharp Edges and Burrs

Part Number	Color
GE-19045-RED	1/2" THK HDPE RED
GE-19045-BLU	1/2" THK HDPE BLUE
GE-19045-BLK	1/2" THK HDPE BLACK

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DIMENSIONS ARE IN INCHES

TOLERANCES:

FRACTIONAL  $\pm 1/16$ ANGULAR: MACH  $\pm 1^\circ$  BEND  $\pm 1^\circ$ TWO PLACE DECIMAL  $\pm .01$ THREE PLACE DECIMAL  $\pm .001$ 

INTERPRET GEOMETRIC

TOLERANCING PER:

MATERIAL

NEXT ASSY

USED ON

FINISH

APPLICATION

DO NOT SCALE DRAWING

NAME

DATE

DRAWN

CHECKED

ENG APPR.

MFG APPR.

Q.A.

COMMENTS:

**FIRST**  
ROBOTICS  
COMPETITION

**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:

**HDPE Top Level**  
3

SIZE DWG. NO.

**B** GE-19045

REV

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

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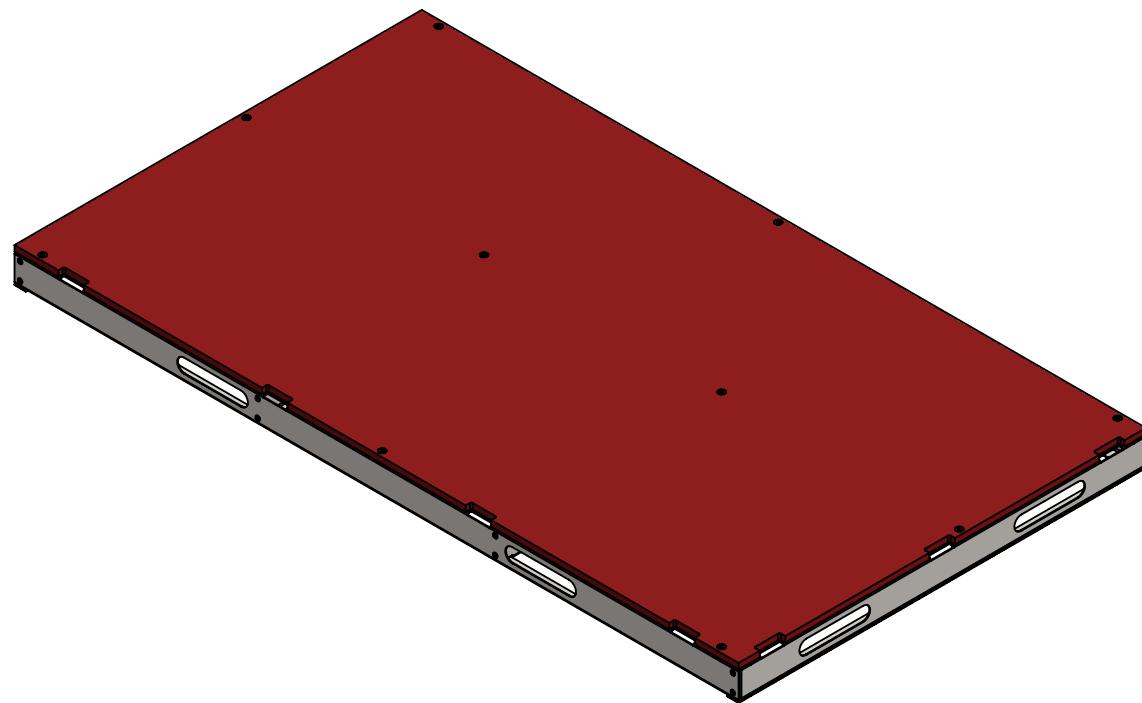
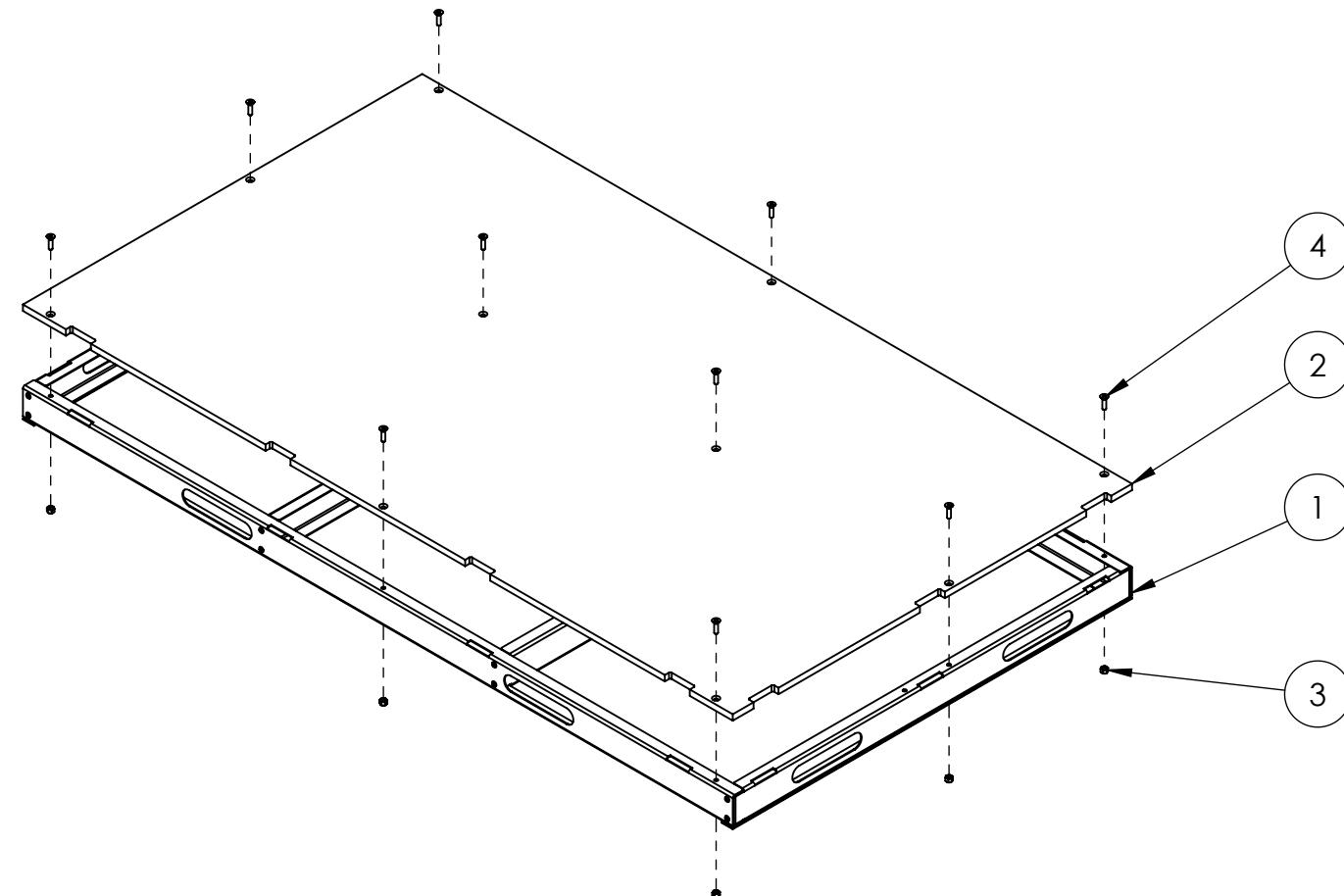
1

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1



ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19063	Level 1 - Frame	1
2	GE-19052	Level 1 - Top Right	1
3	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	10
4	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	10
5	Hook_1_36	1" x 36" Hook, Adhesive Backed	2

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	DAF	9/8/16
		TOLERANCES:	CHECKED		
		FRACTIONAL 1/16	ENG APPR.		
		ANGULAR: MACH 1° BEND 1°	MFG APPR.		
		TWO PLACE DECIMAL .01	Q.A.		
		THREE PLACE DECIMAL .001	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION	DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**LEVEL 1 - Platform Right**

**SIZE DWG. NO. REV**  
**B GE-19051**

**SCALE: 1:12 WEIGHT: SHEET 1 OF 2**

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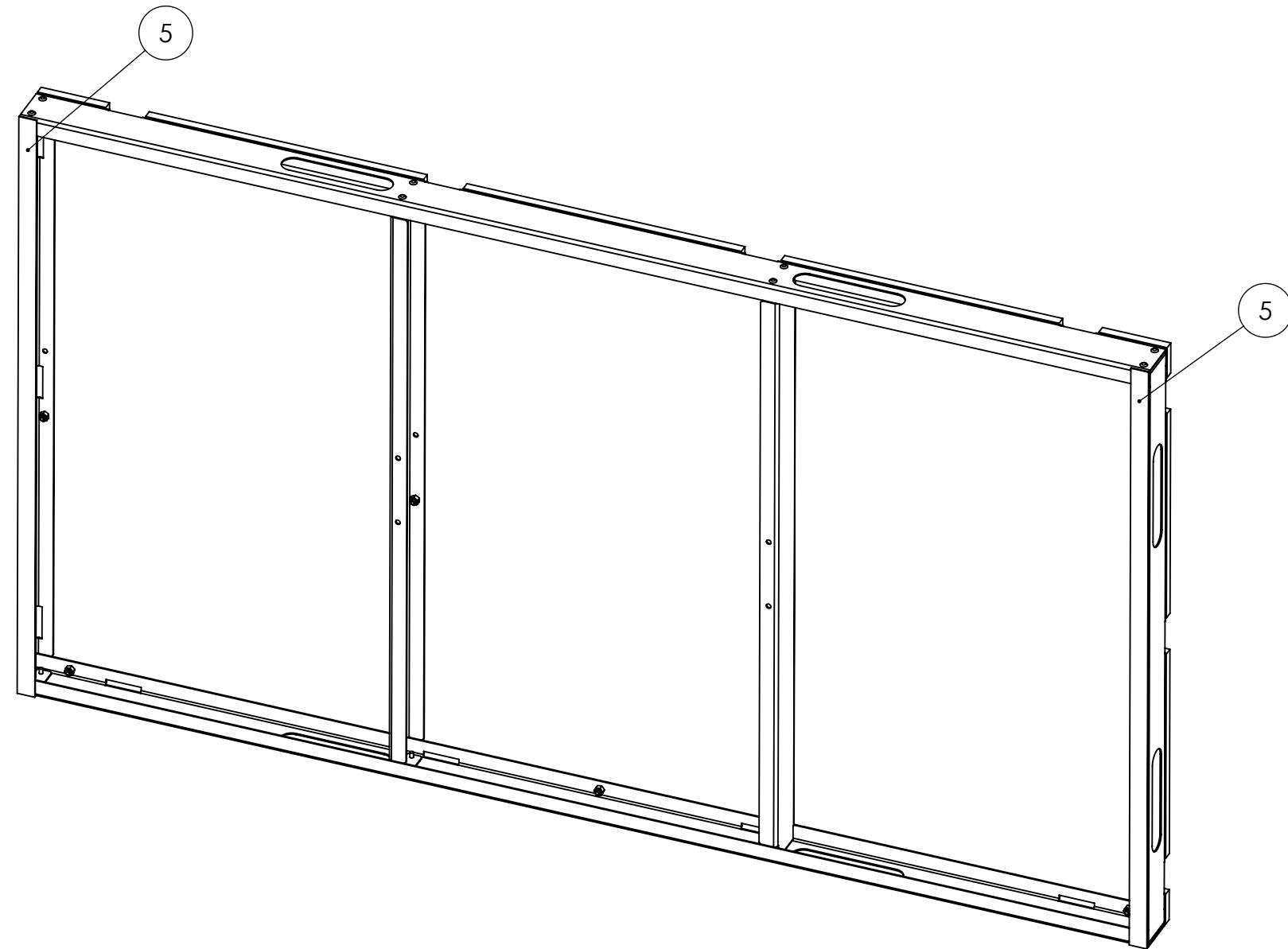
3

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B



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## Notes:

- Clean steel surface prior to application of hook.

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		DRAWN	DAF	9/8/16
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
		SCALE: 1:12	WEIGHT:	SHEET 2 OF 2

**FIRST**  
**ROBOTICS**  
**COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Level 1 -**  
**Platform Right**

**SIZE** DWG. NO. REV  
**B** **GE-19051**

4

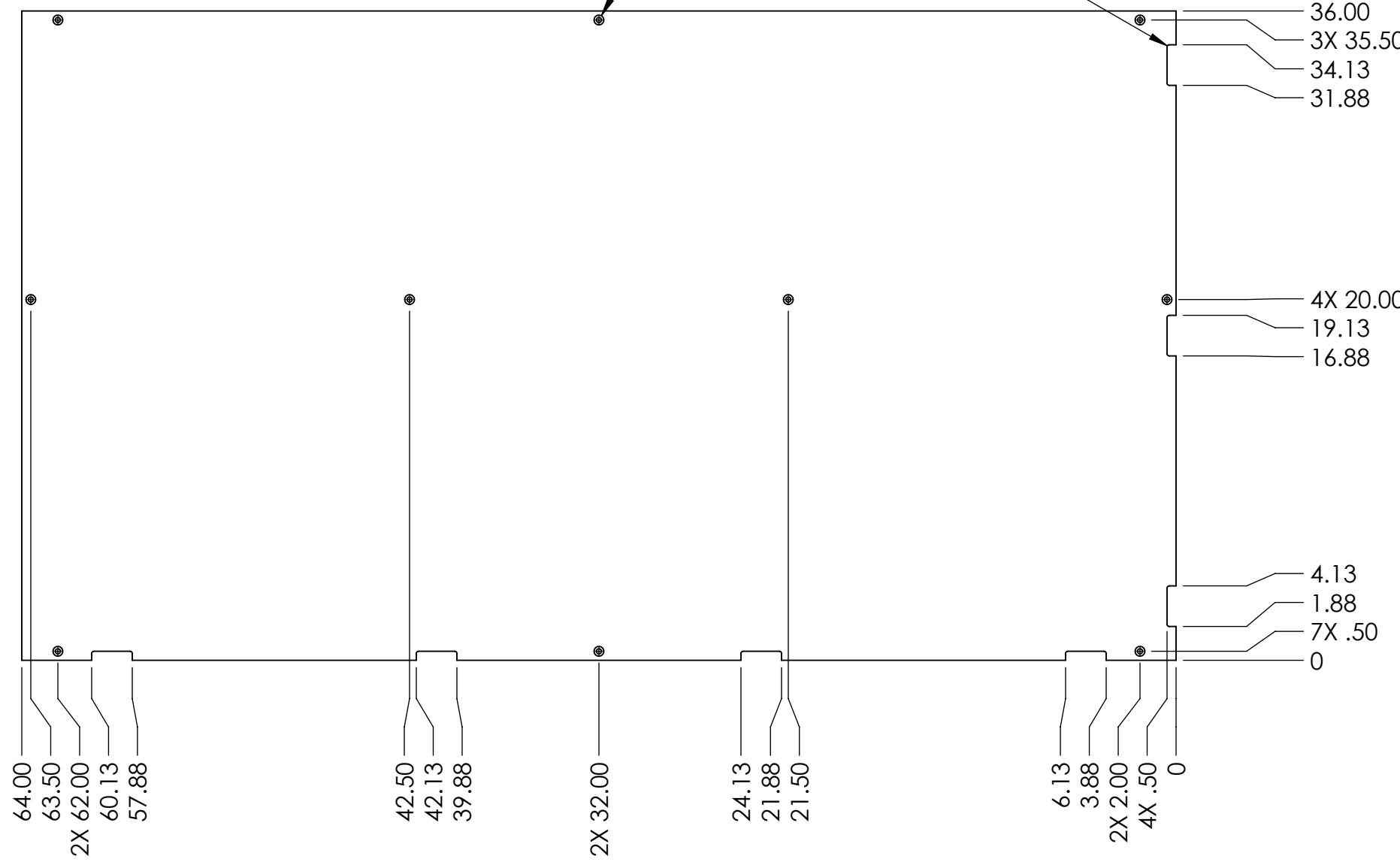
3

2

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B

B



Color Variations	
Part Number	Material
GE-19052-red	1/2" HDPE, Red
GE-19052-blu	1/2" HDPE, Blue
GE-19052-blk	1/2" HDPE, Black

- Notes:
1. Finish: Orange Peel Texture
  2. Remove all burrs and sharp edges.
  3. Tag or label with part number.

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1	REV	DWG. NO.	B GE-19052



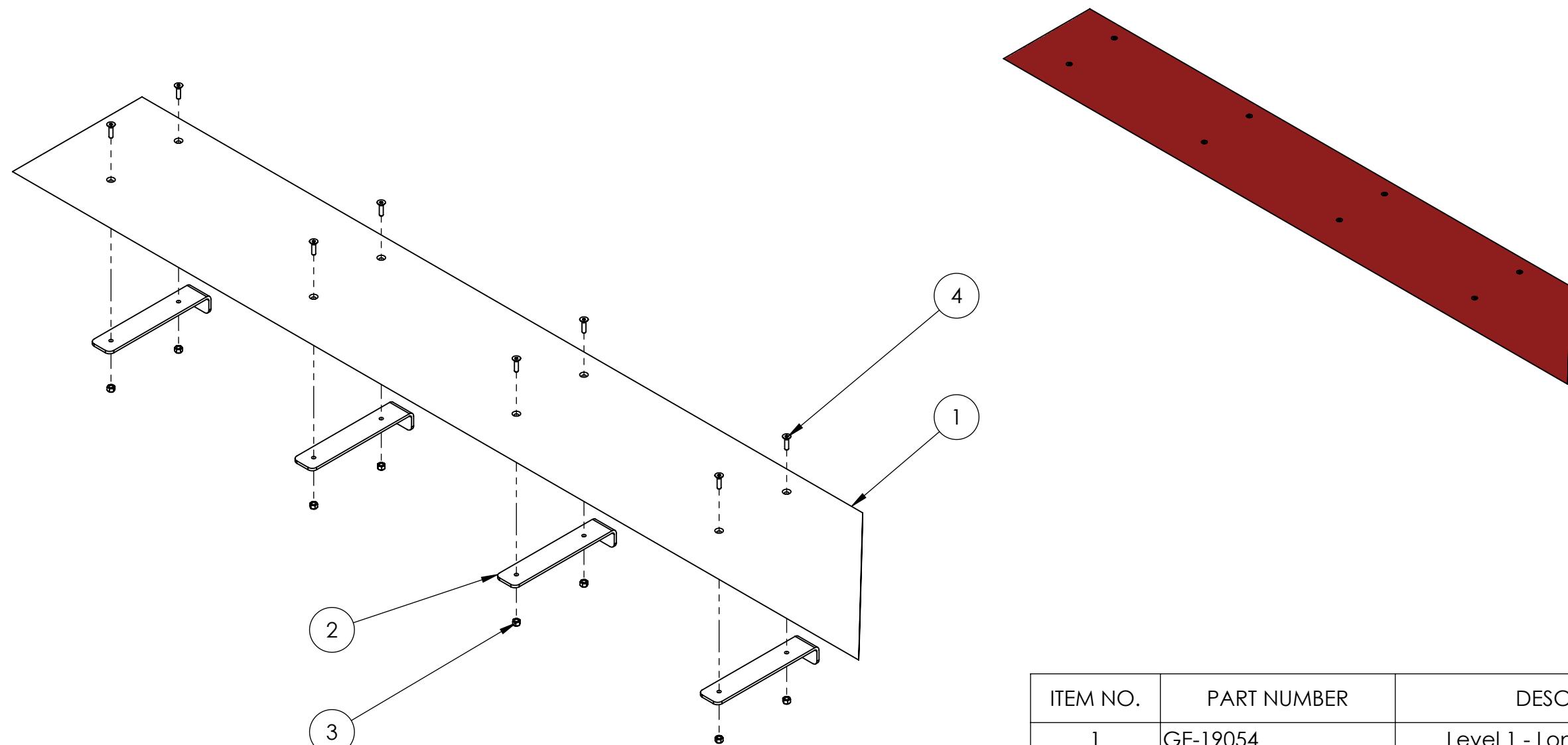
TITLE:  
Level 1 - Top  
Right

4

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4

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1

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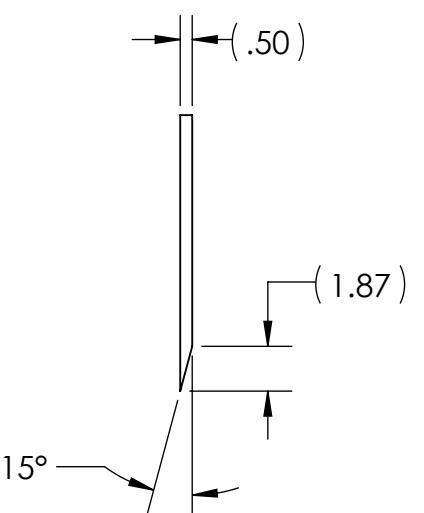
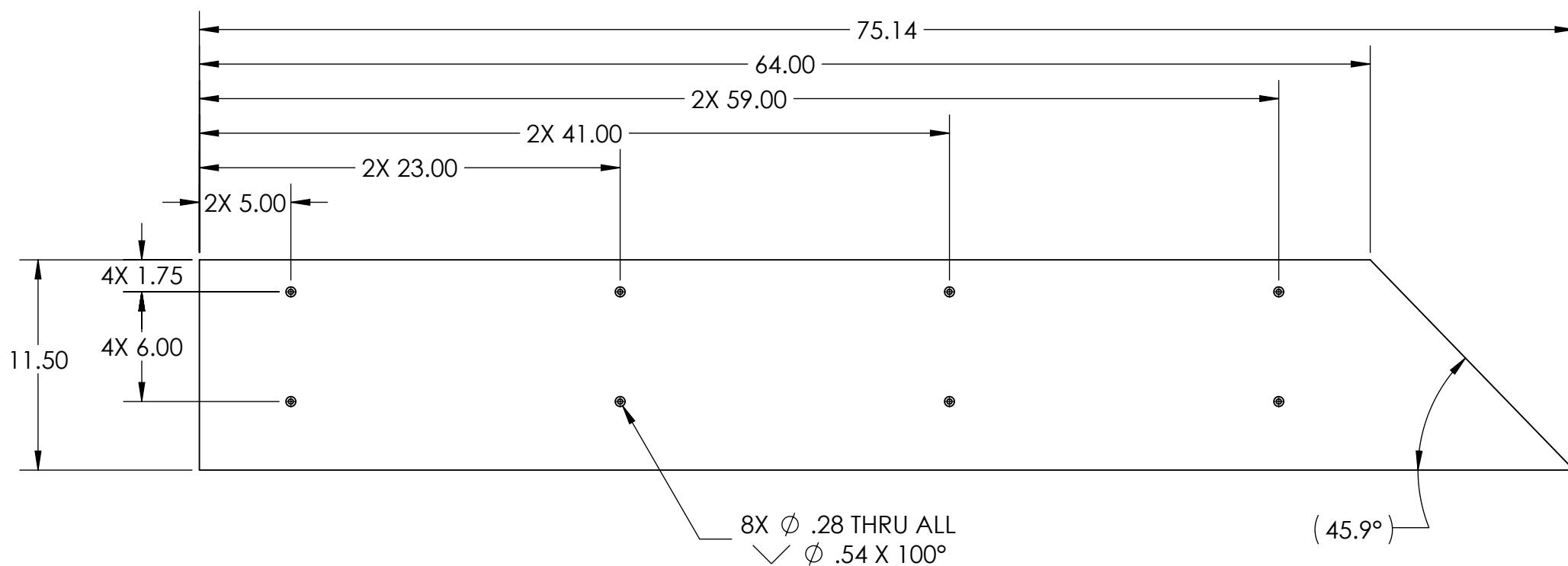
ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19054	Level 1 - Long Ramp, Right	1
2	GE-19055	Level 1 - Ramp Support	4
3	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	8
4	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	8

	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001	NAME	DATE
	DRAWN	DAF	9/7/18
	CHECKED		
	ENG APPR.		
	MFG APPR.		
	Q.A.		
	COMMENTS:		
NEXT ASSY	USED ON	FINISH	
APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Level 1 - Long Ramp Assembly, Right

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19053</b>	
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1



Color Variations	
Part Number	Material
GE-19054-red	1/2" HDPE, Red
GE-19054-blu	1/2" HDPE, Blue
GE-19054-blk	1/2" HDPE, Black

## Notes:

1. Finish: Orange Peel Texture
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN	DAF	9/7/18
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
	NEXT ASSY	USED ON	FINISH	
		APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19054</b>			
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Level 1 - Long Ramp, Right**

4

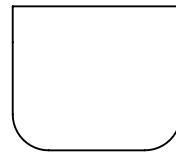
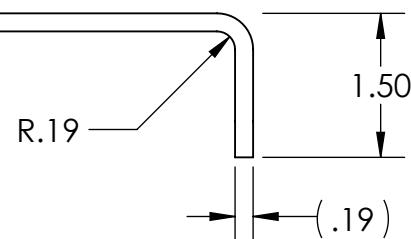
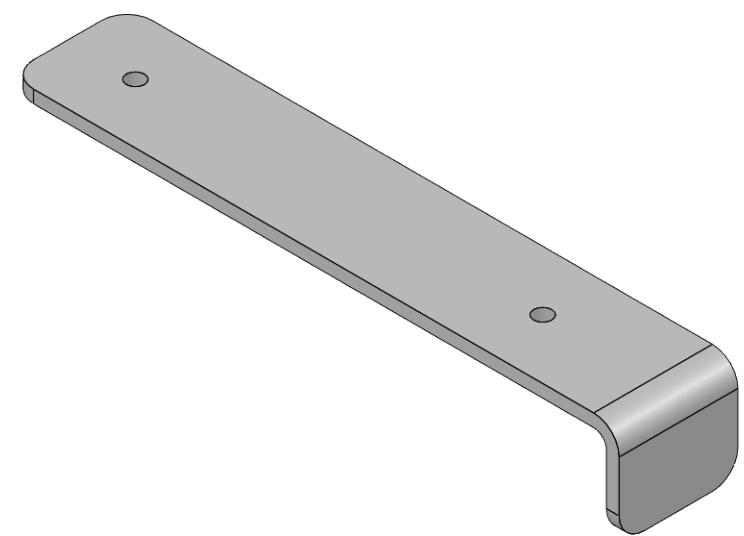
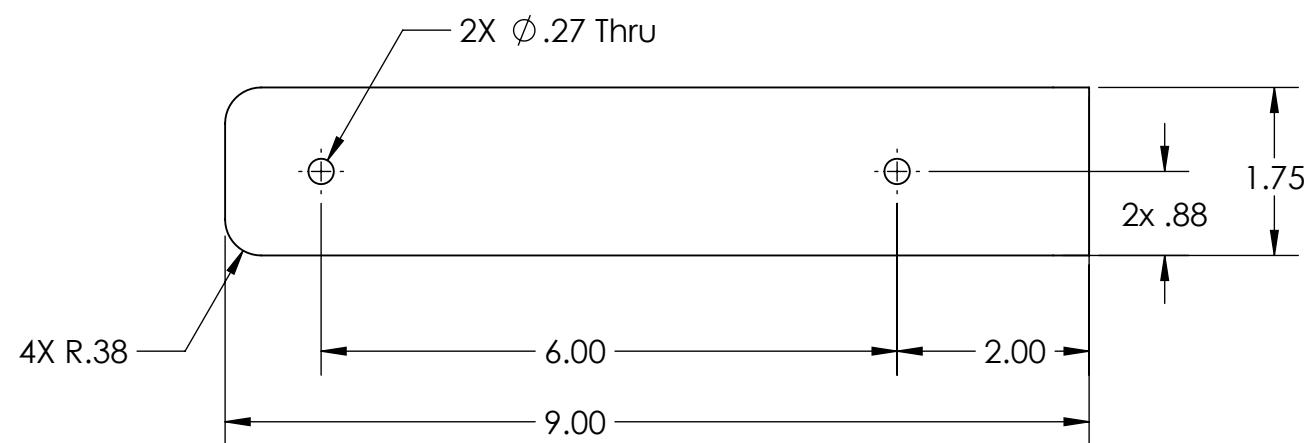
3

2

1

B

B



#### NOTES:

1. MATERIAL: 6 Ga. Preplated Steel
2. Remove all burrs and sharp edges.
3. Package or Tag with part number.

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$				
		INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:		
		MATERIAL				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Level 1 - Ramp Support**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19055</b>	
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1

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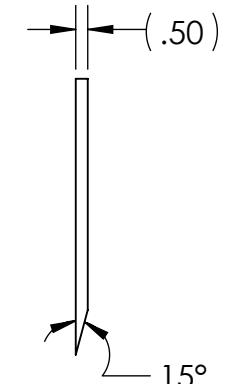
2

1

B

B

The technical drawing shows a cross-sectional view of a structural component. The total width is 47.14. A vertical line on the left has a horizontal distance of 36.00 from the right edge. This line is divided into two segments of 33.00 each, labeled as 2X 33.00. To the right of this, there are two segments of 18.00 each, labeled as 2X 18.00. Further right, there are two segments of 3.00 each, labeled as 2X 3.00. On the far right, there is a vertical section with a height of 11.50. Within this section, there are three horizontal segments of 1.75 each, labeled as 3X 1.75, and three horizontal segments of 6.00 each, labeled as 3X 6.00. The bottom-left corner features a 45.90° angle. At the bottom, there is a note indicating six holes of diameter .28, labeled as 6X Ø .28 THRU ALL, and a note indicating a hole of diameter .54 with a depth of 100°, labeled as √ Ø .54 X 100°.



## Color Variations

Part Number	Material
GE-19056-blu	1/2" HDPE, Blue
GE-19056-blk	1/2" HDPE, Black
GE-19056-red	1/2" HDPE, Red

## Notes:

1. Finish: Orange Peel Texture
  2. Tag or label with part number
  3. Remove all burrs and sharp edges

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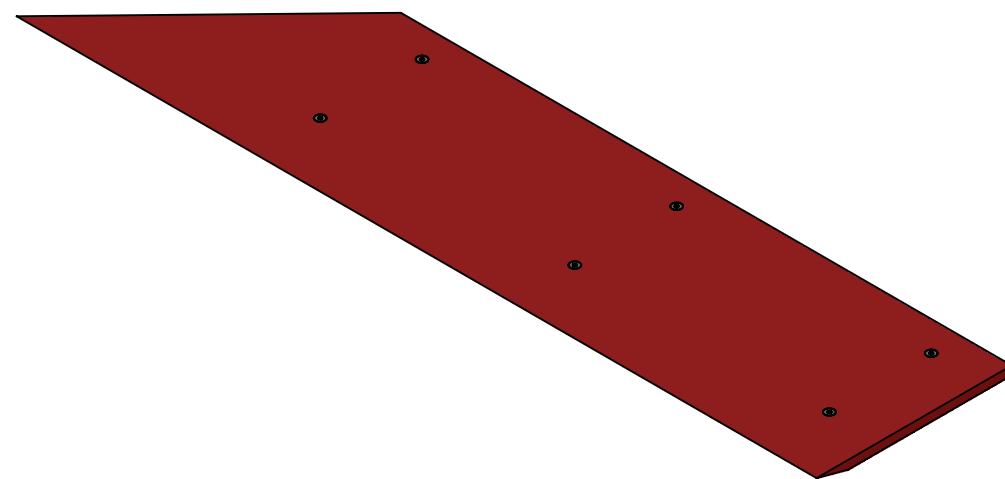
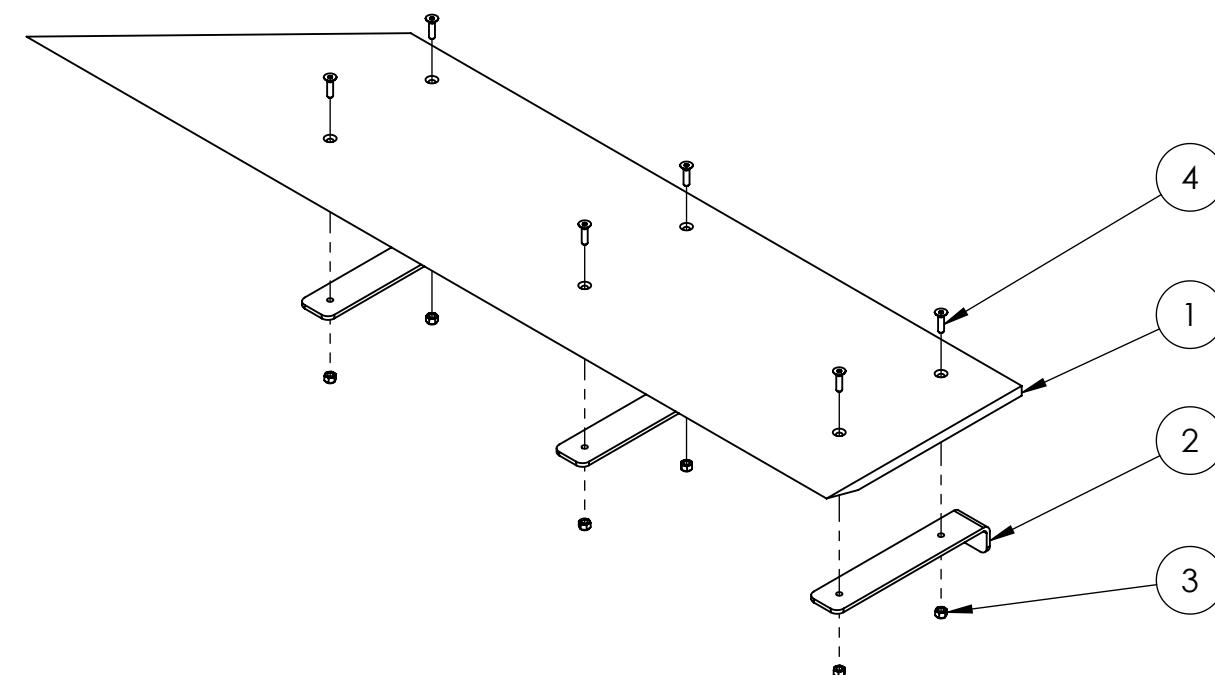
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b>  <b>SOLIDWORKS</b> <small>Modeling Solutions Partner</small>
		DIMENSIONS ARE IN INCHES	DRAWN			
		TOLERANCES:				
		FRACTIONAL $\pm 1/16$	CHECKED			
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	ENG APPR.			
		TWO PLACE DECIMAL $\pm .01$	MFG APPR.			
		THREE PLACE DECIMAL $\pm .001$	Q.A.			
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:			
		MATERIAL				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
			SCALE: 1:8	WEIGHT:	SHEET 1 OF 1	

4

3

2

1



ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19056	Level 1 - Short Ramp, Right	1
2	GE-19055	Level 1 - Ramp Support	3
3	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	6
4	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	6

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	DAF
		TOLERANCES:		9/10/2018
		FRACTIONAL 1/16	CHECKED	
		ANGULAR: MACH 1° BEND 1°	ENG APPR.	
		TWO PLACE DECIMAL .01	MFG APPR.	
		THREE PLACE DECIMAL .001	Q.A.	
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:	
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
 Modeling Solutions Partner

**TITLE:** Level 1 - Short Ramp Assembly, Right

**SIZE** DWG. NO. **B** GE-19057 **REV**

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

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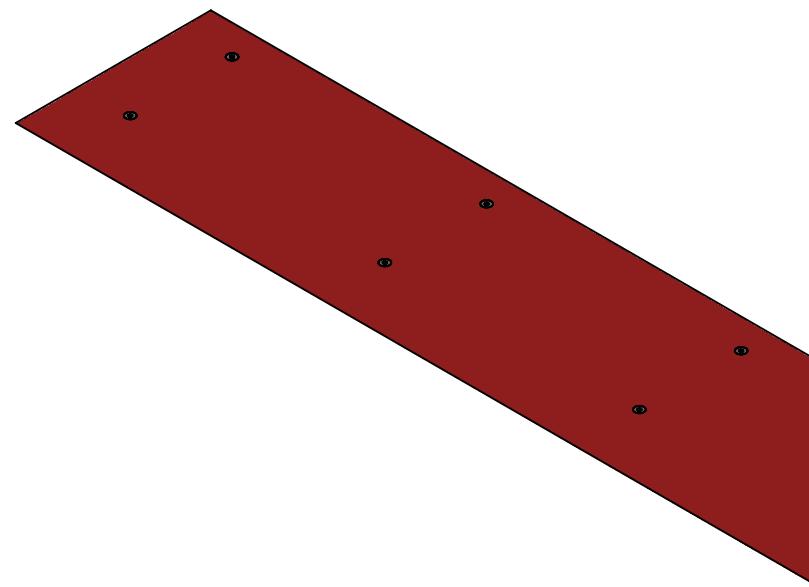
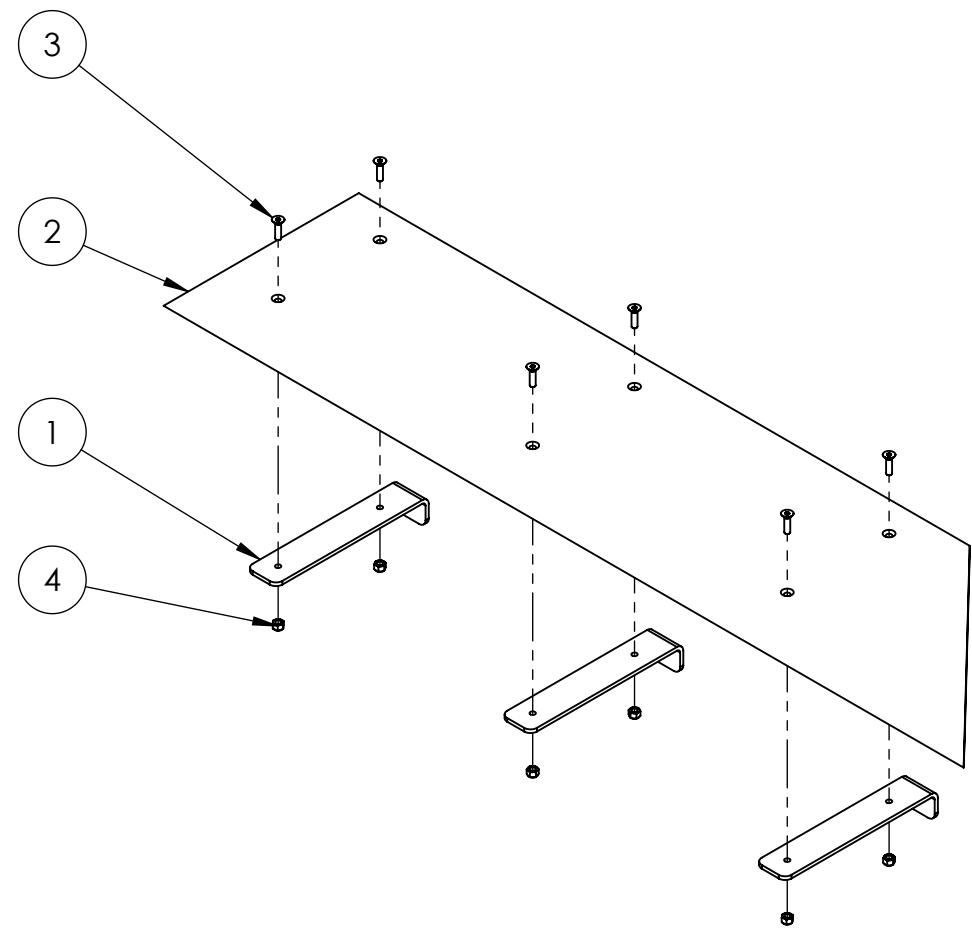
1

4

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2

1



B

B

A

A

ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19055	Level 1 - Ramp Support	3
2	GE-19059	Level 1 - Short Ramp, Left	1
3	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	6
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	6

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES		DRAWN	DAF
		TOLERANCES: FRACTIONAL 1/16		CHECKED	
		ANGULAR: MACH 1° BEND 1°		ENG APPR.	
		TWO PLACE DECIMAL .01		MFG APPR.	
		THREE PLACE DECIMAL .001		Q.A.	
		INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:	
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Level 1 - Short Ramp Assembly, Left

**SIZE** DWG. NO. **B** GE-19058 **REV**

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

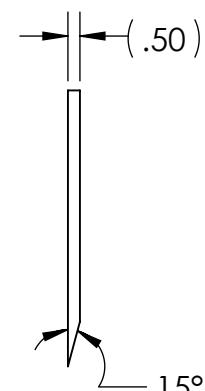
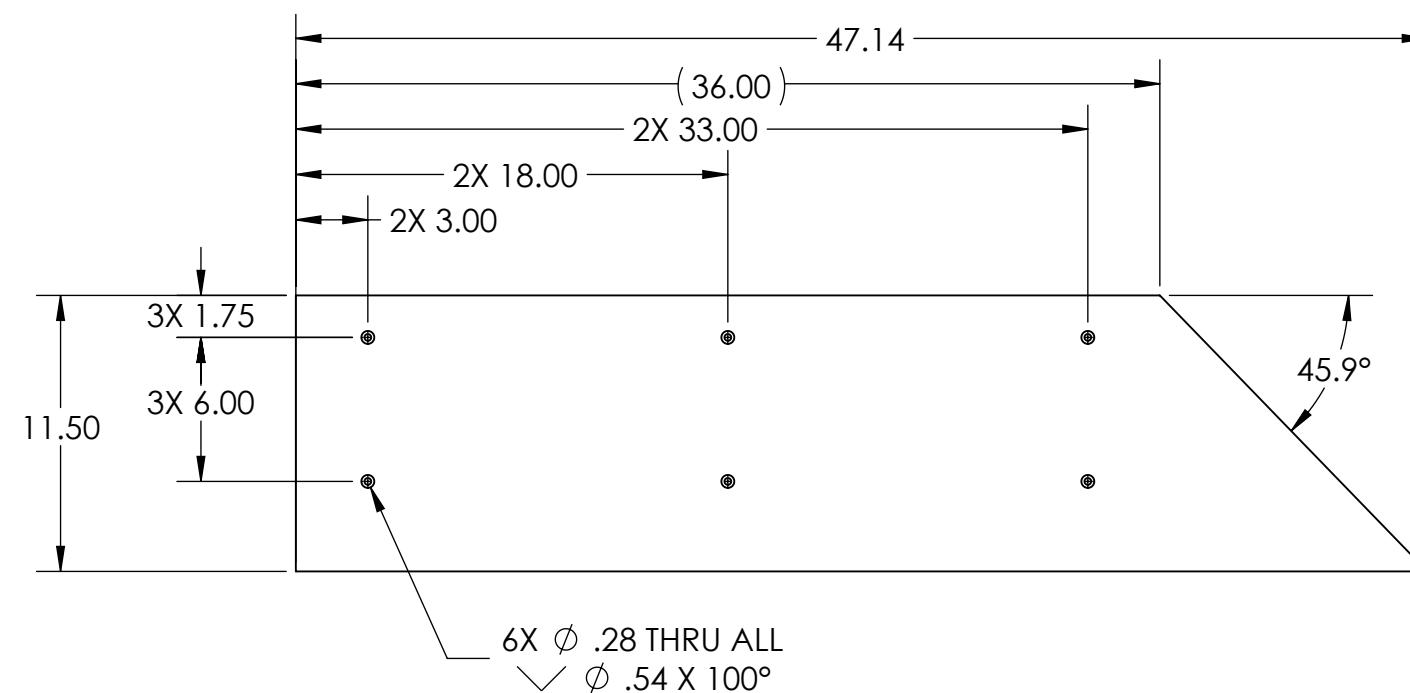
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4

3

2

1



Color Variations	
Part Number	Material
GE-19059-blk	1/2" HDPE, Black
GE-19059-blu	1/2" HDPE, Blue
GE-19059-red	1/2" HDPE, Red

- Notes:
1. Finish: Orange Peel Texture
  2. Tag or label with part number
  3. Remove all burrs and sharp edges

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN	DAF	9/10/18
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:8		WEIGHT:	SHEET 1 OF 1	
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19059</b>			

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Level 1 - Short  
Ramp, Left**

SIZE DWG. NO. REV  
**B GE-19059**

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

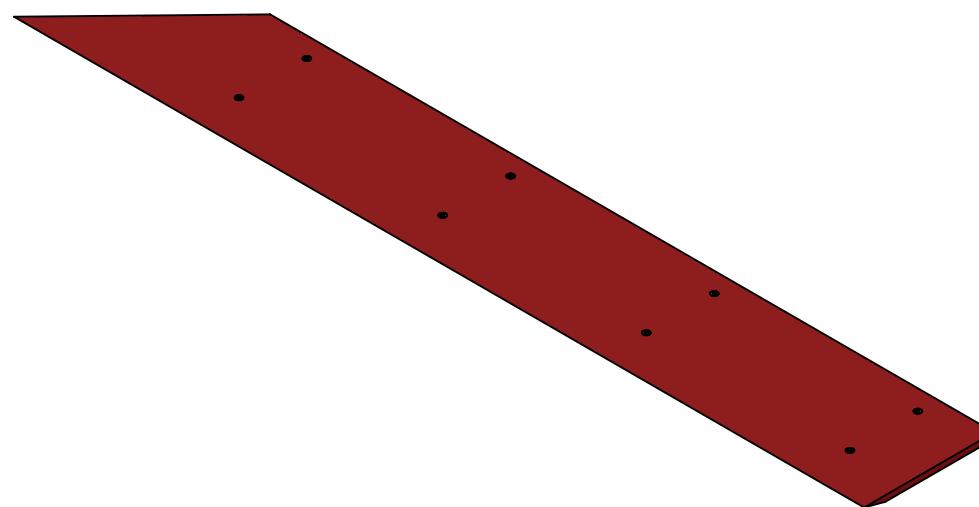
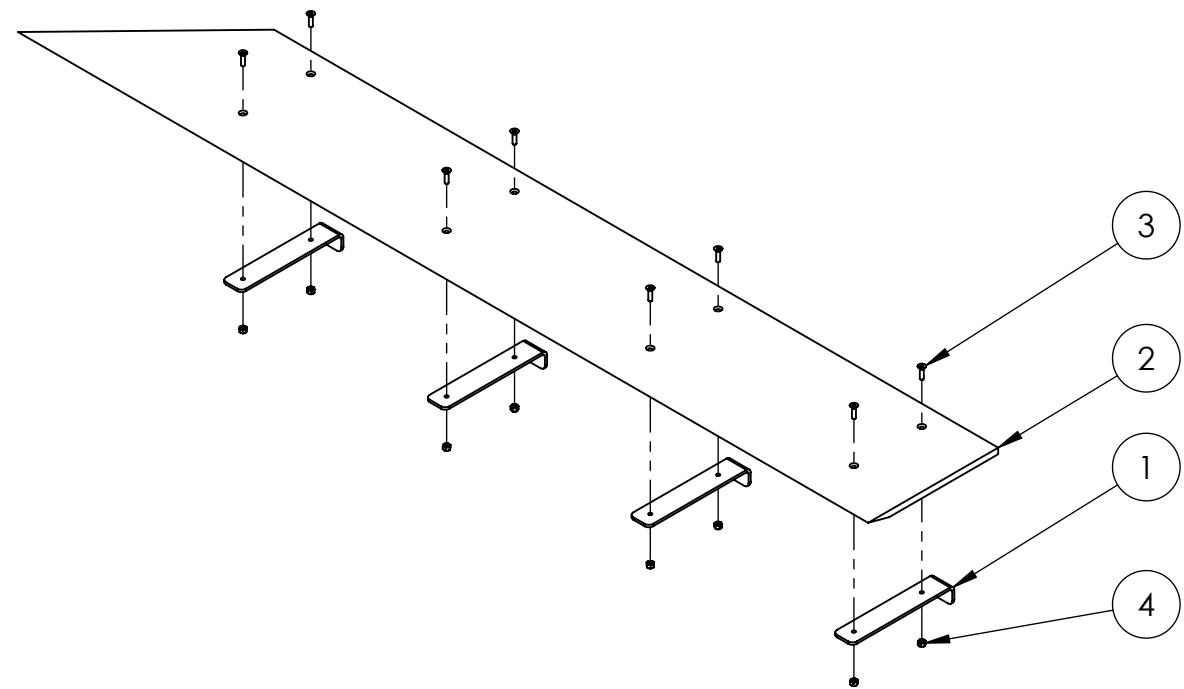
3

2

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B

B



ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19055	Level 1 - Ramp Support	4
2	GE-19061	Level 1 - Long Ramp, Left	1
3	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	8
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	8

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES:	CHECKED	
		FRACTIONAL 1/16	ENG APPR.	
		ANGULAR: MACH 1° BEND 1°	MFG APPR.	
		TWO PLACE DECIMAL .01	Q.A.	
		THREE PLACE DECIMAL .001	COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**LEVEL 1 - LONG RAMP ASSEMBLY, LEFT**

**SIZE DWG. NO. REV**  
**B GE-19060**

**SCALE: 1:12 WEIGHT: SHEET 1 OF 1**

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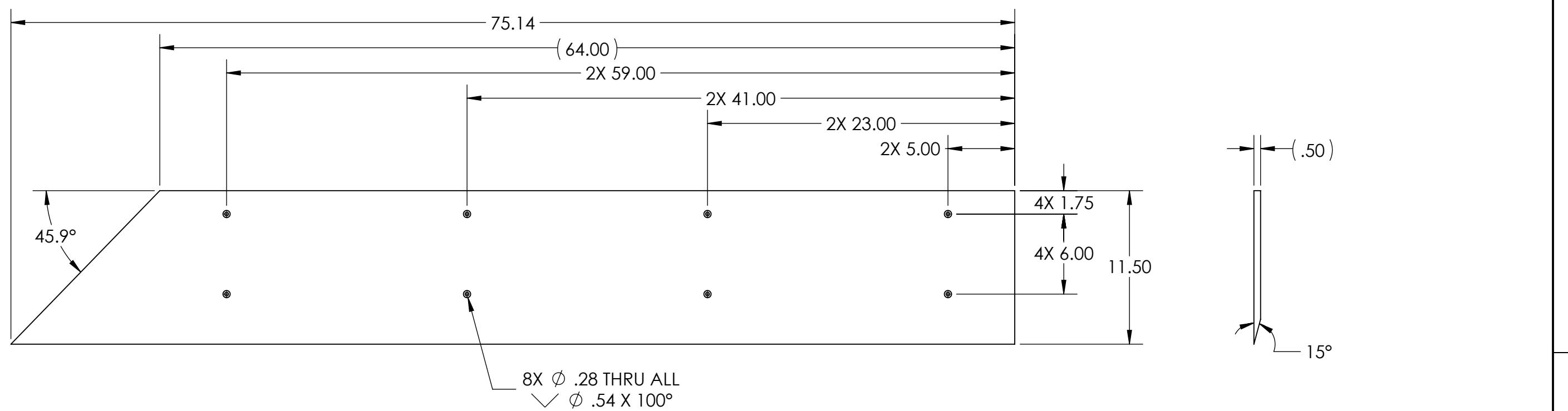
1

4

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2

1



Color Variations	
Part Number	Material
GE-19061-blk	1/2" HDPE, Black
GE-19061-blu	1/2" HDPE, Blue
GE-19061-red	1/2" HDPE, Red

- Notes:
1. Finish: Orange Peel Texture
  2. Tag or label with part number
  3. Remove all burrs and sharp edges

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		DRAWN	DAF	9/10/18
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:8		WEIGHT:	SHEET 1 OF 1	

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Level 1 - Long  
Ramp, Left**

SIZE DWG. NO. REV  
**B GE-19061**

4

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4

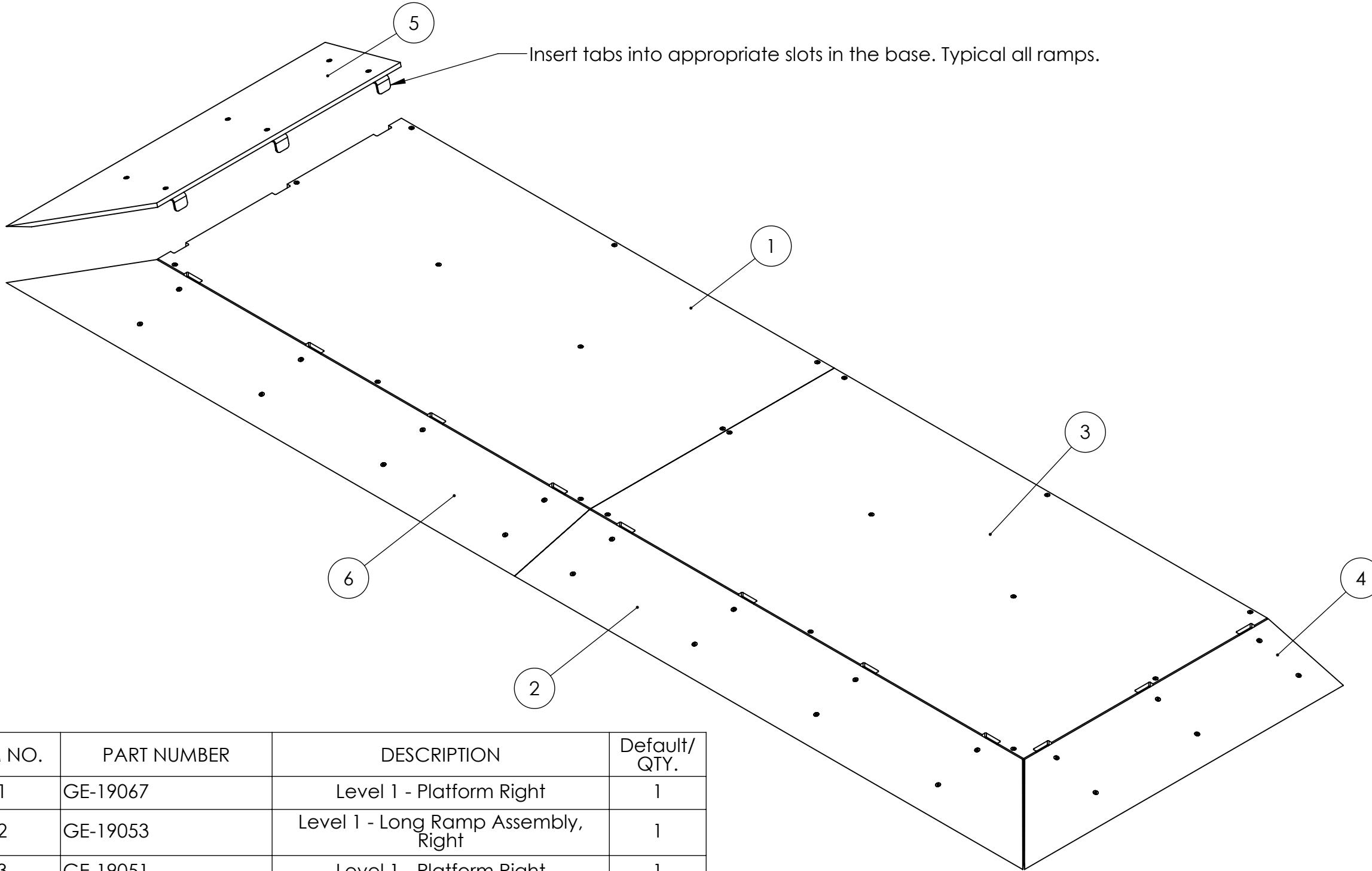
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19067	Level 1 - Platform Right	1
2	GE-19053	Level 1 - Long Ramp Assembly, Right	1
3	GE-19051	Level 1 - Platform Right	1
4	GE-19057	Level 1 - Short Ramp Assembly, Right	1
5	GE-19058	Level 1 - Short Ramp Assembly, Left	1
6	GE-19060	Level 1 - Long Ramp Assembly, Left	1

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	DAF
		TOLERANCES:		9/10/18
		FRACTIONAL 1/16	CHECKED	
		ANGULAR: MACH 1° BEND 1°	ENG APPR.	
		TWO PLACE DECIMAL .01	MFG APPR.	
		THREE PLACE DECIMAL .001	Q.A.	
			COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19062</b>			
SCALE: 1:12	WEIGHT:	SHEET 1 OF 1		

 FIRST ROBOTICS COMPETITION  SOLIDWORKS Modeling Solutions Partner

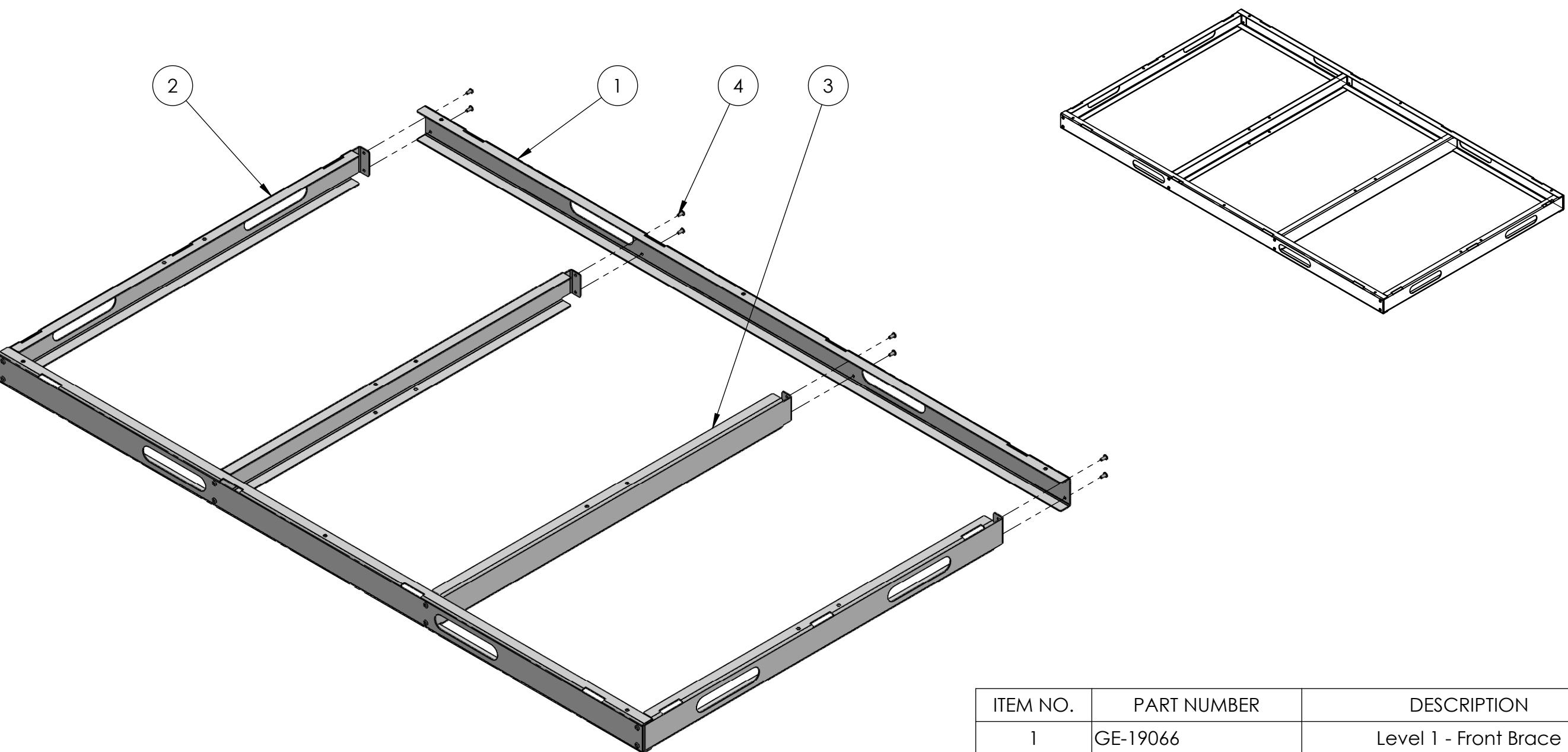
## Level 1 - Assembly

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Notes:

1. Rivets should be plated or stainless steel.
2. Tag or label with part number.

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19066	Level 1 - Front Brace	2
2	GE-19064	Level 1 - Side Brace	2
3	GE-19065	Level 1 - Middle Brace	2
4	rivet_.1875_.126-.25	3/16" Rivet, .126-.25 Grip Range	16

		UNLESS OTHERWISE SPECIFIED:			
		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL: ±1/16			
		ANGULAR: MACH ±1° BEND ±1°			
		TWO PLACE DECIMAL ±.01			
		THREE PLACE DECIMAL ±.001			
		INTERPRET GEOMETRIC			
		TOLERANCING PER:			
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
	APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:8		WEIGHT:		SHEET 1 OF 1	

**FIRST**  
ROBOTICS  
COMPETITION

**SOLIDWORKS**  
Modeling Solutions Partner

**Level 1 - Frame**

**B** GE-19063

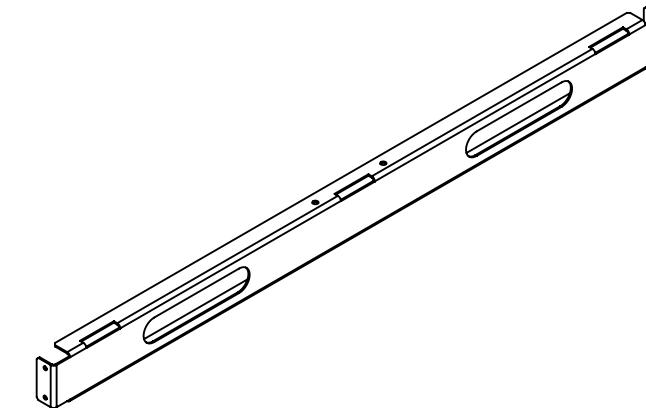
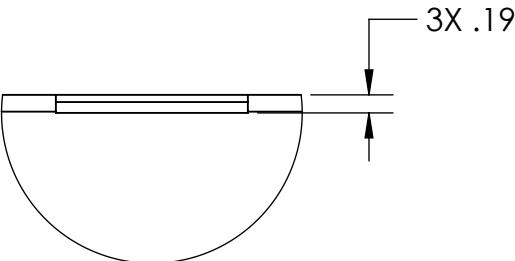
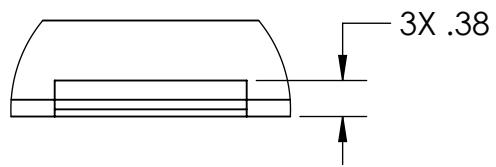
4

3

2

1

DETAIL B  
SCALE 1 : 2



This technical drawing shows a horizontal mechanical part with various dimensions and features. The part has a total length of 4X R.10 inches. It includes two stepped sections, each with a height of .50 inches and a width of 2X Ø.27 inches. A circular feature at the left end has a diameter of .07 inches. Vertical dimensions are marked along the top edge: 0, 1.93, 3.93, 15.93, 16.93, 18.93, 19.93, 31.93, 33.93, and 4X R.10. A callout labeled 'A' points to a detail view of the stepped section.

This technical drawing shows a profile view of a mechanical part. The vertical axis on the left lists height dimensions: 2.50, 2X 2.33, 2X 1.25, 2X .17, and 0. The horizontal axis at the bottom lists width dimensions: 0, 2X .98, 5.93, 24.93, and X 34.88. A circle labeled 'B' is positioned above the first two height levels. A dimension line between the 2X 2.33 and 2X 1.25 levels is labeled '2X 5.00'. A dimension line between the 2X 1.25 and 2X .17 levels is labeled '4X R'. A dimension line between the 24.93 and X 34.88 levels is labeled '2X 1.25'. Two small circles with crosshairs are located on the horizontal axis between the 5.93 and 24.93 marks. A double-headed arrow between the 24.93 and X 34.88 marks indicates a total width of 34.88 units.

The technical drawing illustrates a vertical assembly. At the top, four holes are spaced at 1.00 units apart. Below them, two holes are spaced at .50 units apart. A central feature is labeled with a diameter of  $\phi .194$  and a tolerance of  $+.002$  to  $-.002$ . The distance from the bottom of this feature to the bottom of the part is 1.50 units. At the very bottom, there are eight slots angled at  $45^\circ$ , each 1.00 units wide.

## Notes:

1. Material: 14 Ga. Pre-plated steel
  2. Remove all burrs and sharp edges.

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b>  <b>SOLIDWORKS</b> <small>Modeling Solutions Partner</small>
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN	DAF	9/3/18	
			CHECKED			
			ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1				

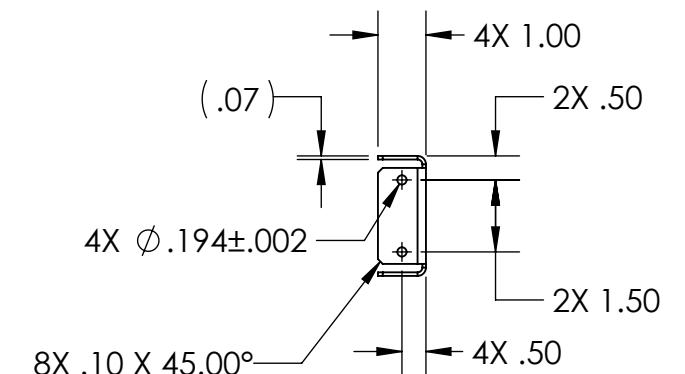
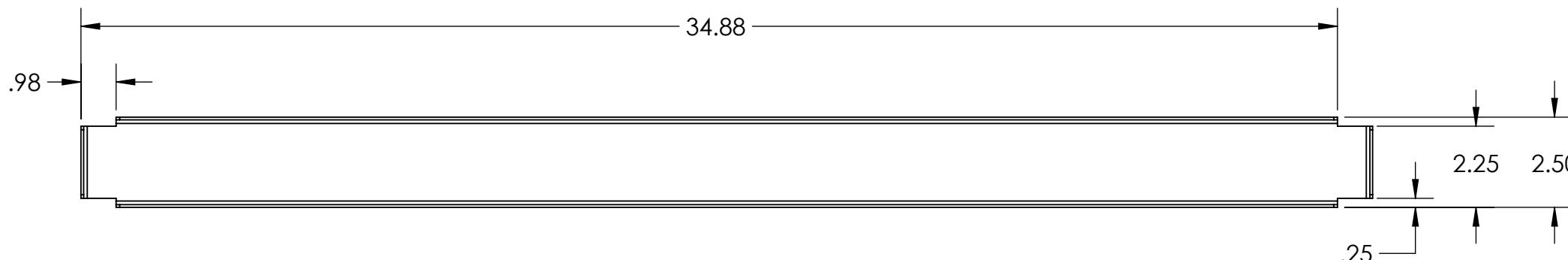
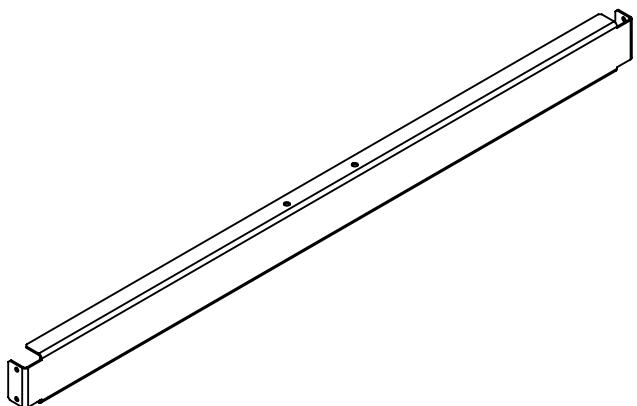
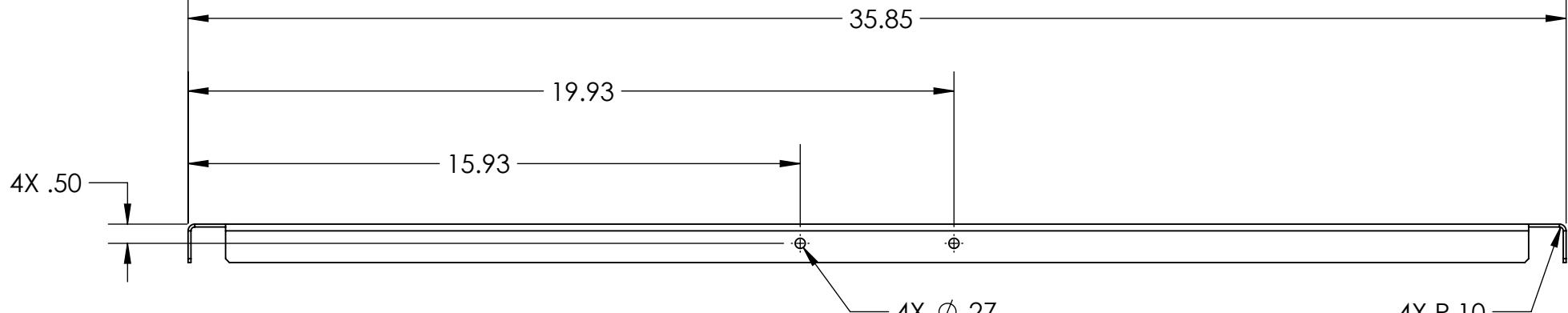
4

3

2

1

B



- Notes:
1. Material: 14 GA. Preplated Steel.
  2. Remove all burrs and sharp edges

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		DRAWN	DAF	9/6/18
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
MATERIAL				
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Level 1 - Middle Brace**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19065</b>	

SCALE: 1:4 WEIGHT: SHEET 1 OF 1

4

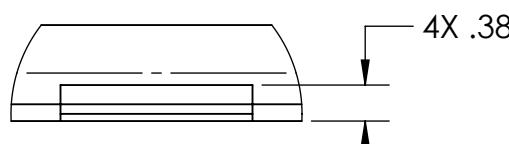
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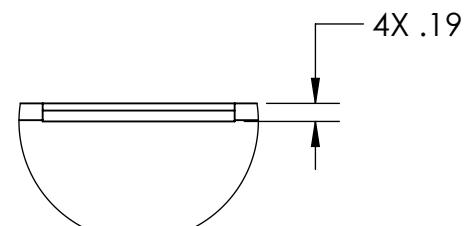
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B

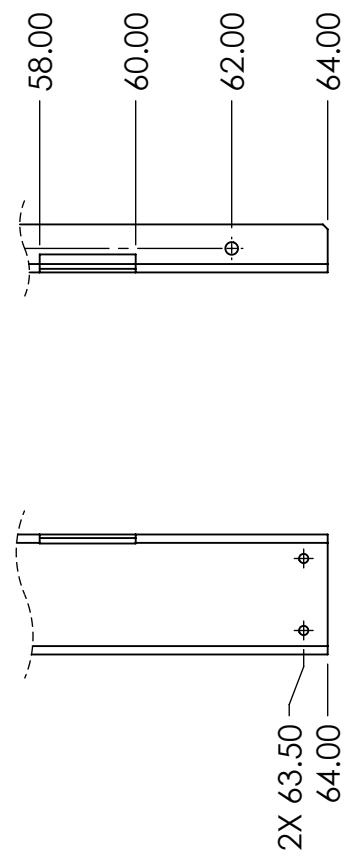
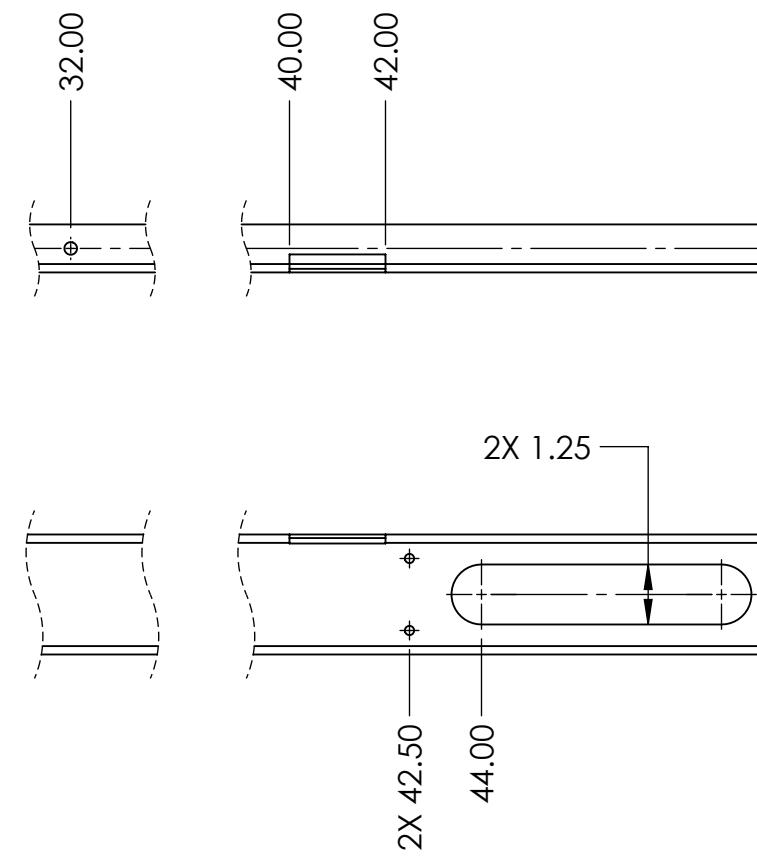
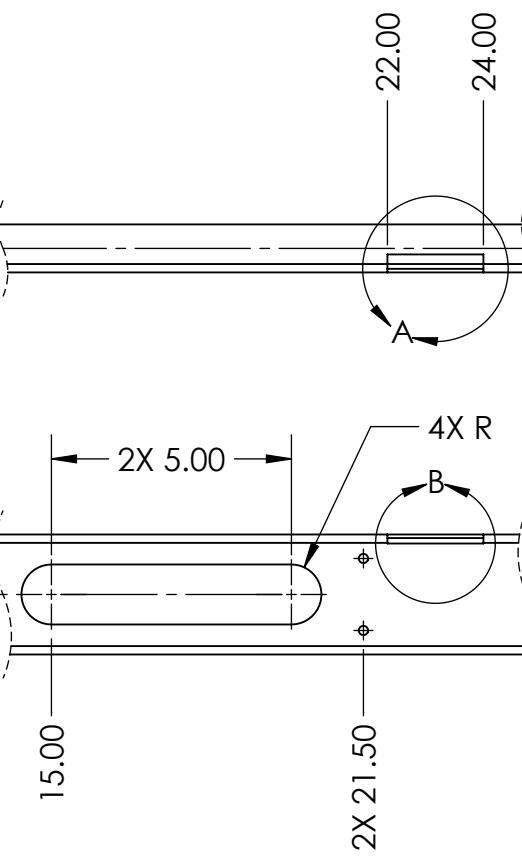
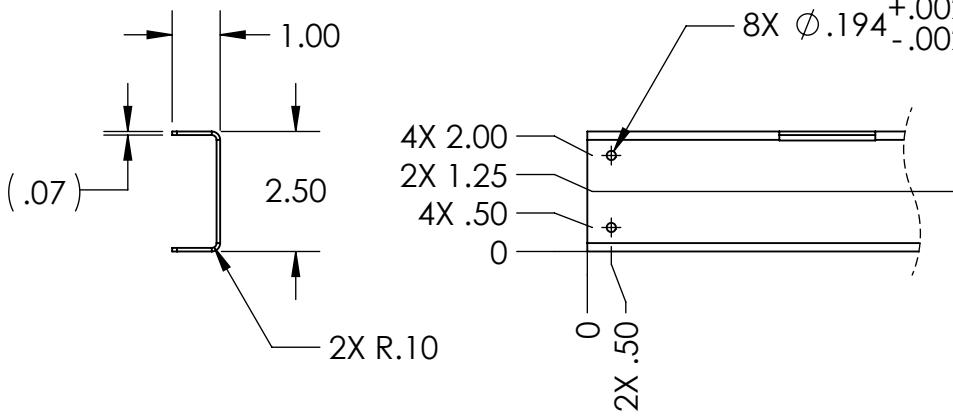
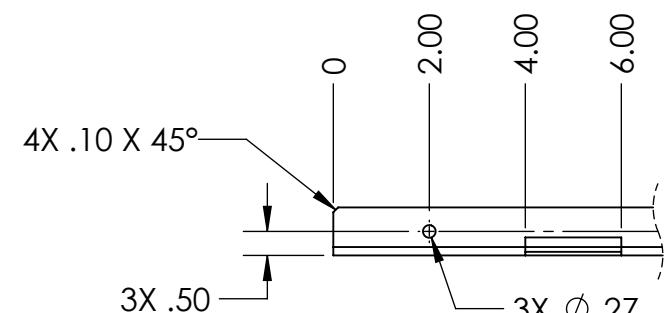
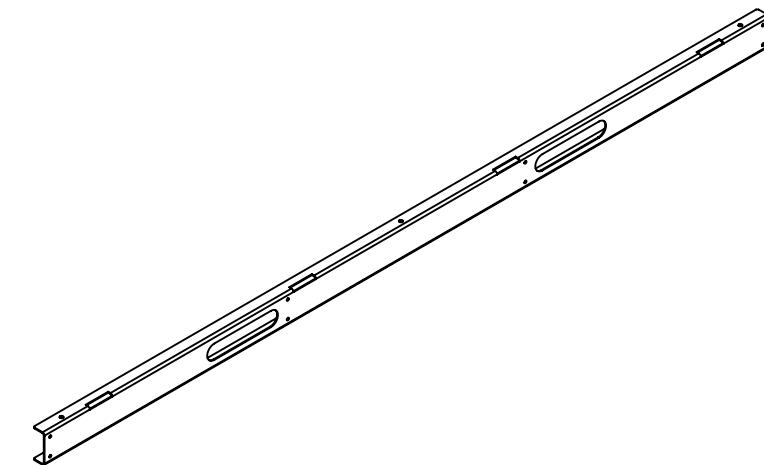
B



DETAIL A  
SCALE 1 : 2



DETAIL B  
SCALE 1 : 2



- Notes:
1. Material: 14 GA, Preplated Steel.
  2. Remove all burrs and sharp edges.

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		DRAWN	DAF	9/6/18
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
SIZE	DWG. NO.			REV
<b>B</b>	<b>GE-19066</b>			
SCALE: 1:4	WEIGHT:			SHEET 1 OF 1

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Level 1 - Front  
Brace**

4

3

2

1

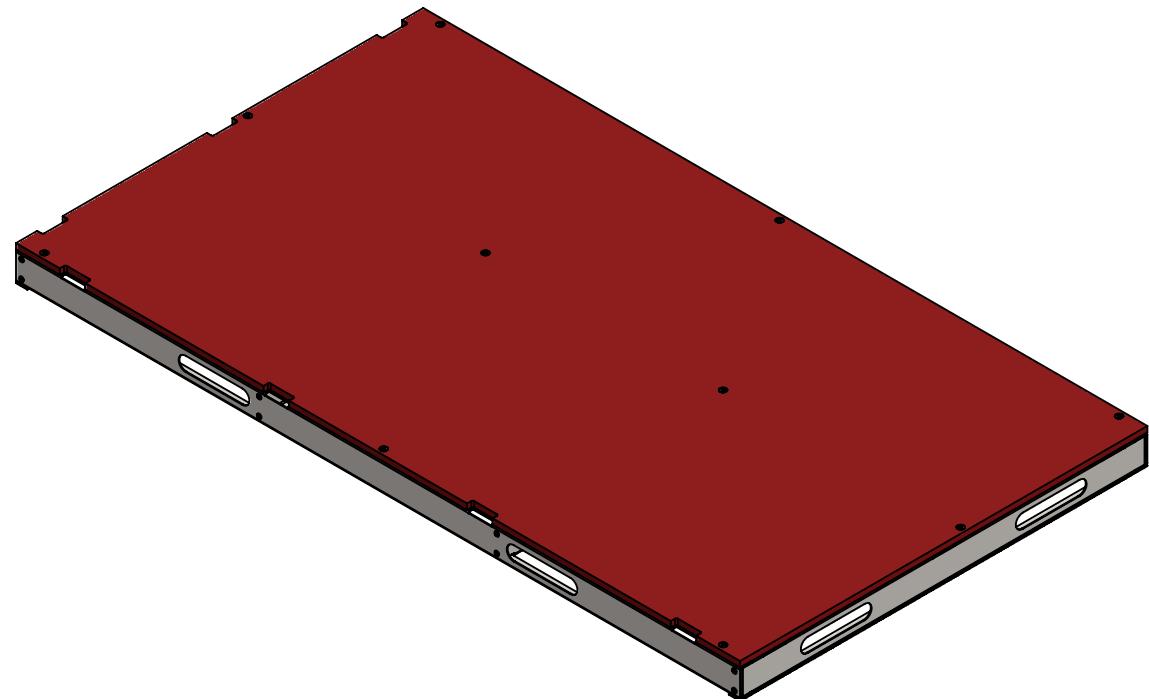
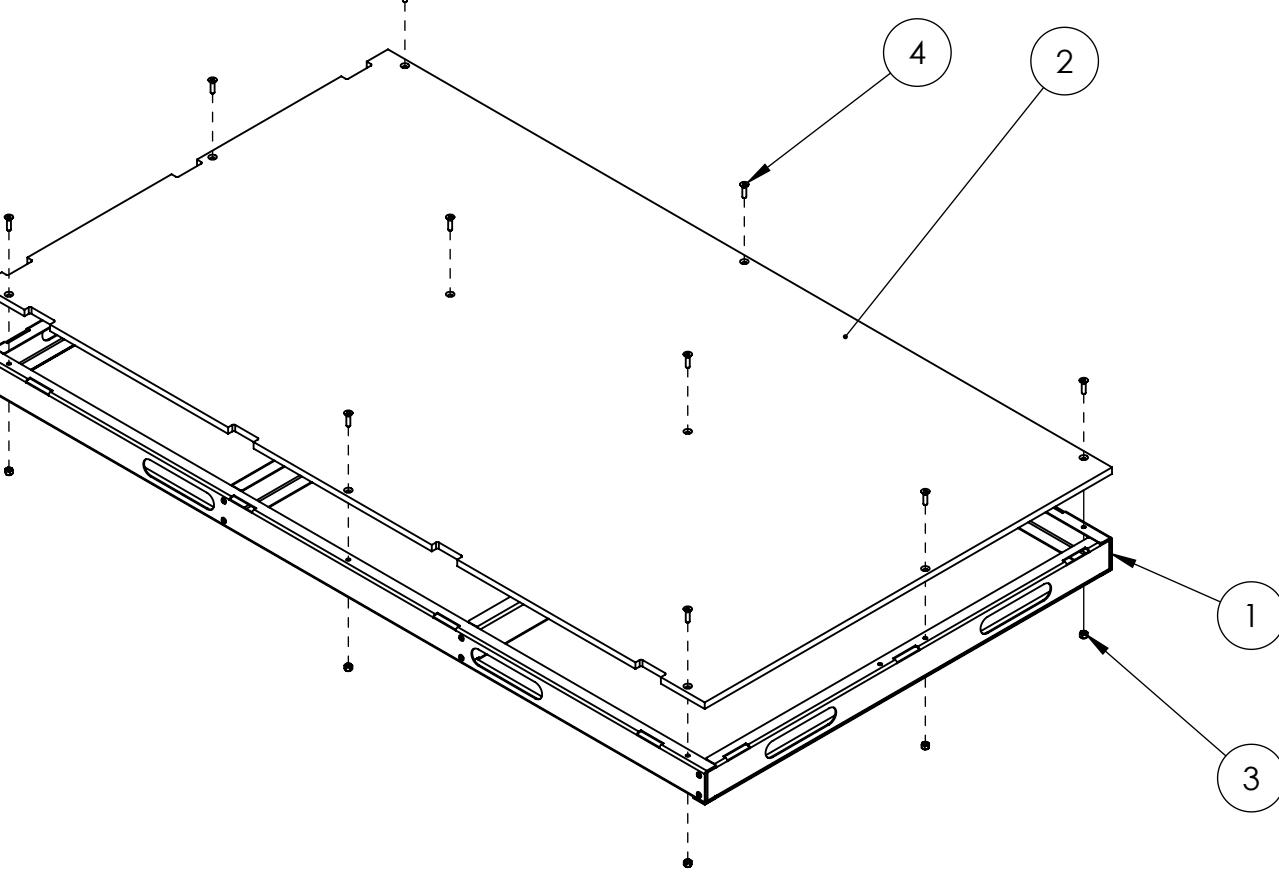
4

3

2

1

B



B

ITEM NO.	PART NUMBER	DESCRIPTION	GE-19067/QTY.
1	GE-19063	Level 1 - Frame	1
2	GE-19068	Level 1 - Top Left	1
3	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	10
4	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	10
5	Hook_1_36	1" x 36" Hook, Adhesive Backed	2

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL 1/16	ENG APPR.		
		ANGULAR: MACH 1° BEND 1°	MFG APPR.		
		TWO PLACE DECIMAL .01	Q.A.		
		THREE PLACE DECIMAL .001	COMMENTS:		
		INTERPRET GEOMETRIC			
		TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION	DO NOT SCALE DRAWING		

**FIRST**  
**ROBOTICS**  
**COMPETITION**
**SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Level 1 - Platform Left

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19067</b>	

SCALE: 1:12 WEIGHT: SHEET 1 OF 2

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4

3

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4

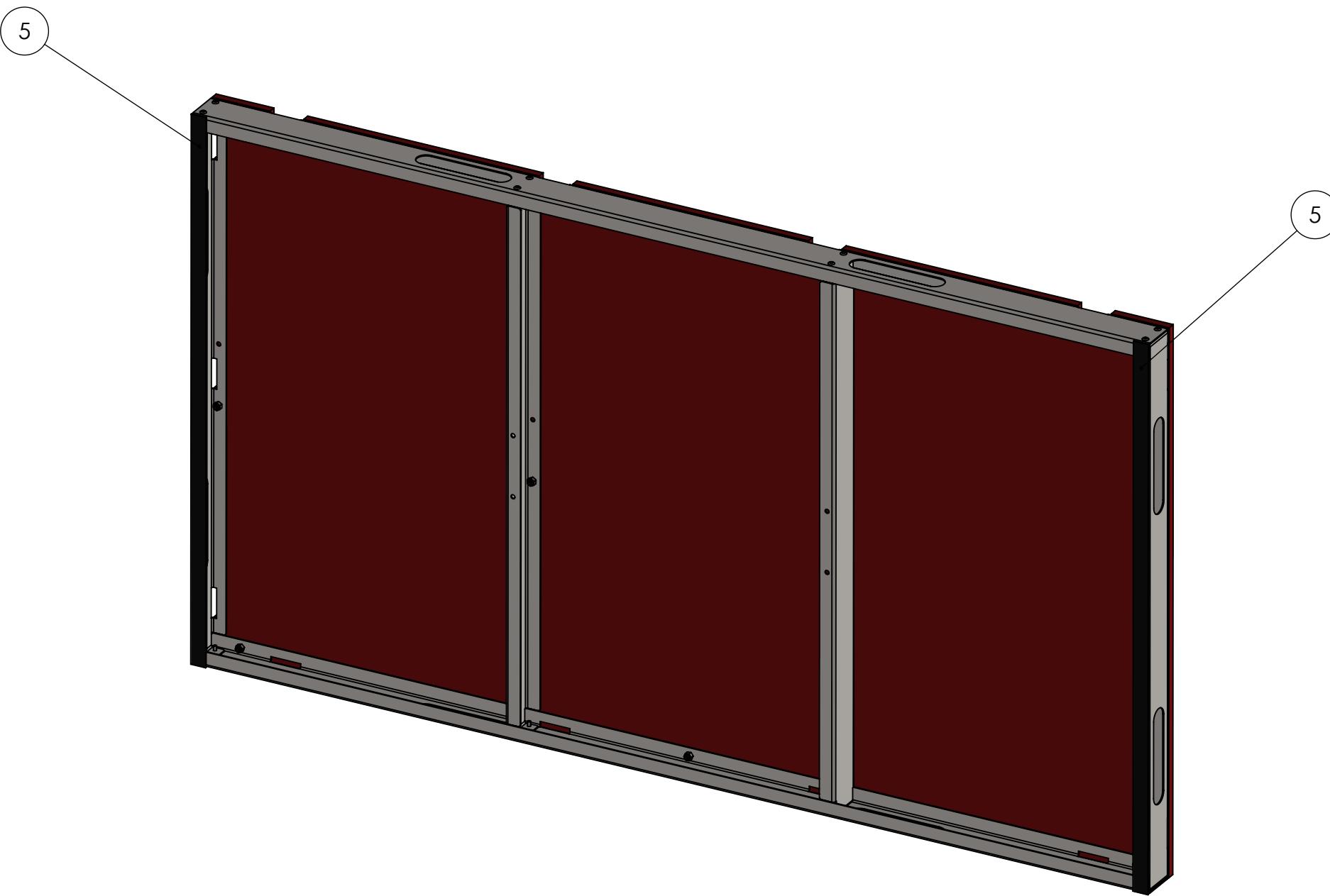
3

2

1

B

B



A

A

## Notes:

- Clean surface of metal underneath Item 5 prior to application.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION		DO NOT SCALE DRAWING


**FIRST  
ROBOTICS  
COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Level 1 -  
Platform Left**

**SIZE**
**DWG. NO.**
**REV**

**B**
**GE-19067**

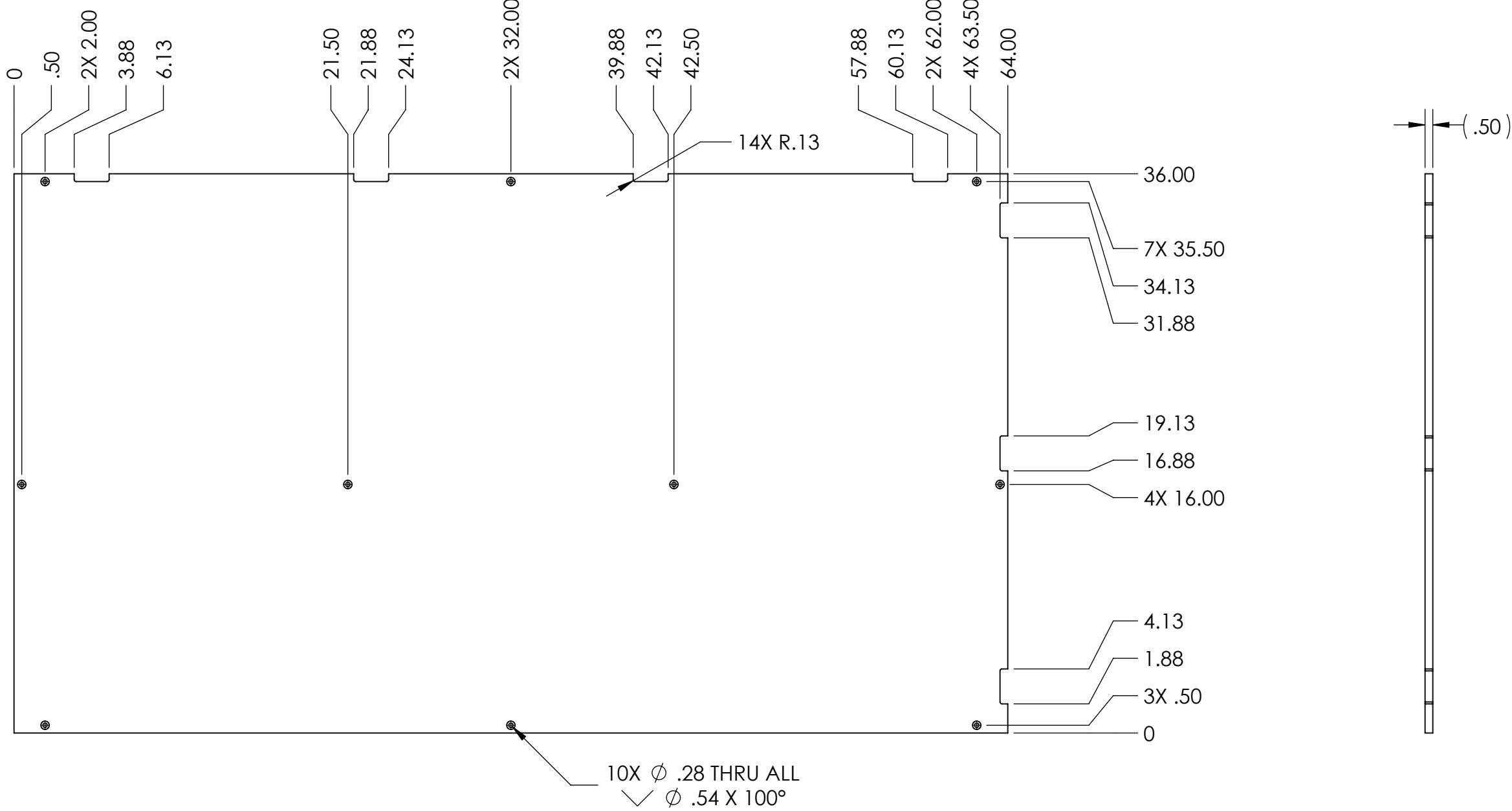
SCALE: 1:12
WEIGHT:
SHEET 2 OF 2

4

3

2

1



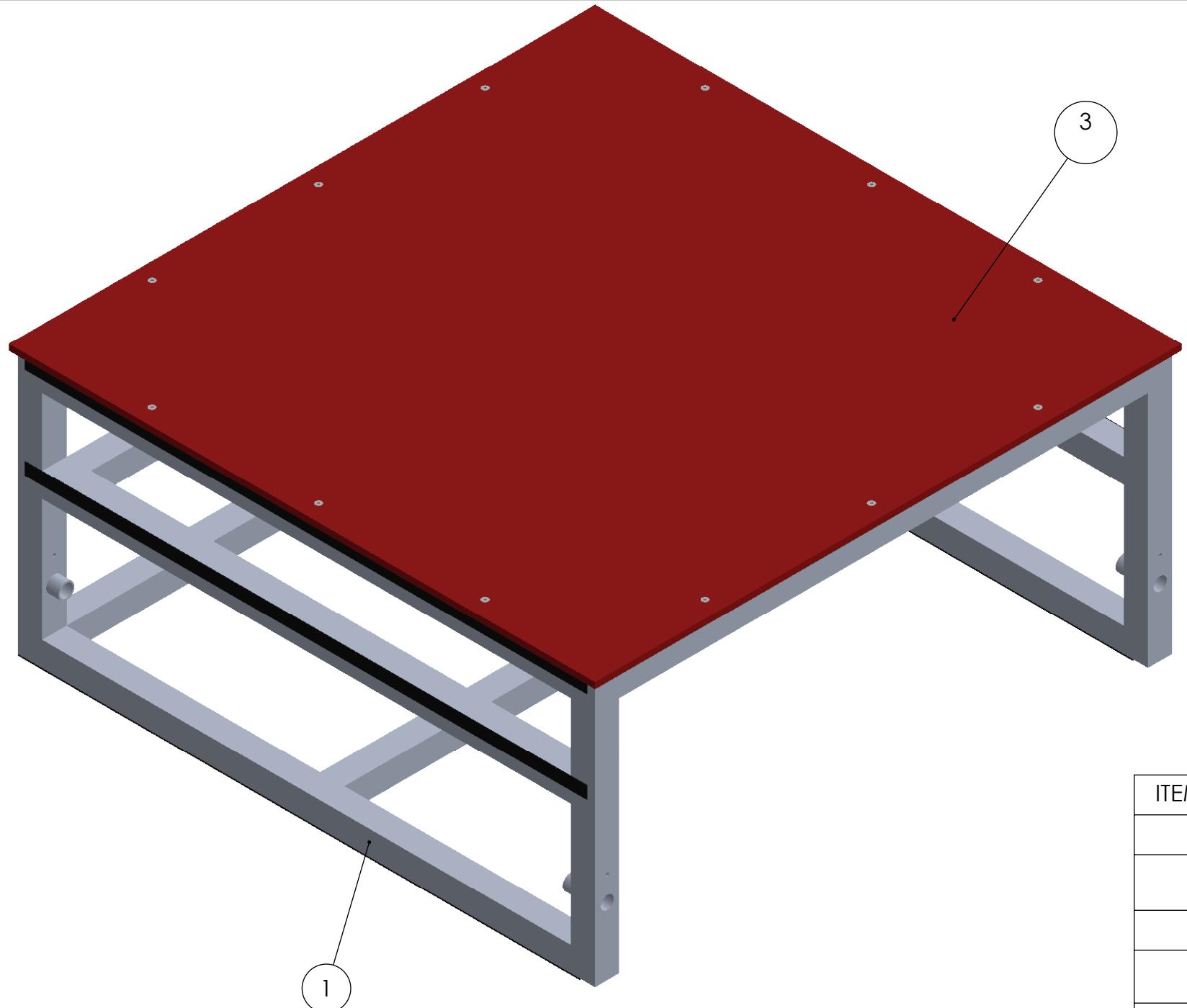
Color Variations	
Part Number	Material
GE-19068-red	1/2" HDPE, Red
GE-19068-blu	1/2" HDPE, Blue
GE-19068-blk	1/2" HDPE, Black

## Notes:

1. Finish: Orange Peel Texture
  2. Remove all burrs and sharp edges.
  3. Tag or label with part number.

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		TWO PLACE DECIMAL $\pm .01$	CHECKED			
		THREE PLACE DECIMAL $\pm .001$	ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1				



ITEM NO.	PART NUMBER	DESCRIPTION	Step /QTY.
1	GE-19030	HAB Level 3 Frame	1
2	Flat_Hex_.25-20_3.00	Steel Hex Drive Flat Head Screw 1/4"-20 Thread Size, 3" Long	12
3	GE-19045	HDPE Top Level 3	1
4	Hook_1_46	1" X 46" Hook Fastener, Adhesive Backed	6
5	Hook_2_46	2" X 46" Hook Fastener, Adhesion Backed	2
6	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	12

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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001	DRAWN			
			CHECKED			
			ENG APPR.			
			MFG APPR.			
			Q.A.			
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:			
		MATERIAL				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				

4

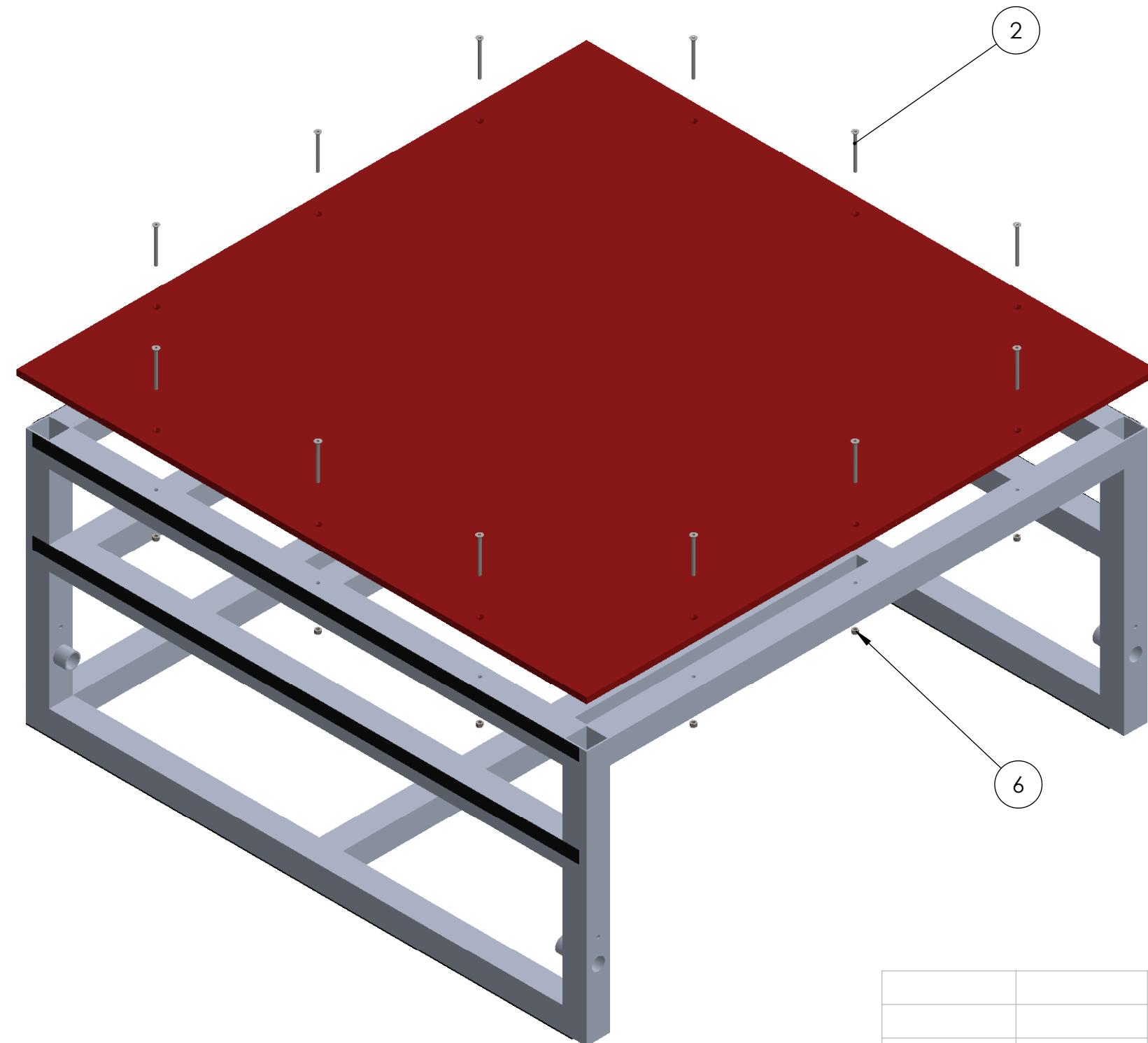
3

2

1

B

B



A

A

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		INTERPRET GEOMETRIC TOLERANCING PER:		ENG APPR.	
		MATERIAL		MFG APPR.	
		NEXT ASSY	USED ON	Q.A.	
		FINISH		COMMENTS:	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Hab 3 Fastener Assembly**

**B** **GE-19069**

SIZE DWG. NO. REV  
SCALE: 1:8 WEIGHT: SHEET 2 OF 3

4

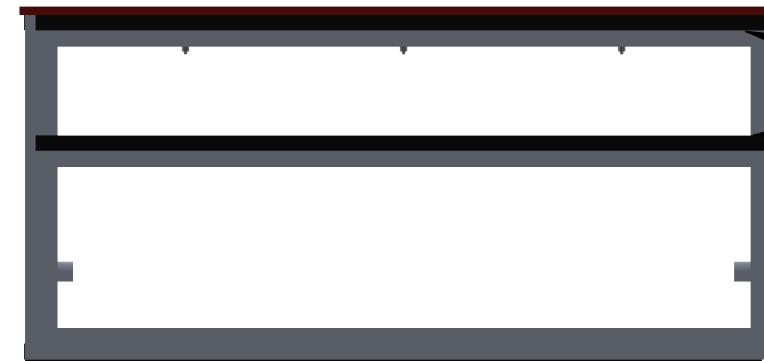
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2

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B

B



4  
Mirror on opposite side



A

A

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		INTERPRET GEOMETRIC TOLERANCING PER:			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Hab 3 Fastener**  
**Assembly**

**B** GE-19069

SIZE DWG. NO. REV  
SCALE: 1:16 WEIGHT: SHEET 3 OF 3

4

3

2

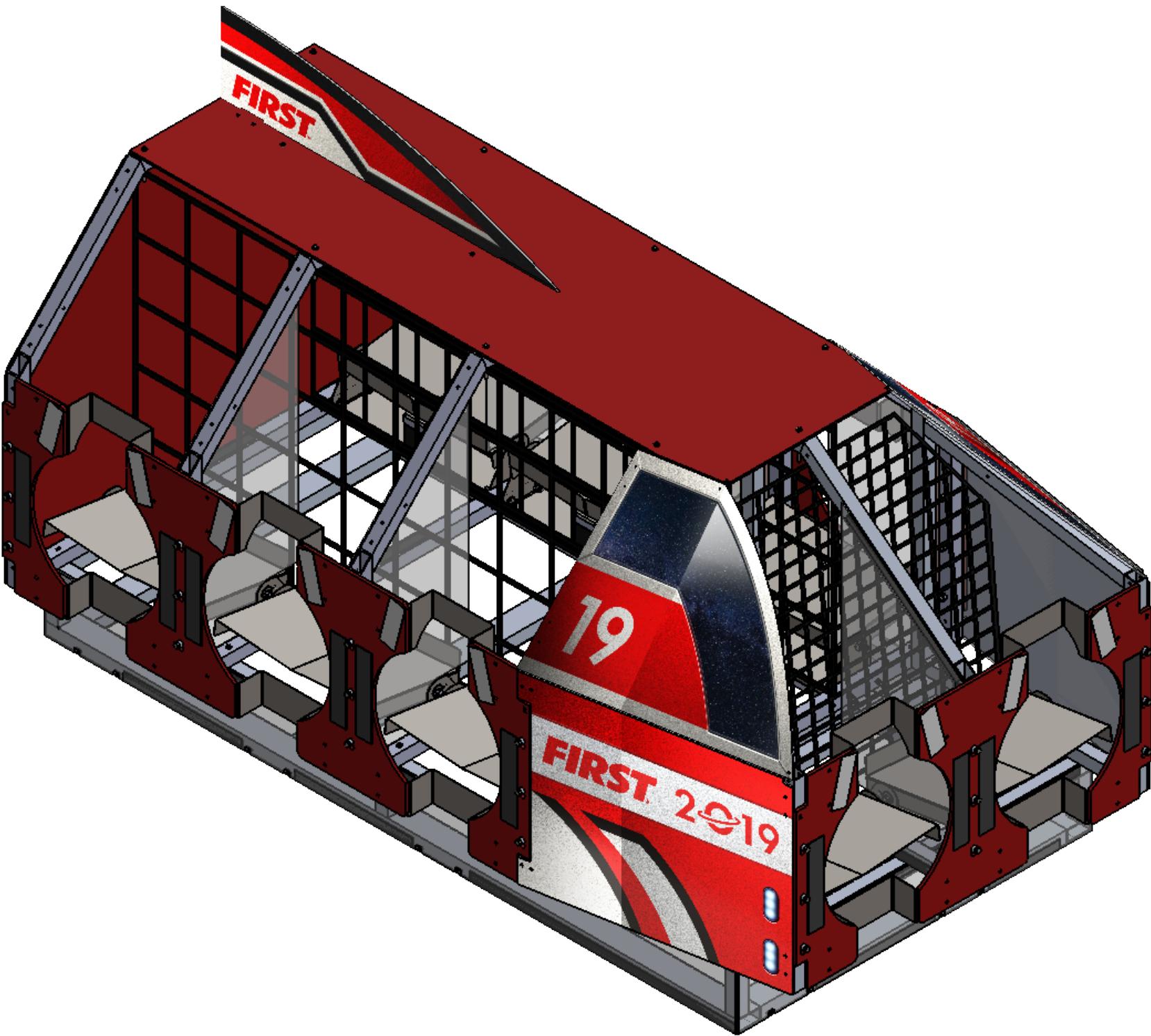
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19026	Keyhole Insert	8
2	GE-19071-Assembly	Cargo Ship Base, with Hook	1
3	GE-19072-Assembly	Cargo Ship Main Frame	4
4	GE-19074-Assembly	Cargo Ship Frame Front	1
5	GE-19075	Cargo Ship Nose Side	2
6	GE-19078	Cargo Ship Top Plastic	1
7	GE-19079-Left-Red	Cargo Ship Front Side Plastic, Left Red	1
8	GE-19079-Right-Red	Cargo Ship Front Side Plastic, Right Red	1
9	GE-19080-Left-Red	Cargo Ship Front Top Plastic Left Red	1
10	GE-19080-Right-Red	Cargo Ship Front Top Plastic Right Red	1
11	GE-19081-Assembly	Cargo Ship Back Plastic	1
12	GE-19082-Red	Cargo Ship Fin, Red	1
13	GE-19088-Left-Assembly	Cargo Ship Divider Side, Left	3
14	GE-19088-Right-Assembly	Cargo Ship Divider Side, Right	3
15	GE-19089-Assembly	Cargo Ship Divider Front	1
16	GE-19092	Cargo Ship Tray Assembly	8
17	GE-19098	Keyhole Insert Bottom	8
18	GE-19103	Cargo Net Side	2
19	GE-19104	Cargo Net Front	1
20	GE-19106	Light Sub Assembly	1
21	GE-19165	Panel Plastic Full Assembly	6
22	GE-19166	Panel Plastic Half Assembly, Left	3
23	GE-19195	Cargo Ship Corner Bracket	4
24	GE-19217	Panel Plastic Half Assembly, Right	3
25	GE-19229-Assembly	Cargo Ship Bumper Plastic Front	1
26	GE-19228-Assembly	Cargo Ship Bumper Plastic Side	2
27	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	6
28	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	22
29	hex_.25_20_3.5	Steel Hex Head Screw, 1/4"-20 x 3.5 long, fully threaded	25
30	spacer_.375_.625_.375	Spacer, 3/8" ID, 5/8" OD, 3/8" thk	33
31	hex_.375_16_3_partial	Steel Hex Head Screw, 3/8"-16, 3" long	33
32	nylock_.375_16	Steel Nylon-Insert Locknut, 3/8"-16	33
33	wing_.25_20	Steel Wing Nut, 1/4"-20, 31/64" Base Diameter	9
34	washer_split_.26_.487	Steel Split Lock Washer for 1/4" Screw	9
35	pin_quick_ring_.25_2.5	SS Ring-Grip Quick-Release Pin, 1/4" diameter, 2.5" long	22

Notes:

There are red/blue variants for Items 6-12, 21-22, 24. Only red shown here.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SCALE: 1:24		WEIGHT:	SHEET 1 OF 8	
SIZE	DWG. NO.	REV		
B	GE-19070			

## Cargo Ship Full Assembly

4

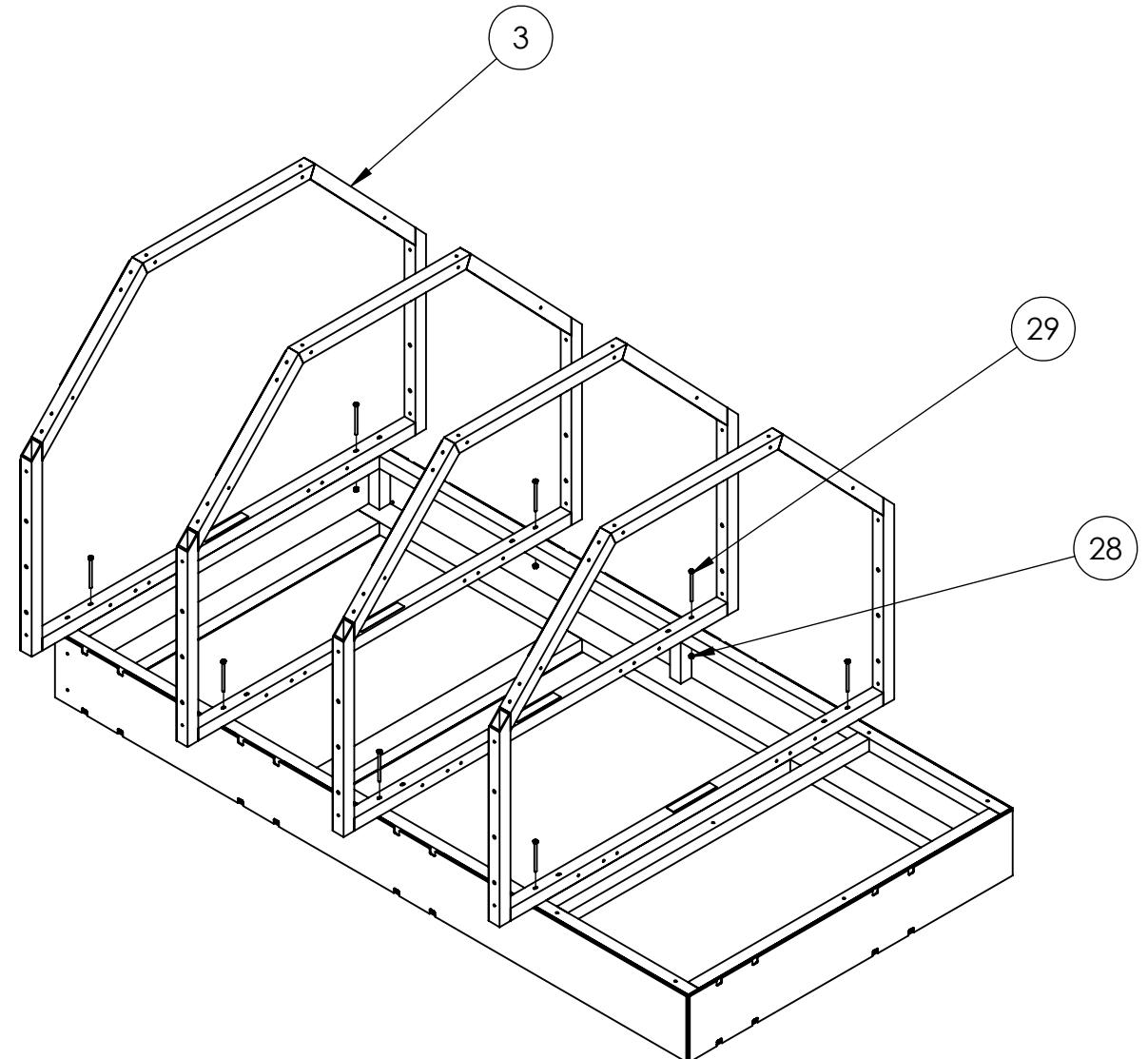
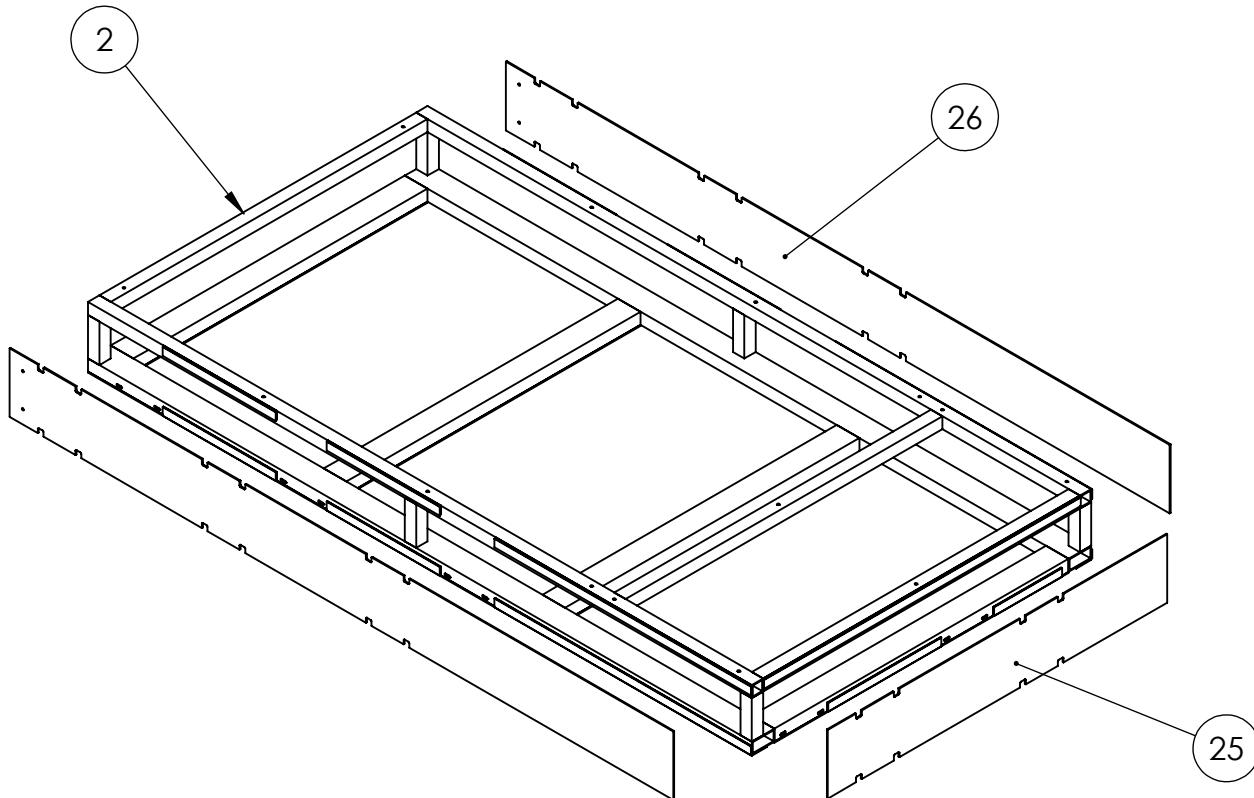
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2

1

B

B



A

A

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DIMENSIONS ARE IN INCHES		DRAWN		
TOLERANCES:		CHECKED		
FRACTIONAL: ±1/16		ENG APPR.		
ANGULAR: MACH ±1° BEND ±1°		MFG APPR.		
TWO PLACE DECIMAL: ±.01		Q.A.		
THREE PLACE DECIMAL: ±.001		COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

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**Cargo Ship Full Assembly**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19070</b>	
SCALE: 1:18	WEIGHT:	SHEET 2 OF 8

4

3

2

1

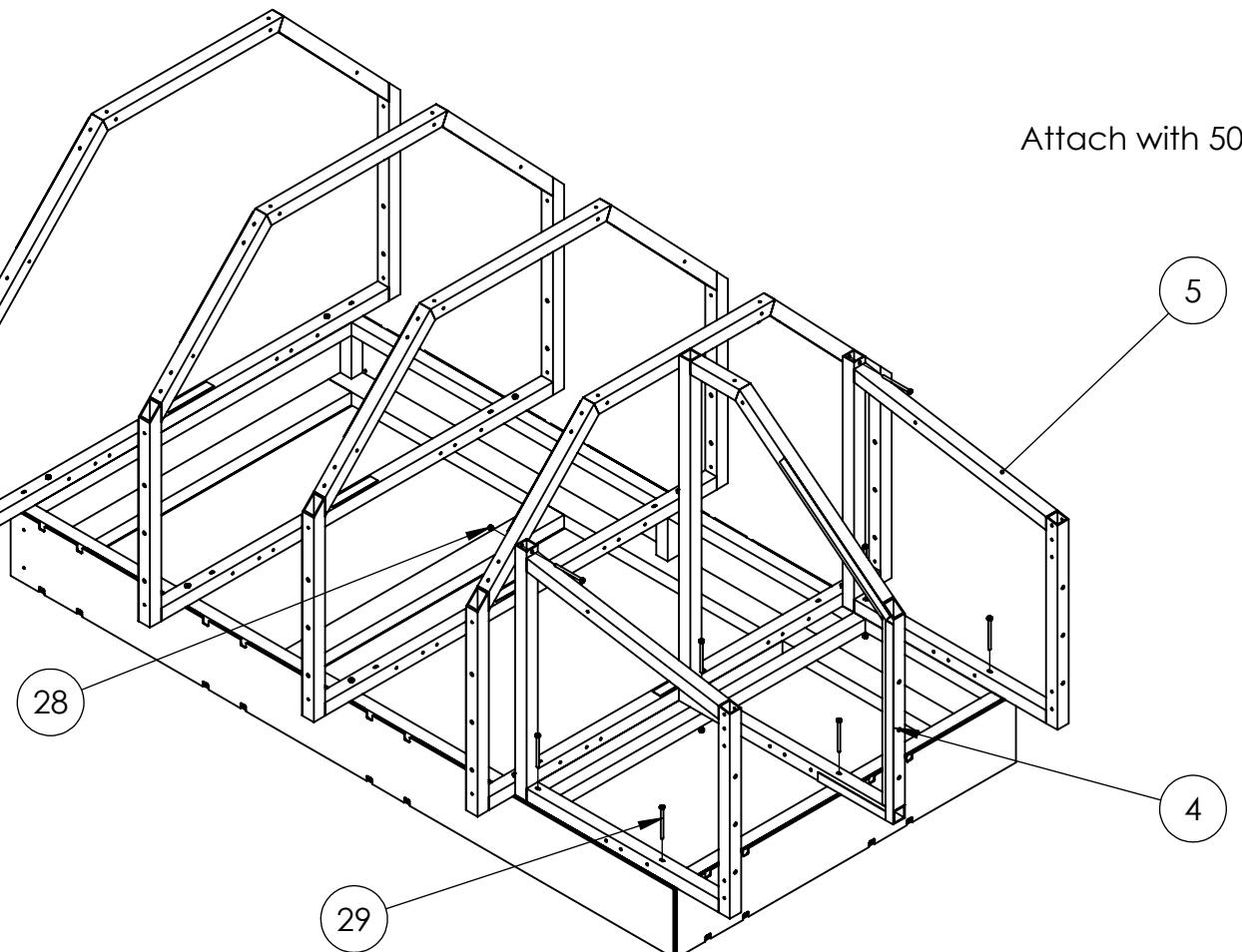
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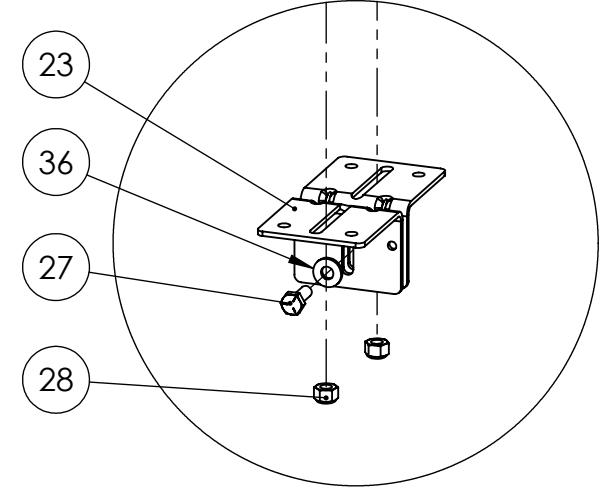
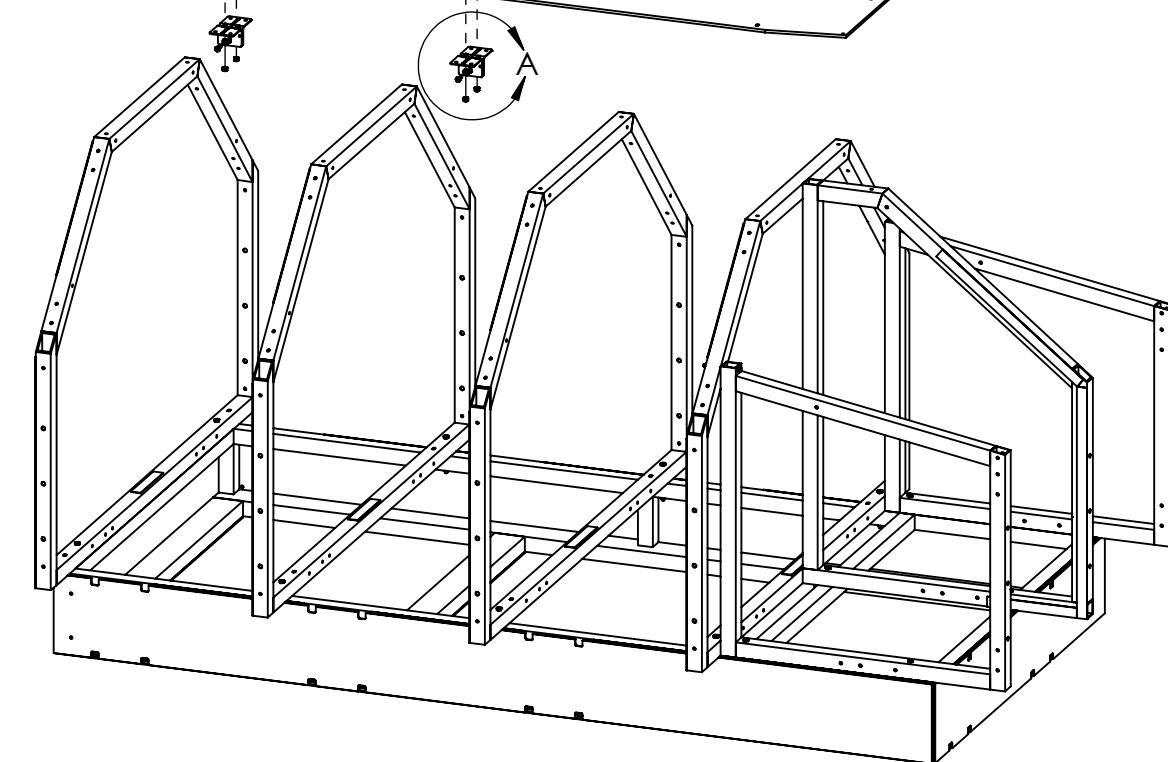
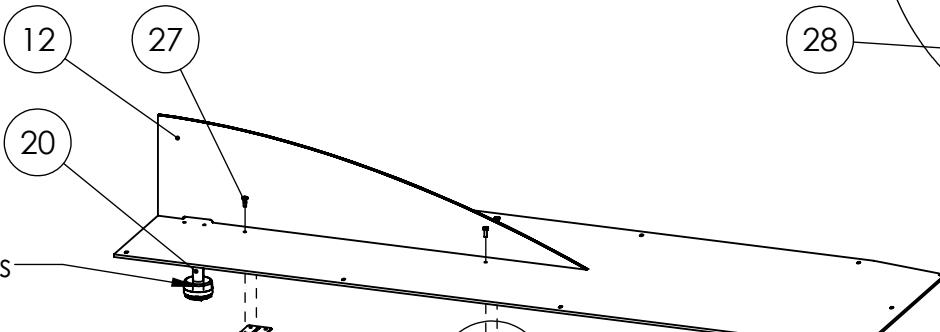
2

1

B



Attach with 50-lb cable ties

DETAIL A  
SCALE 1 : 4

4

3

2

1

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
NEXT ASSY	USED ON	MATERIAL		
APPLICATION		FINISH		
		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner  
TITLE: Cargo Ship Full Assembly  
SIZE DWG. NO. REV  
**B GE-19070**  
SCALE: 1:18 WEIGHT: SHEET 3 OF 8

4

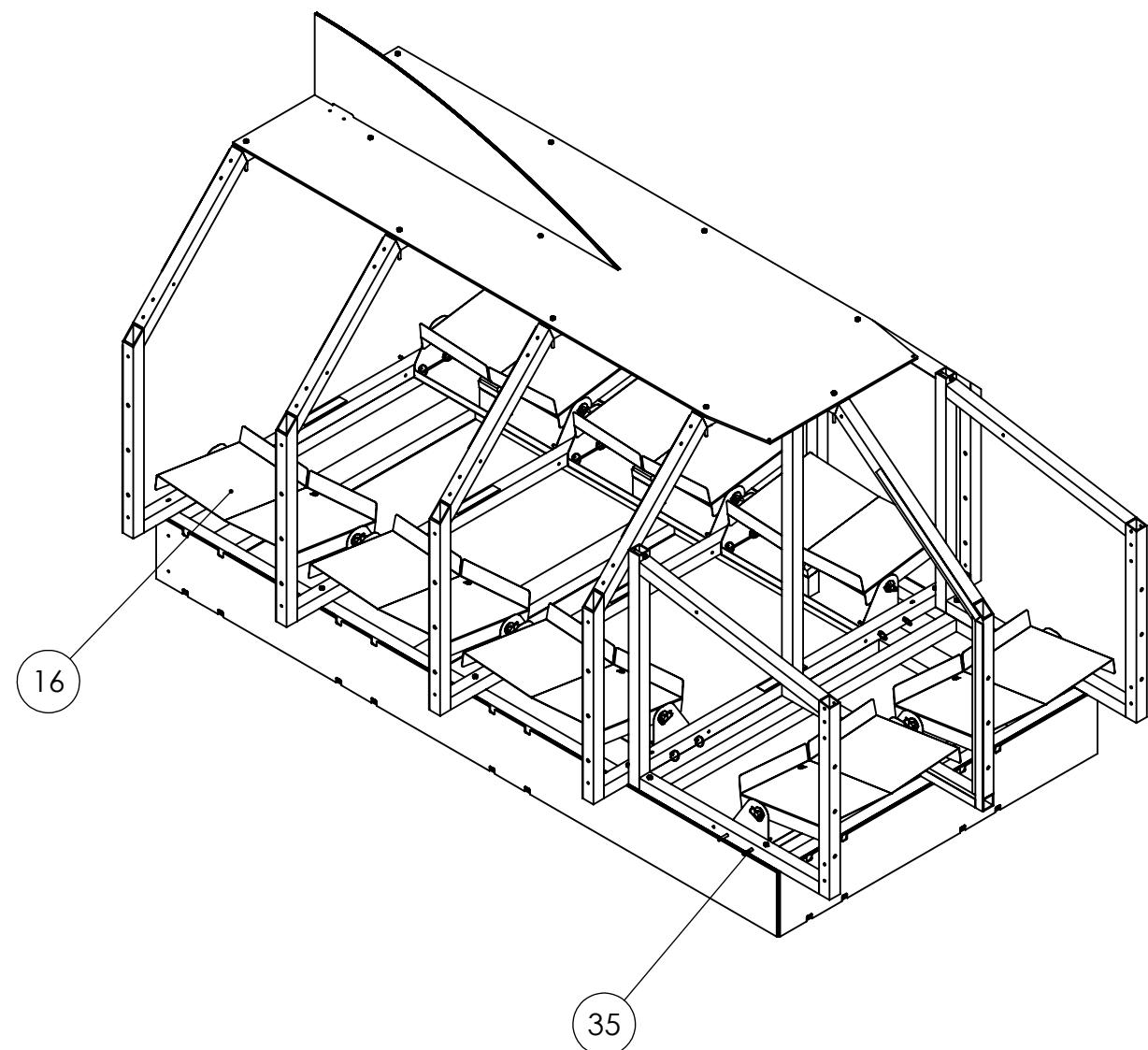
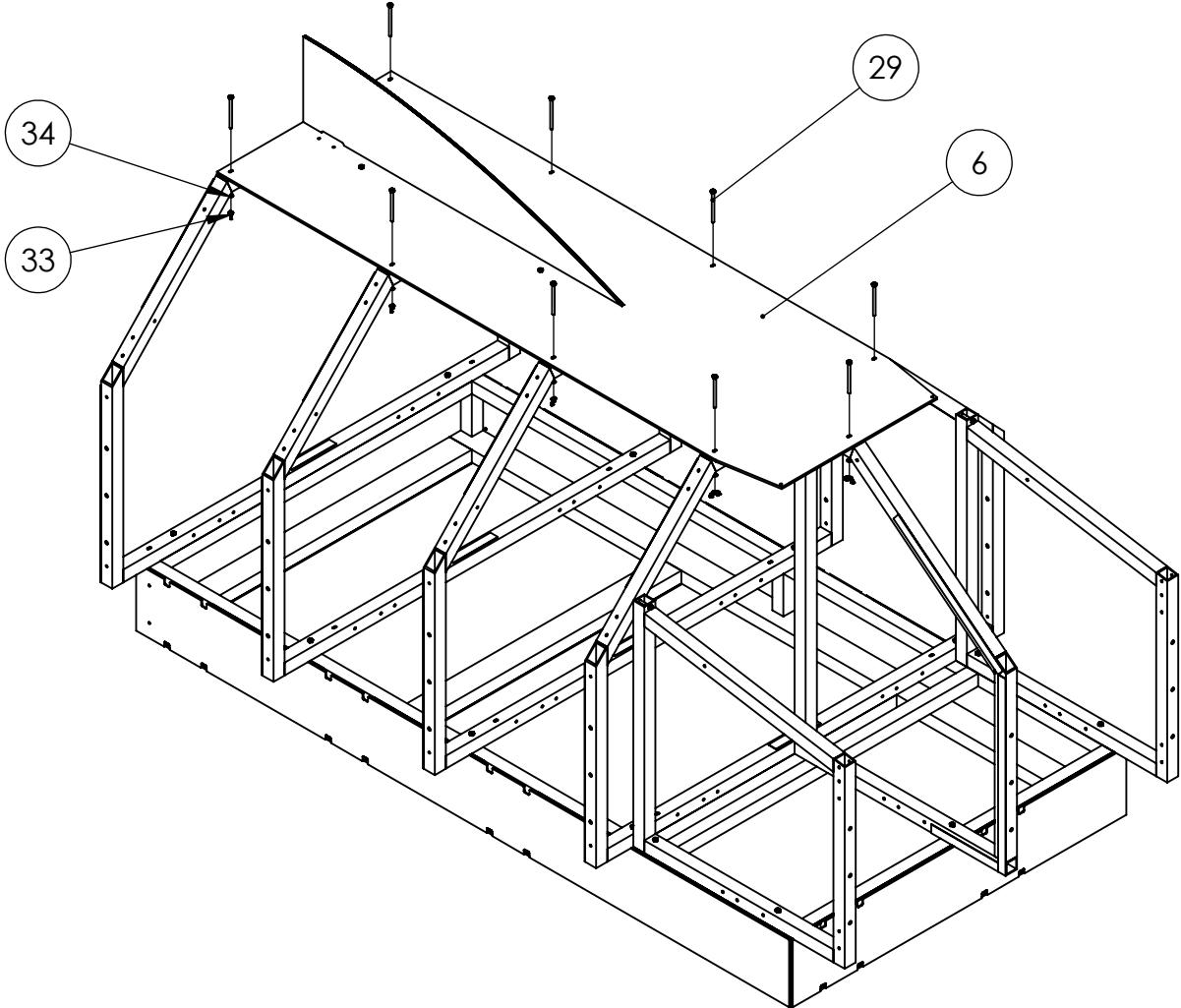
3

2

1

B

B



Notes:  
Place Item 16 (QTY: 8) and secure using Items 35 (QTY: 22)  
through the matching holes in the frame

4

3

2

1

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		TOLERANCES:		CHECKED	
		FRACTIONAL $\pm 1/16$		ENG APPR.	
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		MFG APPR.	
		TWO PLACE DECIMAL $\pm .01$		Q.A.	
		THREE PLACE DECIMAL $\pm .001$		COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
		APPLICATION	DO NOT SCALE DRAWING		

**FIRST**  
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TITLE:

# Cargo Ship Full Assembly

SIZE DWG. NO. REV  
**B GE-19070**

SCALE: 1:18 WEIGHT: SHEET 4 OF 8

4

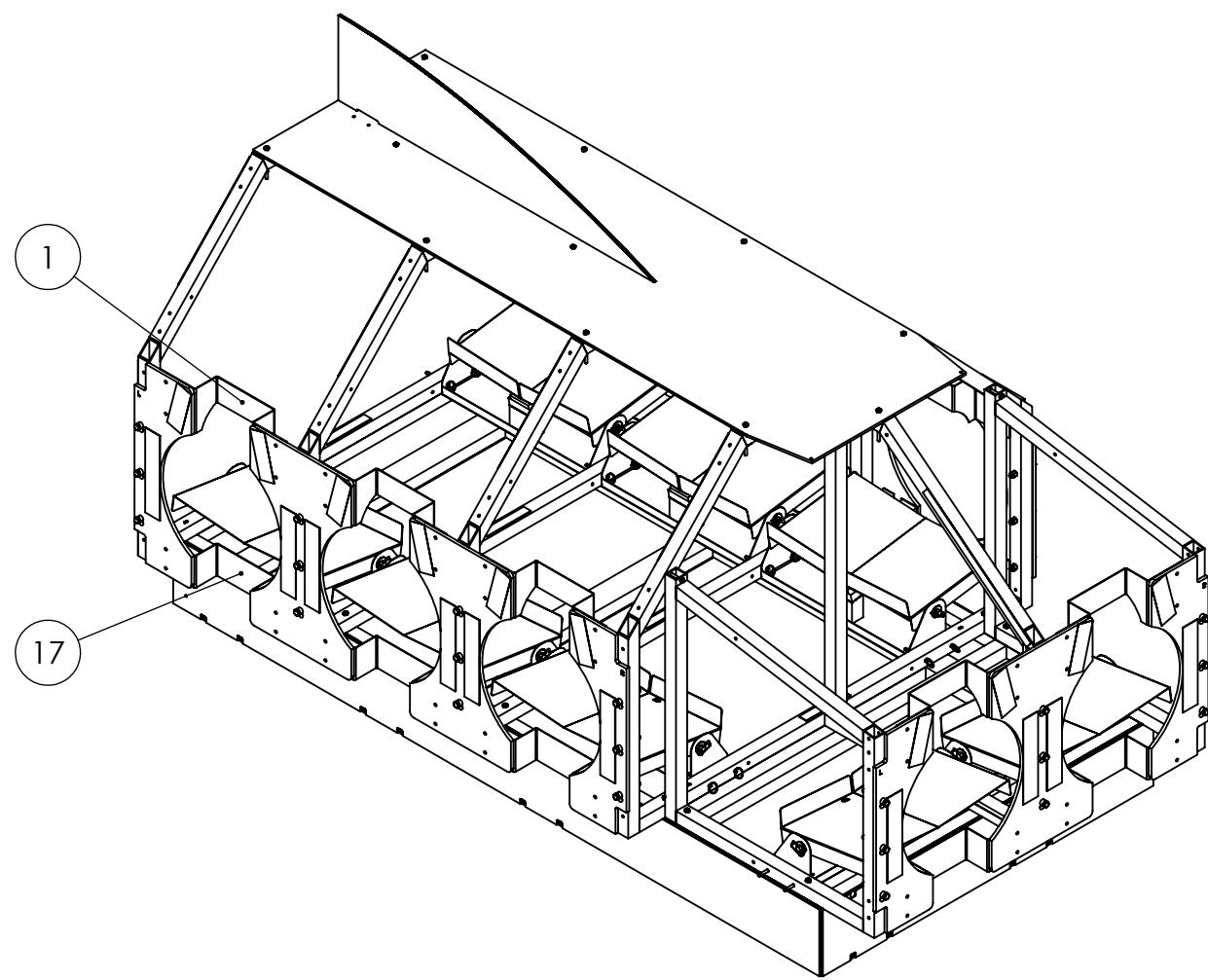
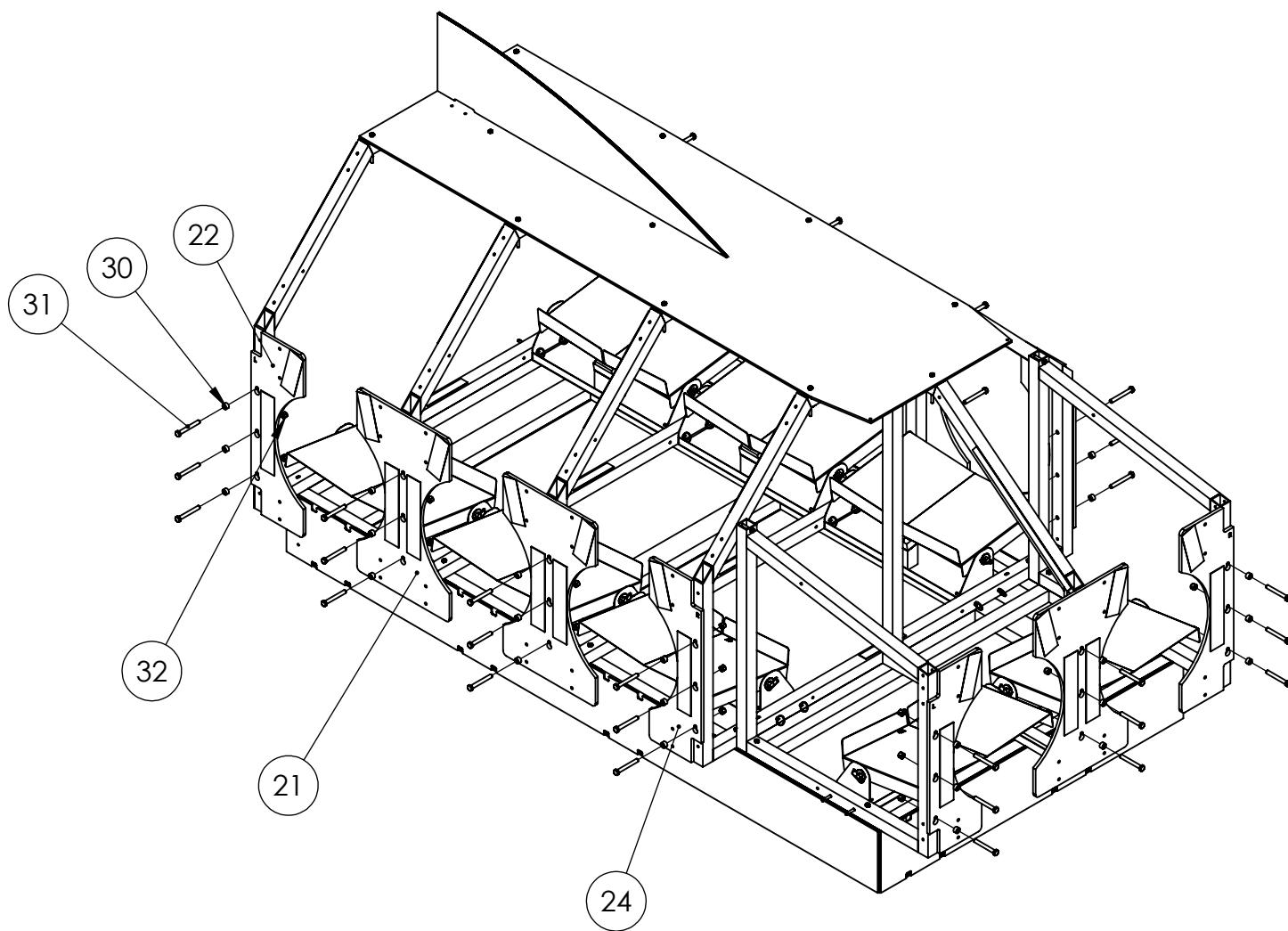
3

2

1

B

B



Notes:  
Attach Items 1 (QTY: 8) and Items 17 (QTY: 8) using 120-lb cable ties.

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
		SCALE: 1:18	WEIGHT:	SHEET 5 OF 8	REV
		B	GE-19070		

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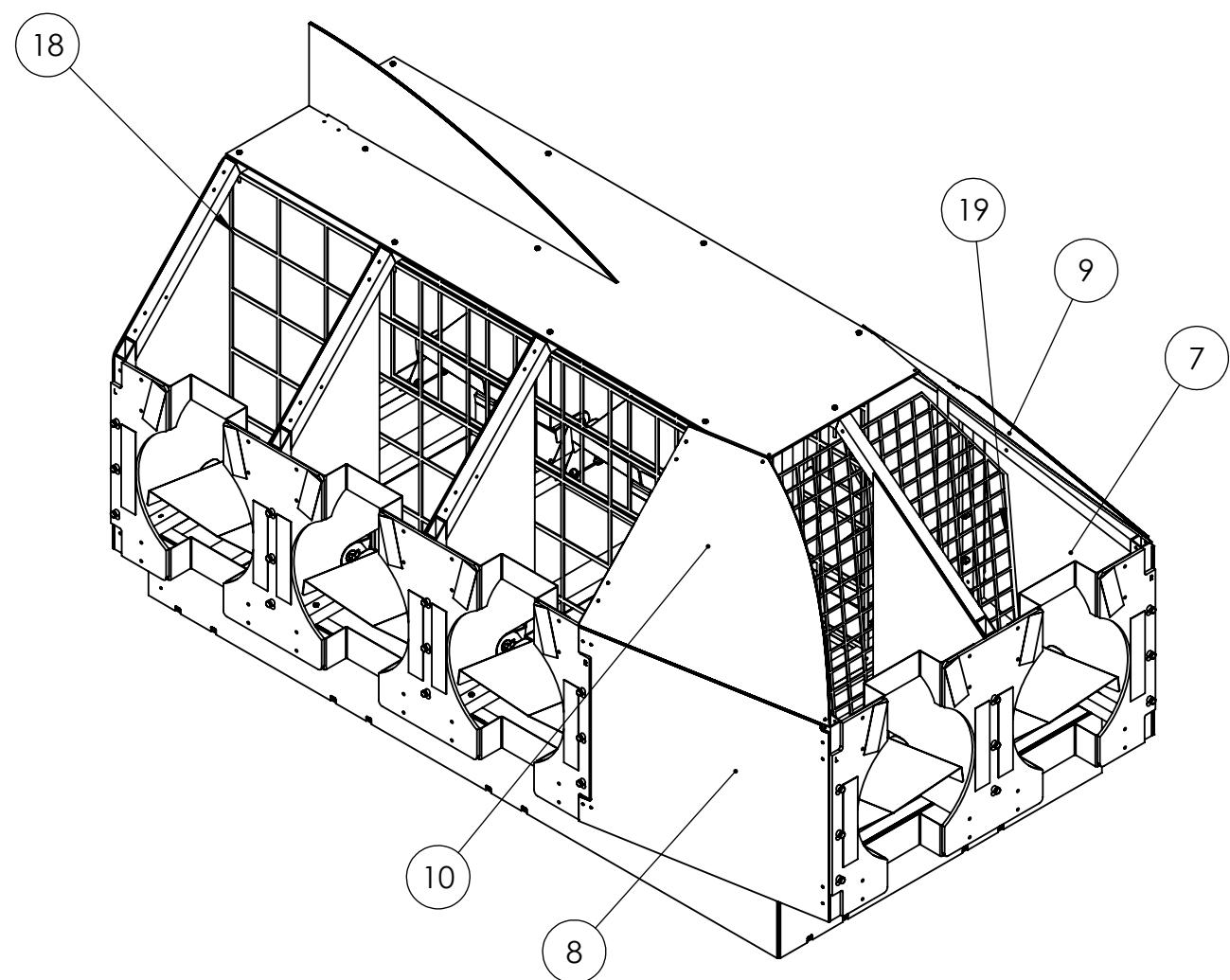
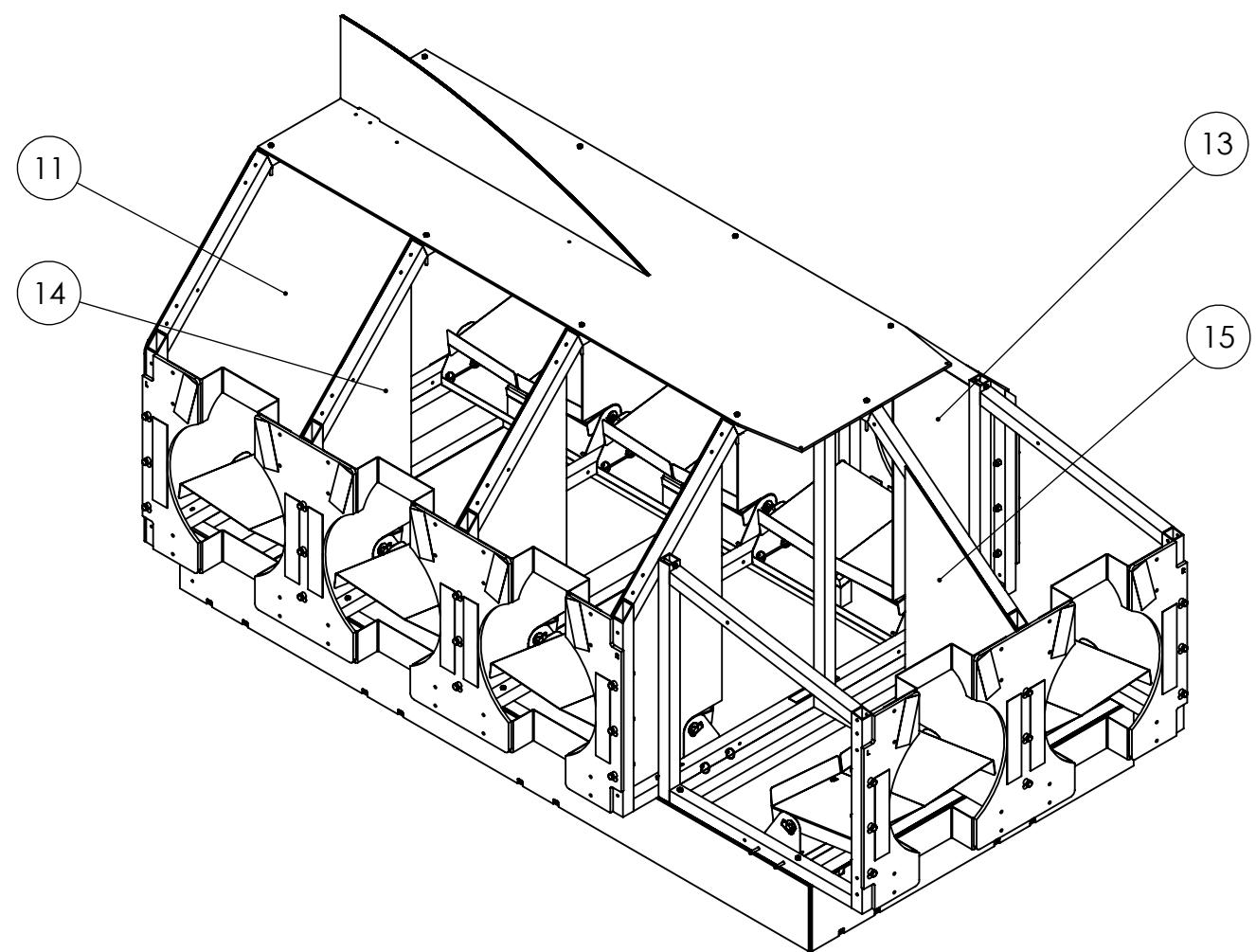
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Notes:  
Attach Item 15, Items 13 (QTY: 3), Items 14 (QTY: 3) and Item 1  
using hook and loop.

**Notes:**  
Attach Items 7, 8, 9 and 10 using 50-lb cable ties. Attach nets using 50-lb cable ties.

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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN			
			CHECKED			
			ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
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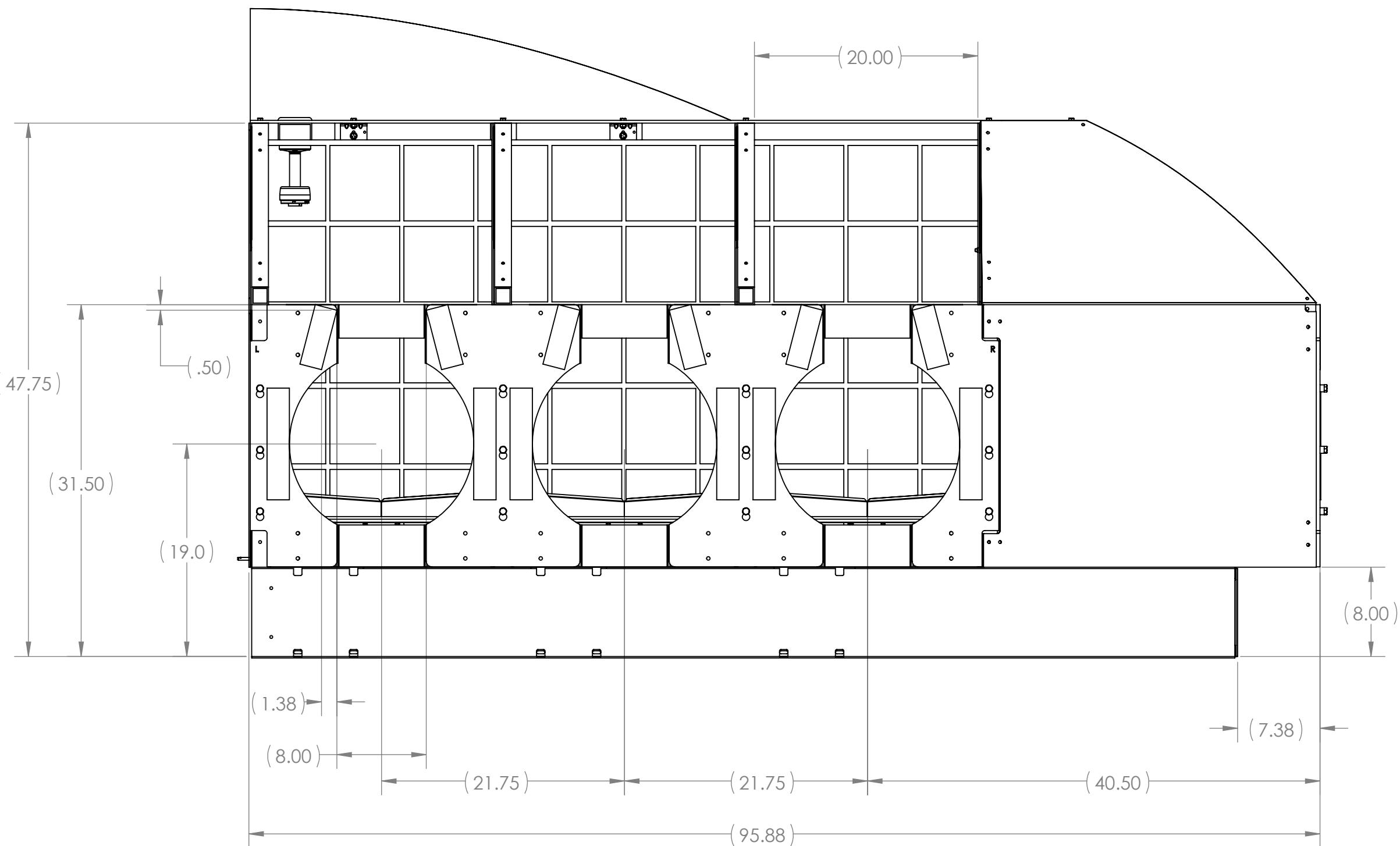
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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SCALE: 1:10	WEIGHT:			SHEET 7 OF 8
<b>B</b>	<b>GE-19070</b>			REV

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Full Assembly**

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This technical drawing shows a cross-section of a building's interior and exterior. The structure features a central rectangular room with a grid pattern on its ceiling. Above this room is a smaller, triangular room. The exterior walls are marked with various dimensions: a total height of 45.50, a width of 21.75, and a depth of 21.50. A vertical column is located on the right side. The floor plan includes labels for 'L' and 'R' at the top right, and '8' repeated multiple times along the bottom and right edges.

A

A

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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN				
			CHECKED				
			ENG APPR.				
			MFG APPR.				
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.				
		MATERIAL	COMMENTS:				
NEXT ASSY	USED ON	FINISH					
APPLICATION		DO NOT SCALE DRAWING					
			SCALE: 1:10	WEIGHT:		SHEET 8 OF 8	

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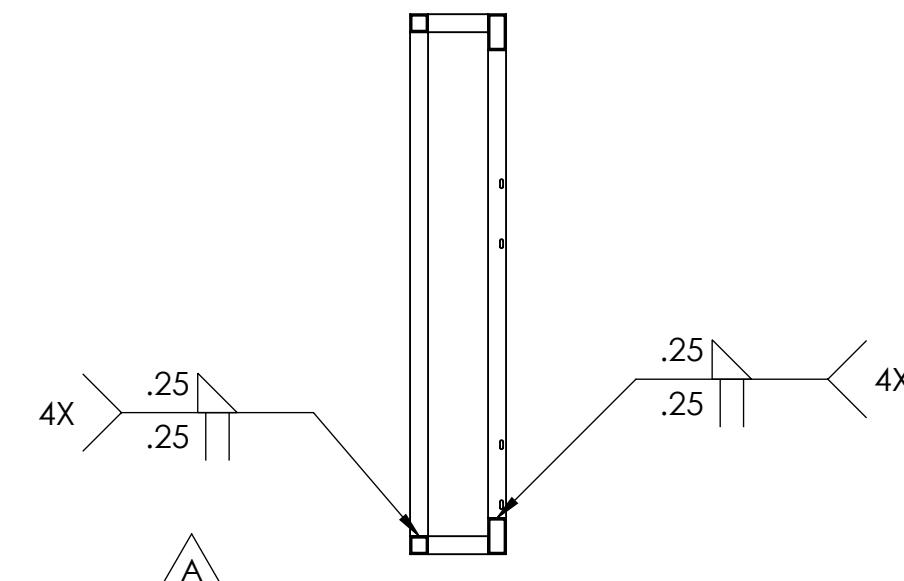
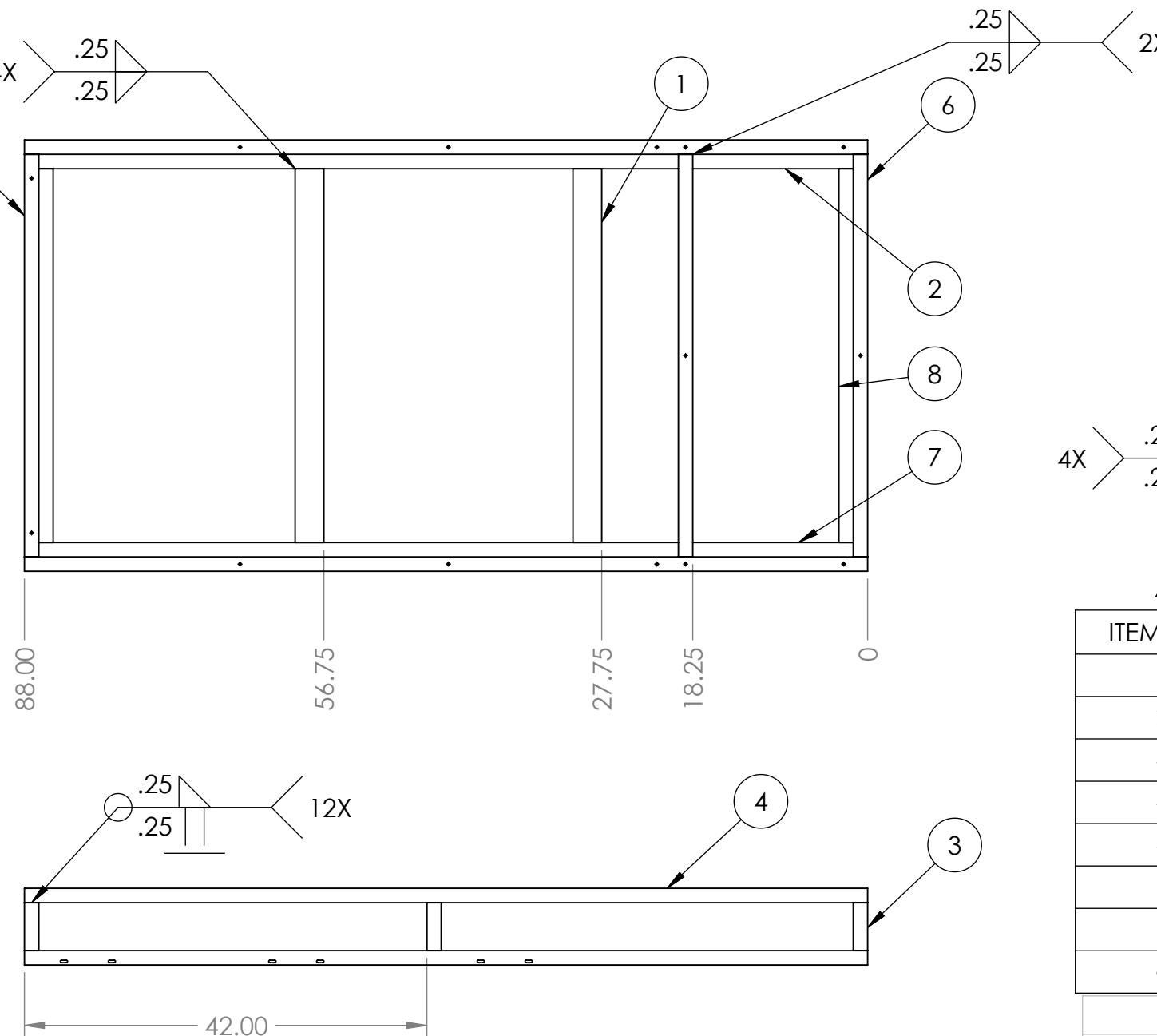
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1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A2	A	Added material table	10/5/2018	DAF
	B	Redrawn and redimensioned	10/10/2018	DAF

B



ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	3	1-1/2" x 3" x .125" Rectangular Tubing, 6061 Aluminum	39
2	1	1-1/2" x 3" x .125" Rectangular Tubing, 6061 Aluminum	88
3	6	1-1/2" x .125" Square Tubing, 6061 Aluminum	5
4	2	1-1/2" x .125" Square Tubing, 6061 Aluminum	88
5	1	1-1/2" x .125" Square Tubing, 6061 Aluminum	42
6	2	1-1/2" x .125" Square Tubing, 6061 Aluminum	42
7	1	1-1/2" x 3" x .125" Rectangular Tubing, 6061 Aluminum	88
8	1	1-1/2" x 3" x .125" Rectangular Tubing, 6061 Aluminum	39

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES		
		TOLERANCES:	DRAWN	CHECKED
		FRACTIONAL: ±1/16		
		ANGULAR: MACH ±1° BEND ±1°	ENG APPR.	MFG APPR.
		TWO PLACE DECIMAL ±.01		
		THREE PLACE DECIMAL ±.001	Q.A.	COMMENTS:
		INTERPRET GEOMETRIC TOLERANCING PER:	MATERIAL	
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Base**

**SIZE DWG. NO. REV**  
**B GE-19071 B**

**SCALE: 1:16 WEIGHT: SHEET 1 OF 3**

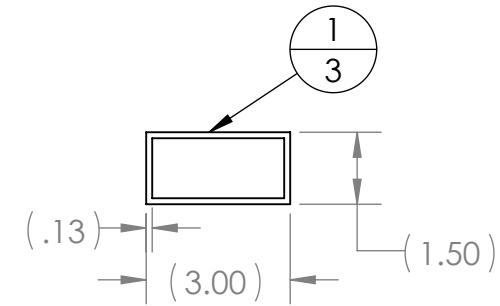
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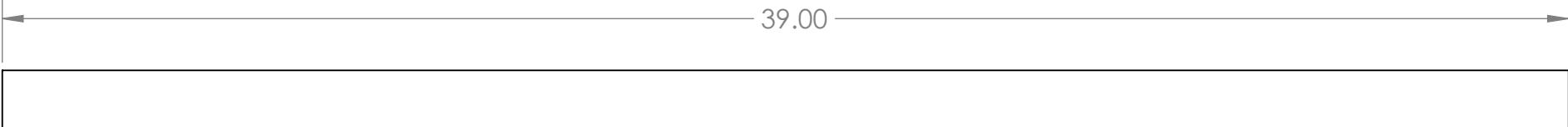
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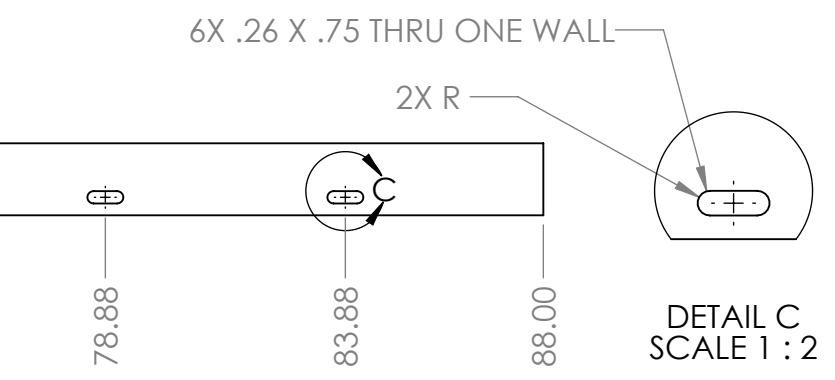
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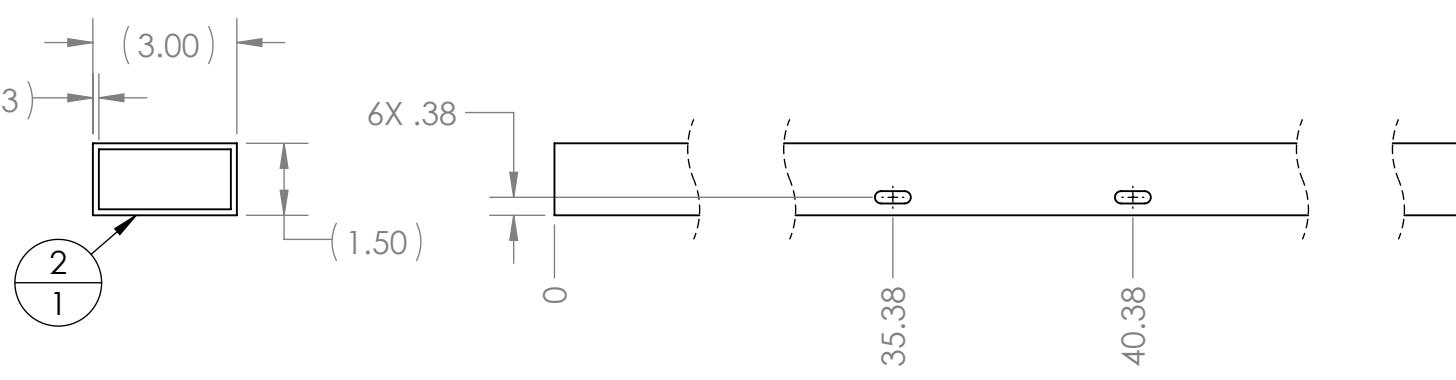
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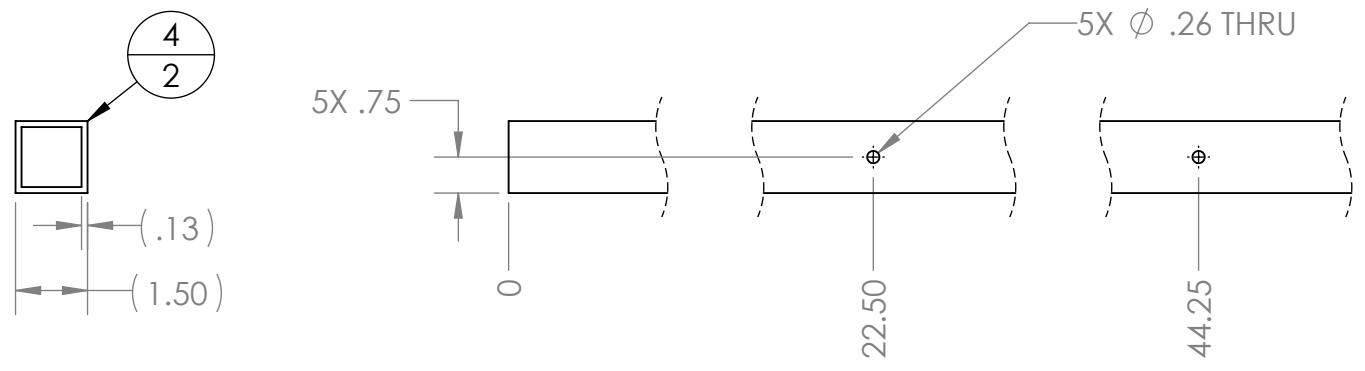
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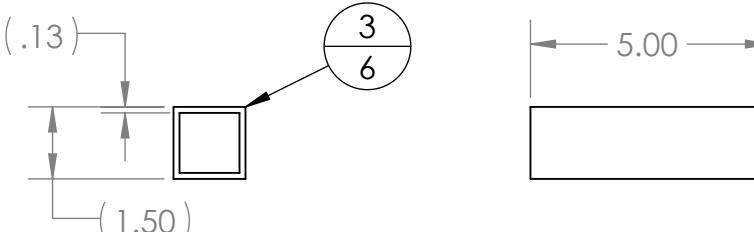
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B



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	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	FINISH		
APPLICATION	DO NOT SCALE DRAWING			

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Cargo Ship Base**

SIZE DWG. NO. REV  
**B GE-19071 B**

SCALE: 1:16 WEIGHT: SHEET 2 OF 3

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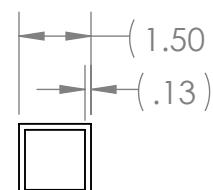
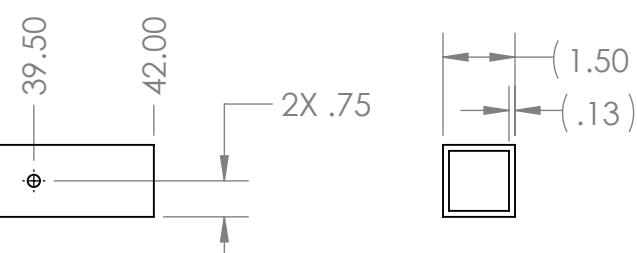
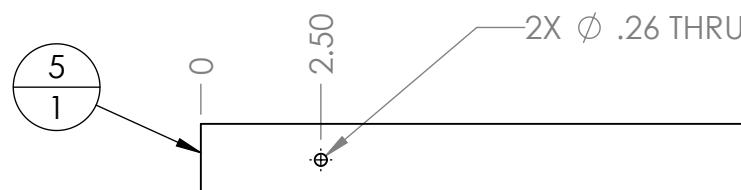
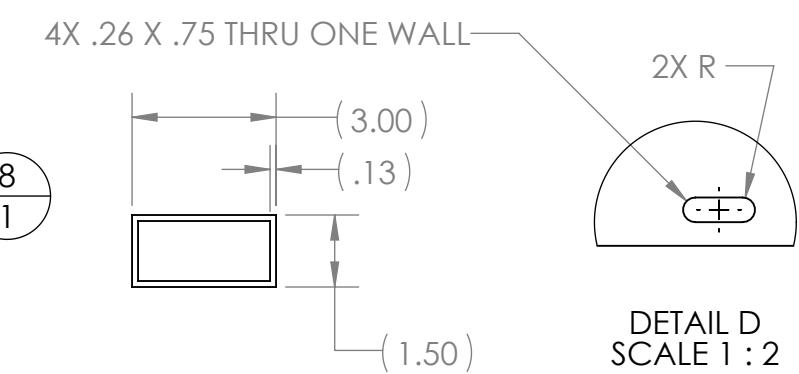
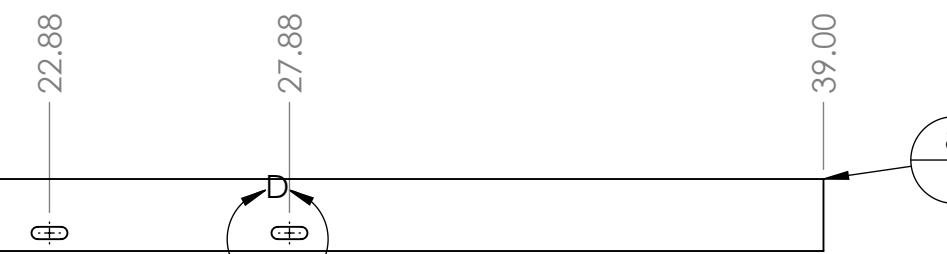
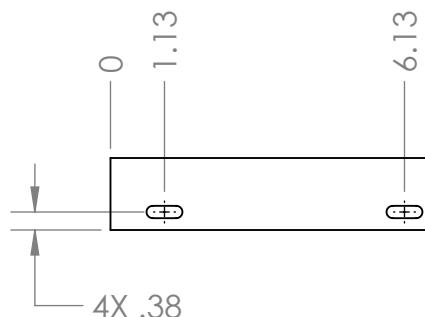
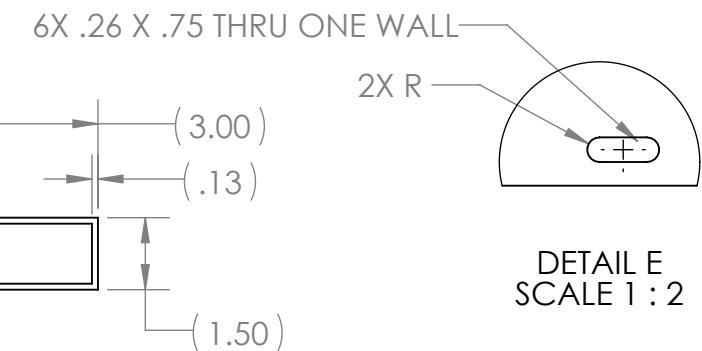
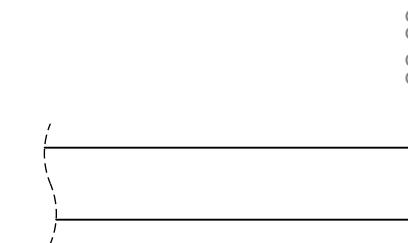
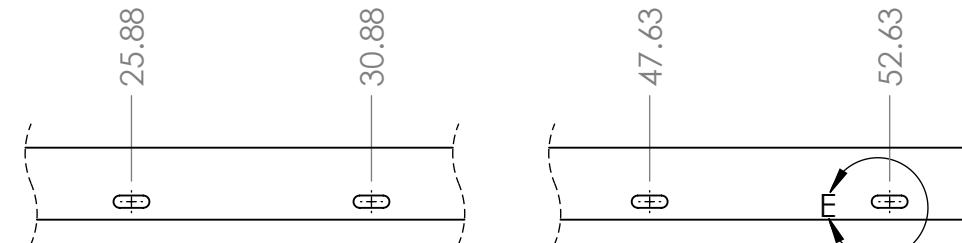
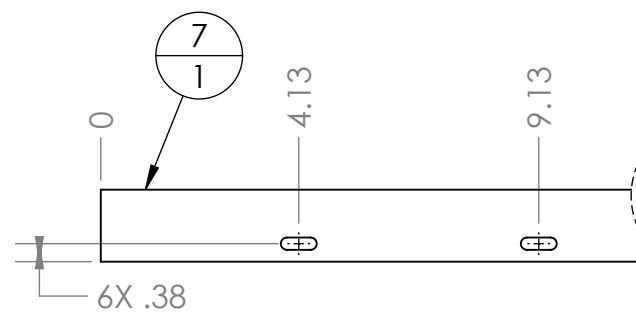
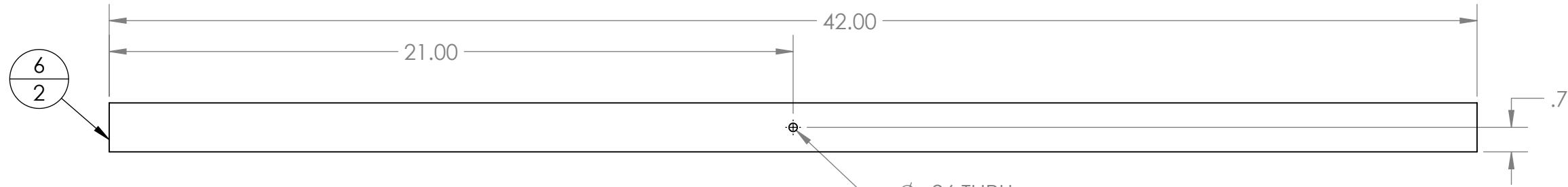
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DRAWN		DIMENSIONS ARE IN INCHES		
CHECKED		TOLERANCES: FRACTIONAL $\pm 1/16$		
ENG APPR.		ANGULAR: MACH $\pm 1^\circ$ , BEND $\pm 1^\circ$		
MFG APPR.		TWO PLACE DECIMAL $\pm .01$		
Q.A.		THREE PLACE DECIMAL $\pm .001$		
COMMENTS:				
NEXT ASSY	USED ON	MATERIAL		
APPLICATION		FINISH		
		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Base**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19071</b>	<b>B</b>
SCALE: 1:16	WEIGHT:	SHEET 3 OF 3

4

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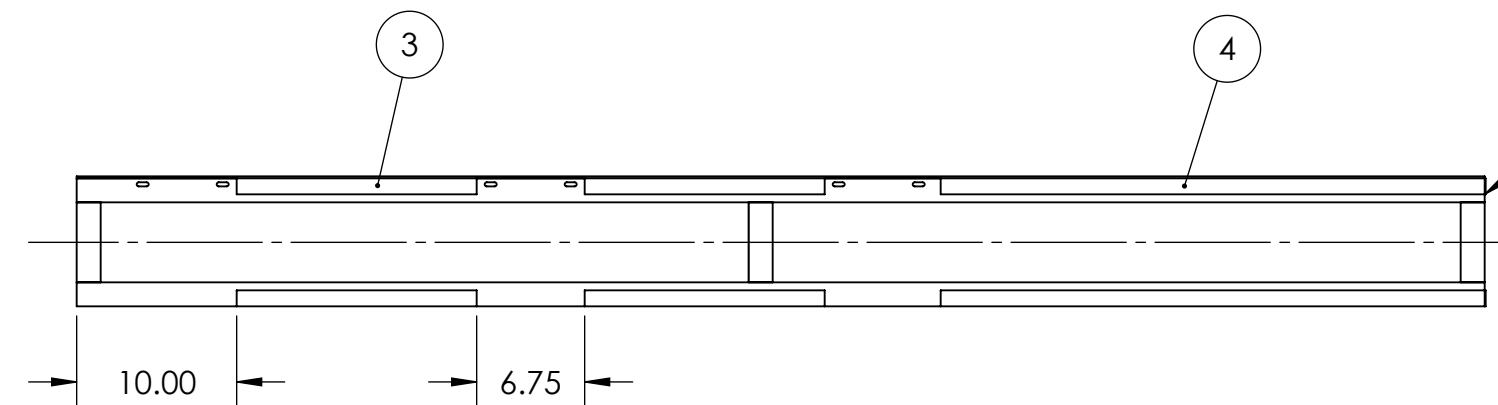
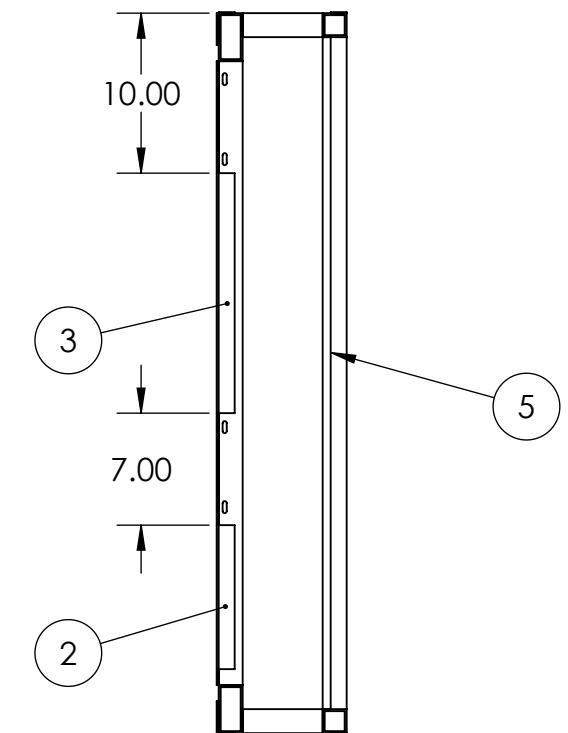
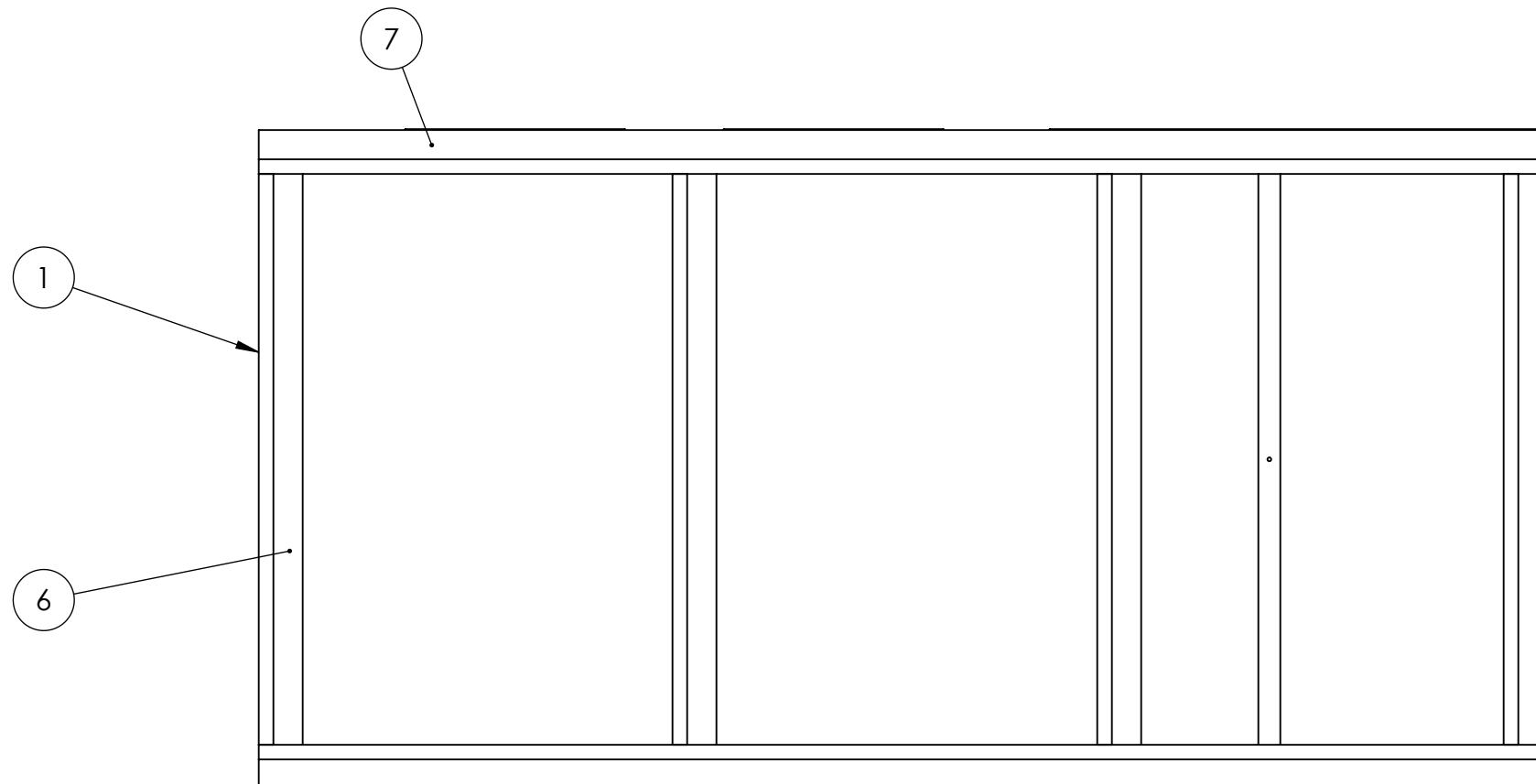
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1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19071	Cargo Ship Base	1
2	Hook_1_9	1" x 9" Hook, Adhesive Backed	1
3	Hook_1_15	1" x 15" Hook, Adhesive Backed	9
4	Hook_1_34	1" x 34" Hook, Adhesive Backed	4
5	Hook_1_42	1" x 42" Hook, Adhesive Backed	1
6	Hook_2_39	2" x 39" Hook, Adhesive Backed	4
7	Hook_2_88	2" x 88" Hook, Adhesive Backed	2

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**TITLE:** GE-19071, with Hook

**SIZE** DWG. NO. **REV**  
**B** GE-19071-Assembly

SCALE: 1:12 WEIGHT: SHEET 1 OF 1

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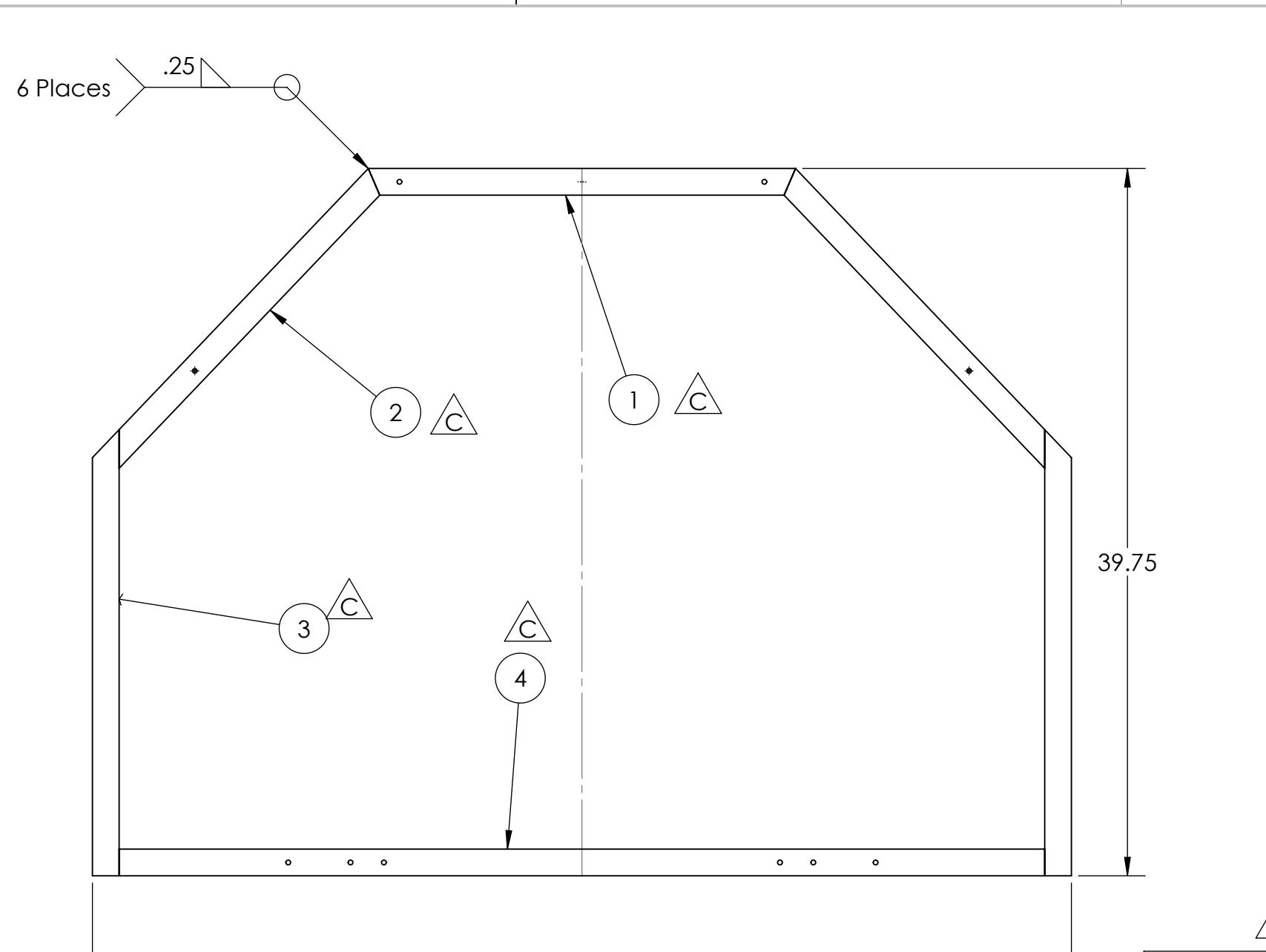
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	Redrawn	10/5/2018	JF
A2	B	Added Material Table	10/5/2018	DAF
B3, B4	C	Fixed Item numbers	10/9/2018	DAF

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	1	1-1/2" x .125" Square tubing, 6061 Aluminum	24
2	2	1-1/2" x .125" Square tubing, 6061 Aluminum	21.86
3	2	1-1/2" x .125" Square tubing, 6061 Aluminum	25.07
4	1	1-1/2" x .125" Square tubing, 6061 Aluminum	52

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES		
		TOLERANCES:	DRAWN	
		FRACTIONAL $\pm 1/16$		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	CHECKED	
		TWO PLACE DECIMAL $\pm .01$		
		THREE PLACE DECIMAL $\pm .001$	ENG APPR.	
		INTERPRET GEOMETRIC	MFG APPR.	
		TOLERANCING PER:		
		MATERIAL	Q.A.	COMMENTS:
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19072</b>	<b>C</b>		
SCALE: 1:8	WEIGHT:	SHEET 1 OF 3		

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TITLE:  
**Cargo Ship Body**  
**Frame**

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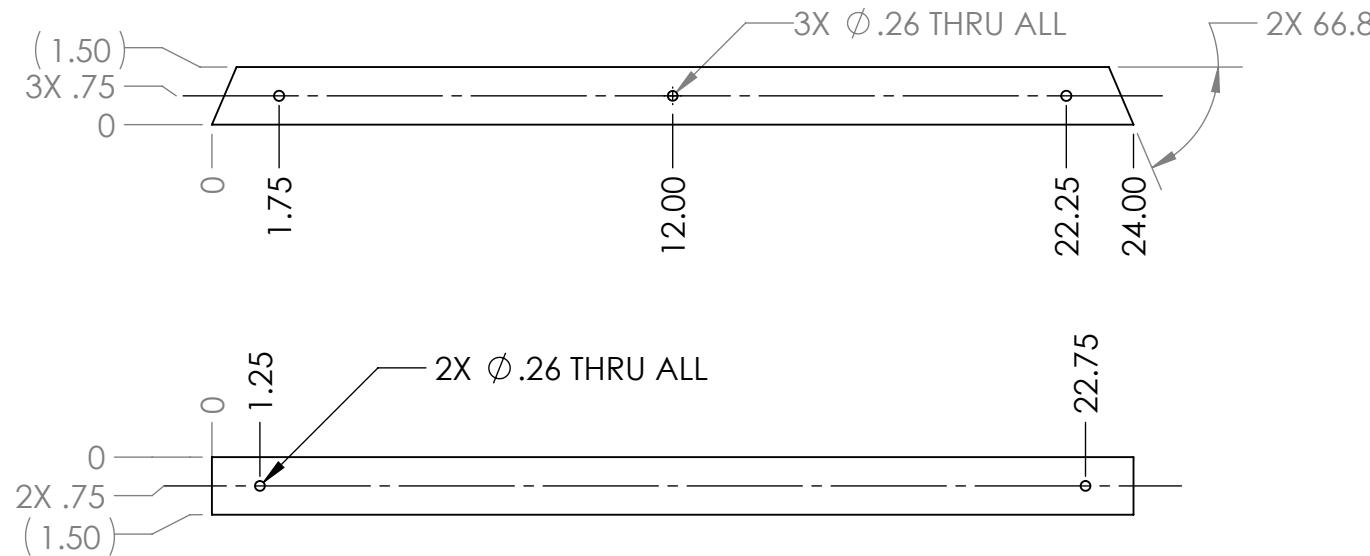
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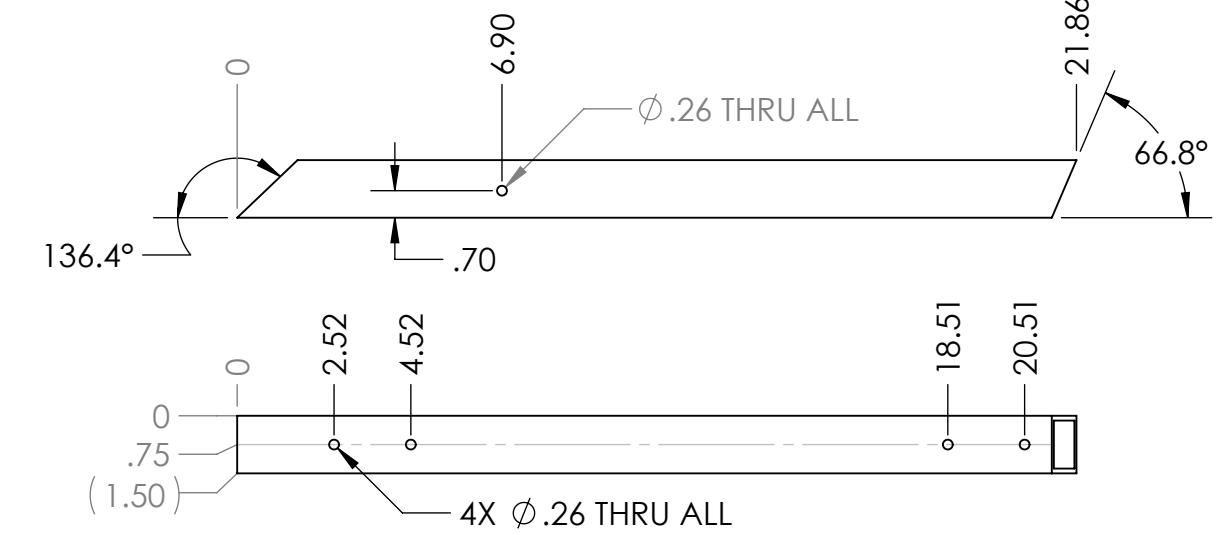
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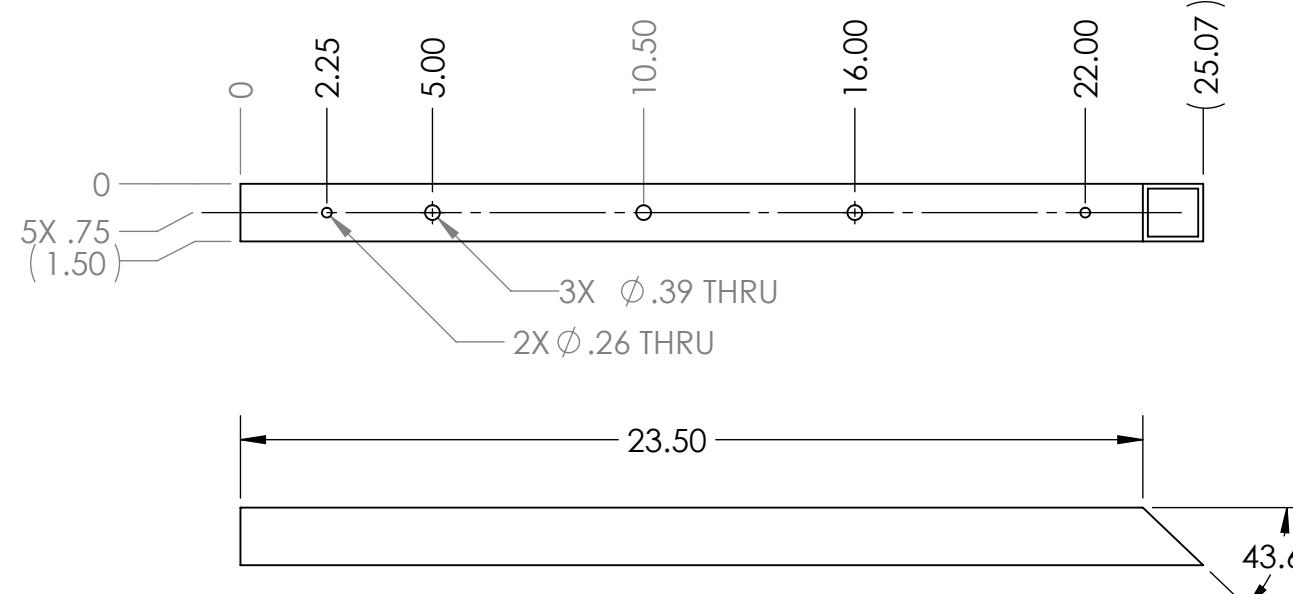
B



Item 1  
Material: 1.5" x .125" thk Square Tubing, 6061 aluminum  
QTY: 1



Item 2  
Material: 1.5" x .125" thk Square Tubing, 6061 aluminum  
QTY: 2



Item 3  
Material: 1.5" x .125" thk Square Tubing, 6061 aluminum  
QTY: 2

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		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
NEXT ASSY	USED ON	MATERIAL		
		FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:5	WEIGHT:	SHEET 2 OF 3		

**FIRST**  
ROBOTICS  
COMPETITION

**SOLIDWORKS**  
Modeling Solutions Partner

# Cargo Ship Body Frame

SIZE DWG. NO. REV  
**B GE-19072 C**

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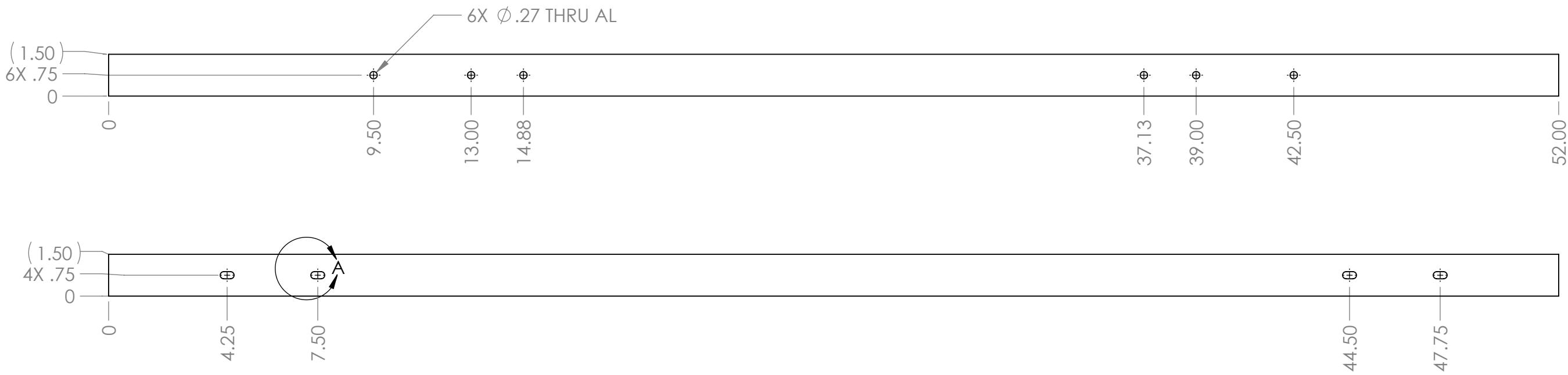
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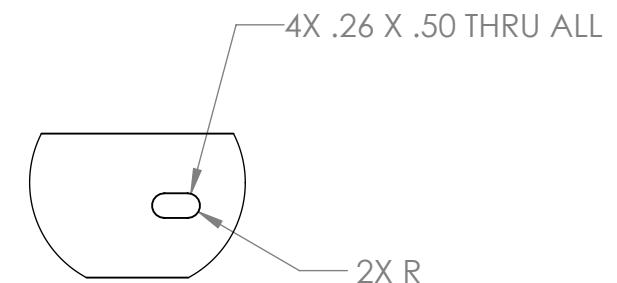
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Item 4  
Material: 1.5" x .125" thk Square Tubing, 6061 aluminum  
QTY: 1

DETAIL A  
SCALE 1 : 2



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		INTERPRET GEOMETRIC TOLERANCING PER:			
NEXT ASSY	USED ON	MATERIAL	FINISH		
APPLICATION	DO NOT SCALE DRAWING				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Body Frame**

**B** **GE-19072** **C**

SIZE DWG. NO. REV  
SCALE: 1:5 WEIGHT: SHEET 3 OF 3

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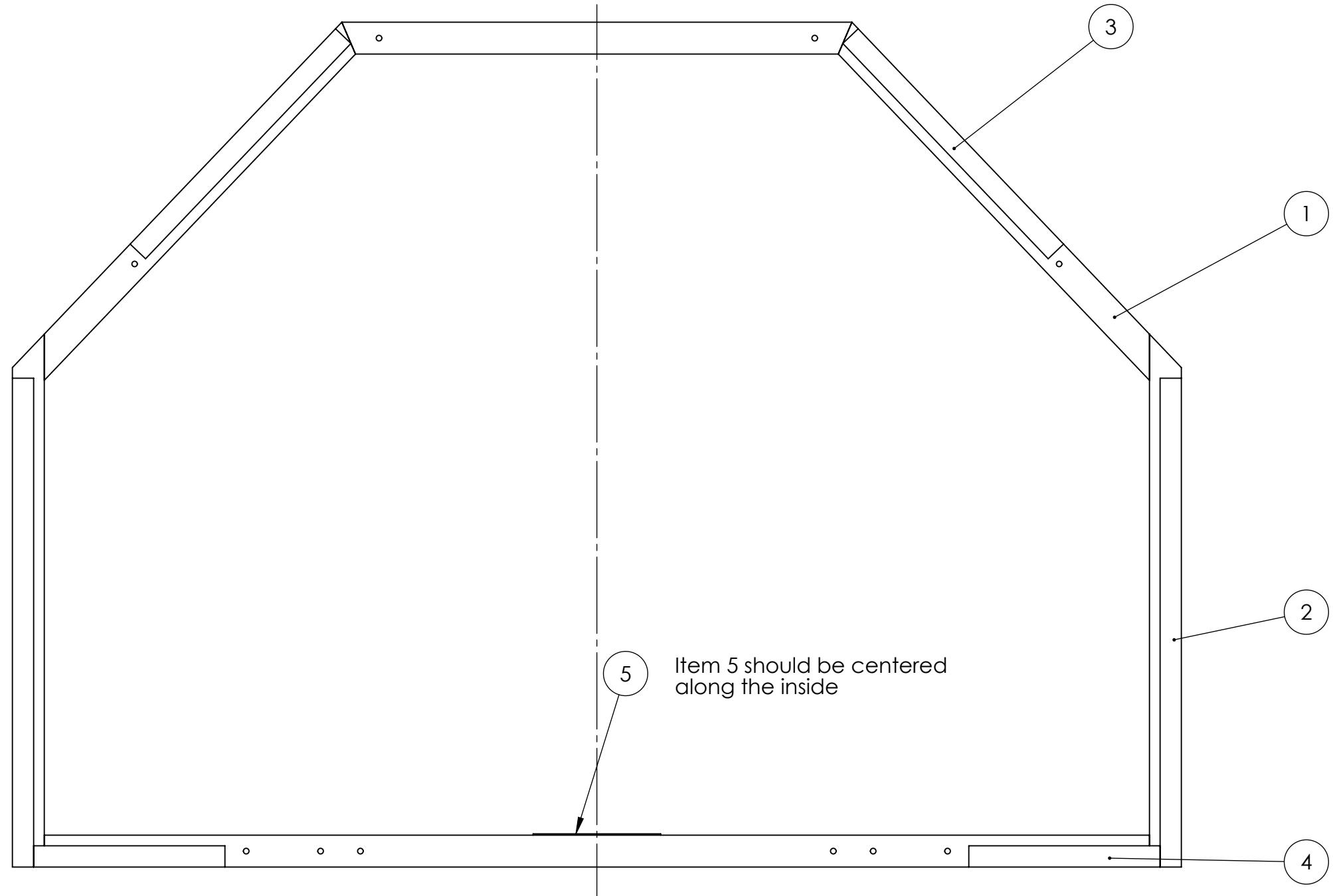
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A

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19072	Cargo Ship Body Frame	1
2	Hook_1_23	1" Hook, 23" Long	2
3	Hook_1_14	1" x 14" Hook, Adhesive Backed	2
4	Hook_1_9	1" x 9" Hook, Adhesive Backed	2
5	Hook_1_6	1" x 6" Hook, Adhesive Backed	1

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		INTERPRET GEOMETRIC TOLERANCING PER:	ENG APPR.	MFG APPR.
		MATERIAL	Q.A.	COMMENTS:
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING	REV	
SCALE: 1:8		WEIGHT:	SHEET 1 OF 1	

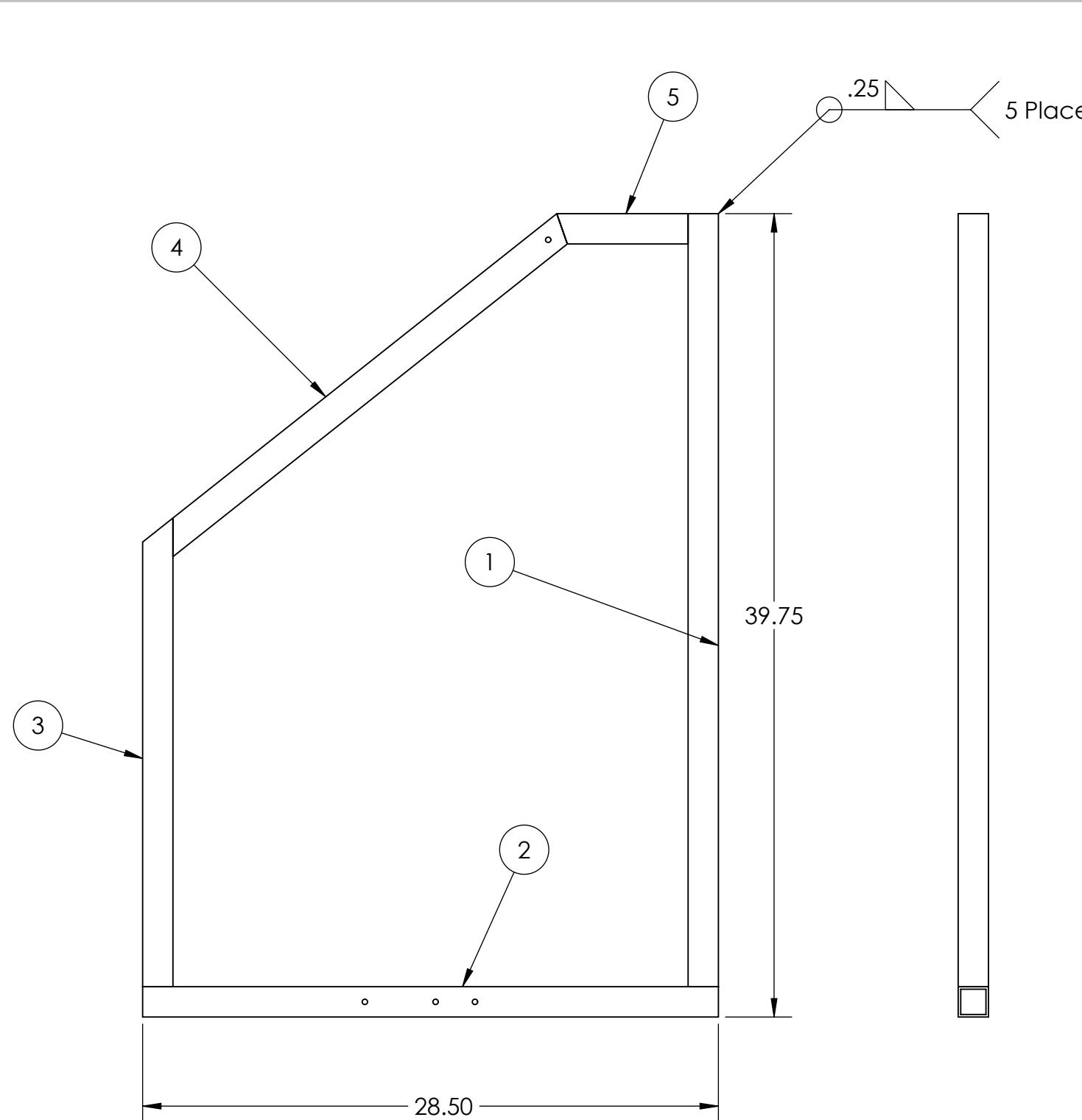
**FIRST** ROBOTICS COMPETITION **SOLIDWORKS**  
Modeling Solutions Partner  
TITLE: **GE-19072, With Hook**  
SIZE **B** DWG. NO. **GE-19072-Assembly** REV  
SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

3

2

1



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## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A		10/5/2018	
A2	B	Added Material Table	10/5/2018	DAF
2-B4	C	Corrected slot size from .26 x .38 to .26 x .5	11/15/2018	

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	1	1-1/2" x .125" Square Tubing, 6061 Aluminum	38.25
2	1	1-1/2" x .125" Square Tubing, 6061 Aluminum	28.5
3	1	1-1/2" x .125" Square Tubing, 6061 Aluminum	23.19
4	1	1-1/2" x .125" Square Tubing, 6061 Aluminum	25.43
5	1	1-1/2" x .125" Square Tubing, 6061 Aluminum	6.5

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$			
		INTERPRET GEOMETRIC TOLERANCING PER:		ENG APPR.	MFG APPR.
		MATERIAL			
NEXT ASSY		USED ON		FINISH	
APPLICATION		DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV			
<b>B</b>	<b>GE-19074</b>	<b>C</b>			
SCALE: 1:7	WEIGHT:	SHEET 1 OF 3			

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Cargo Ship Front  
Frame**

4

3

2

1

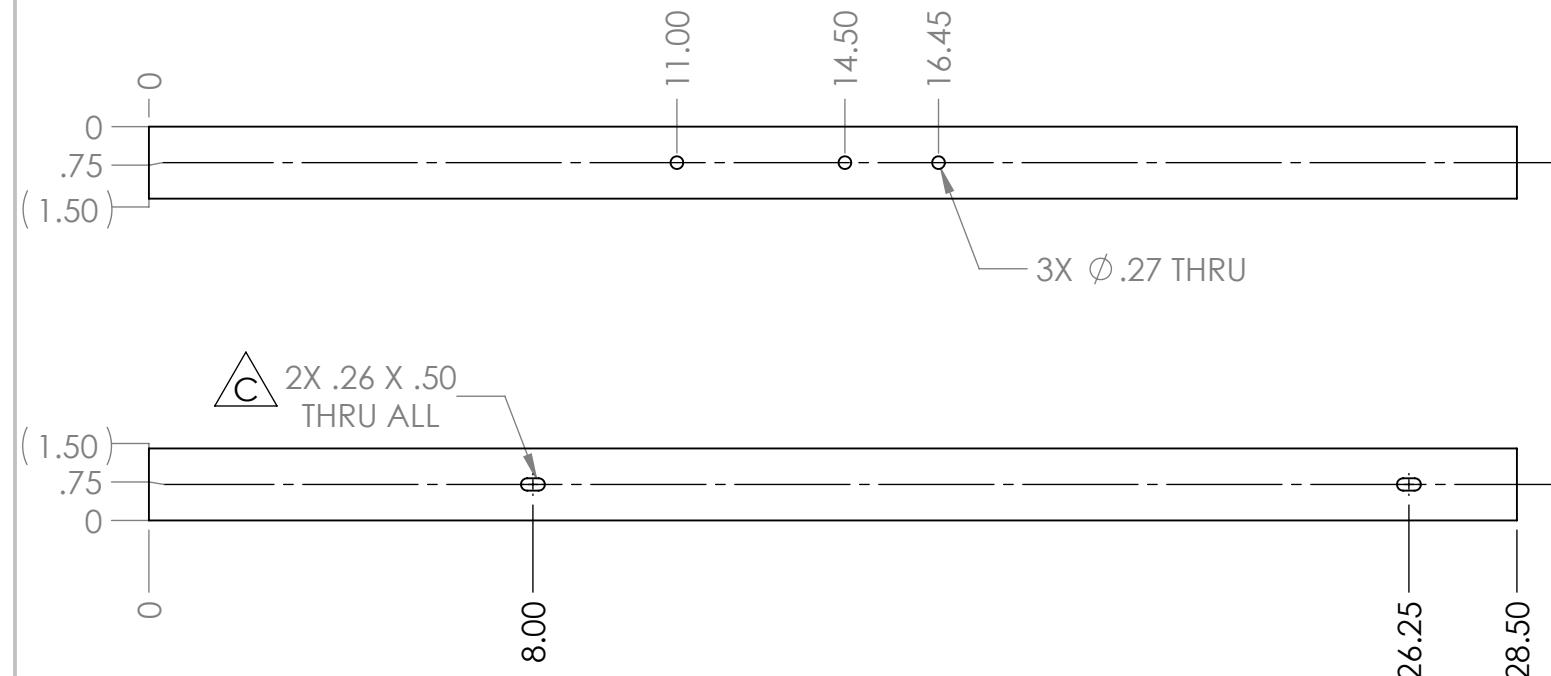
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3

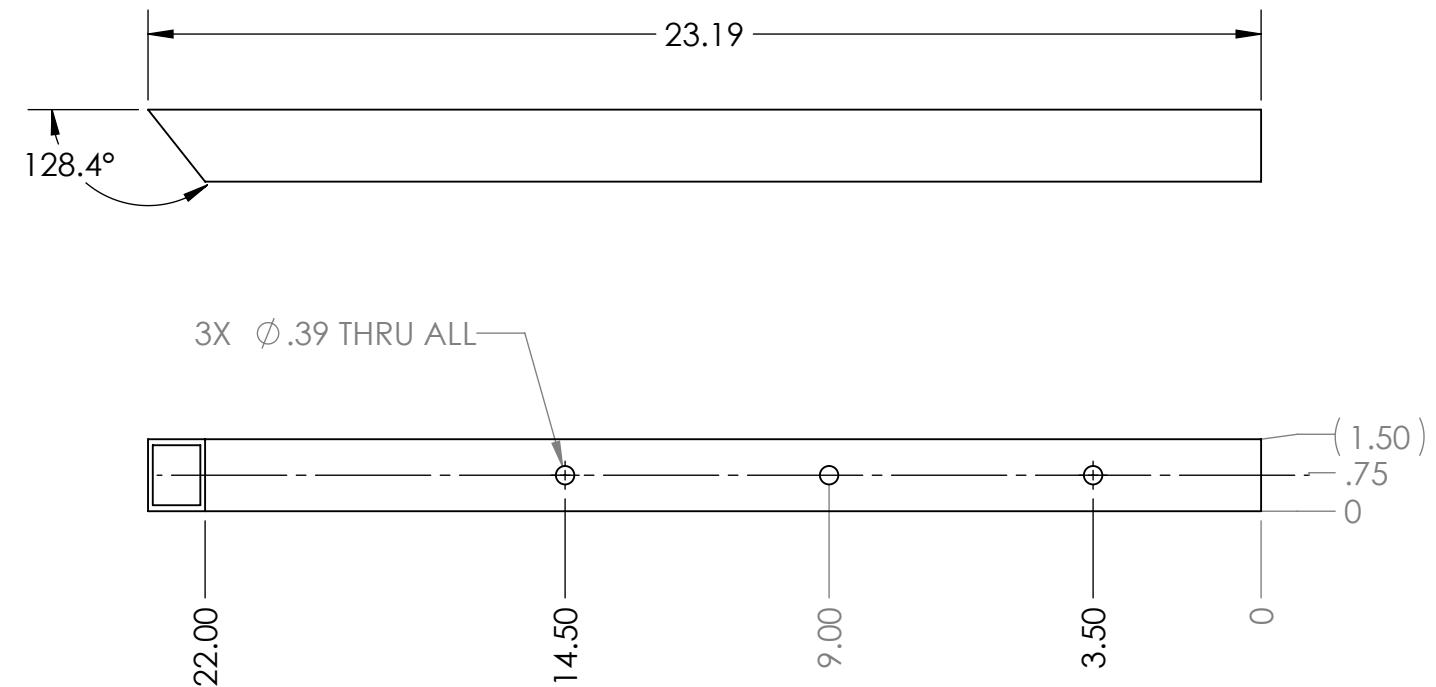
2

1

B



A



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			CHECKED	
			ENG APPR.	
			MFG APPR.	
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.	
		MATERIAL	COMMENTS:	
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Cargo Ship Front Frame

**SIZE** DWG. NO. **B** GE-19074 **REV** **C**

SCALE: 1:4 WEIGHT: SHEET 2 OF 3

4

3

2

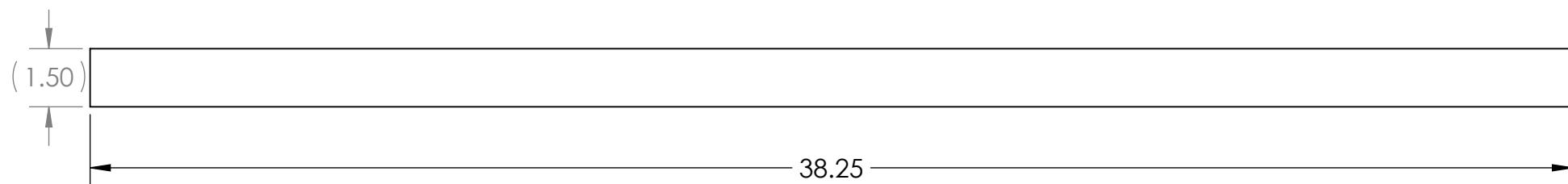
1

4

3

2

1



B

B



Item 1  
Material: 1.5" x .125" thk. Square Tubing, 6061 Aluminum  
QTY: 1

A

A

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Front Frame**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19074</b>	<b>C</b>
SCALE: 1:4	WEIGHT:	SHEET 3 OF 3

4

3

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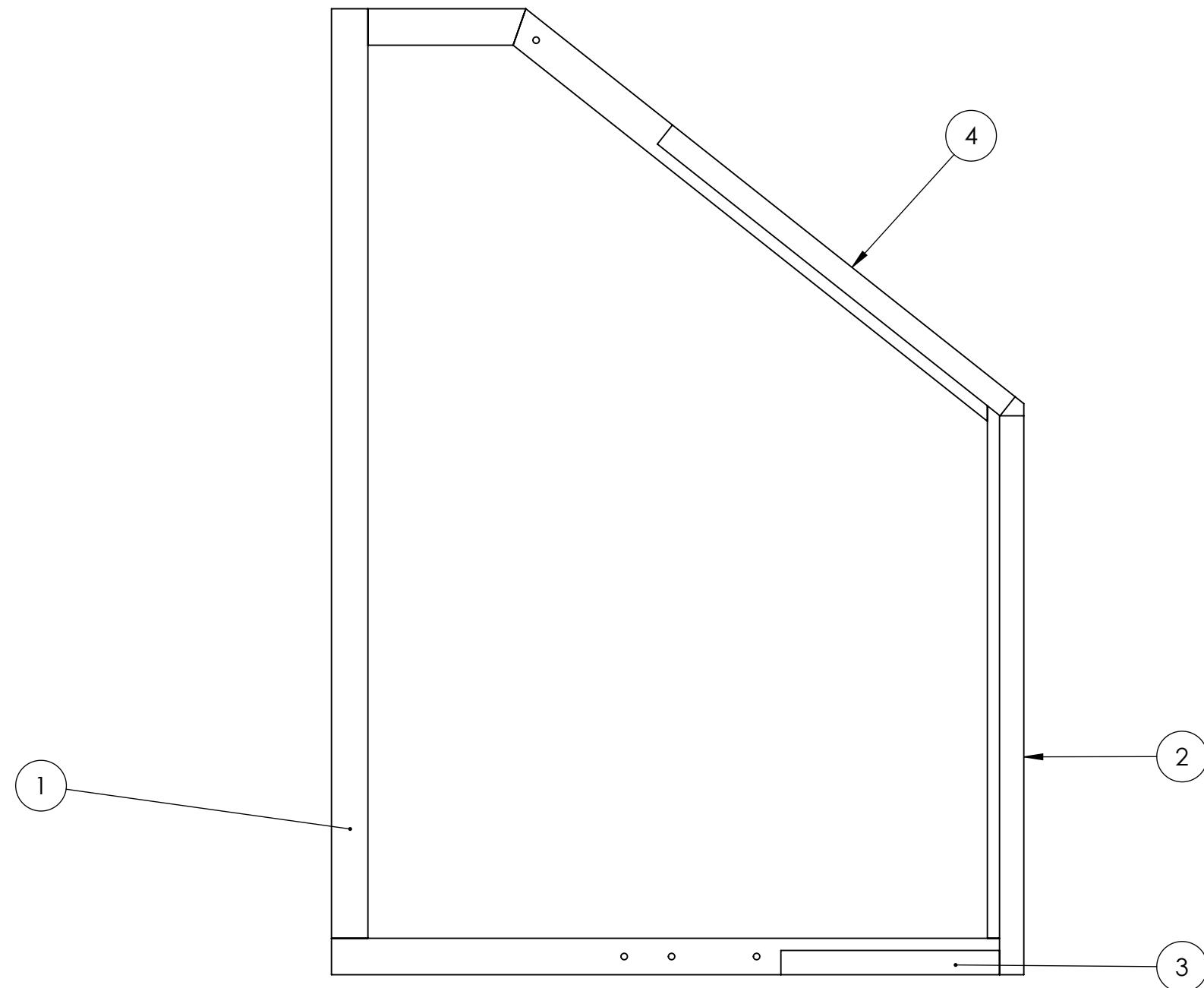
3

2

1

B

B



A

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19074	Cargo Ship Front Frame	1
2	Hook_1_23	1" Hook, 23" Long	1
3	Hook_1_9	1" x 9" Hook, Adhesive Backed	1
4	Hook_1_18	1" x 18" Hook, Adhesive Backed	1

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		DIMENSIONS ARE IN INCHES	
		TOLERANCES:	
		FRACTIONAL: ±1/16	
		ANGULAR: MACH ±1° BEND ±1°	
		TWO PLACE DECIMAL ±.01	
		THREE PLACE DECIMAL ±.001	
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS: _____
		MATERIAL	
NEXT ASSY	USED ON	FINISH	
APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** GE-19074, with Hook

**SIZE** DWG. NO. **REV**  
**B** GE-19074-Assembly

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

3

2

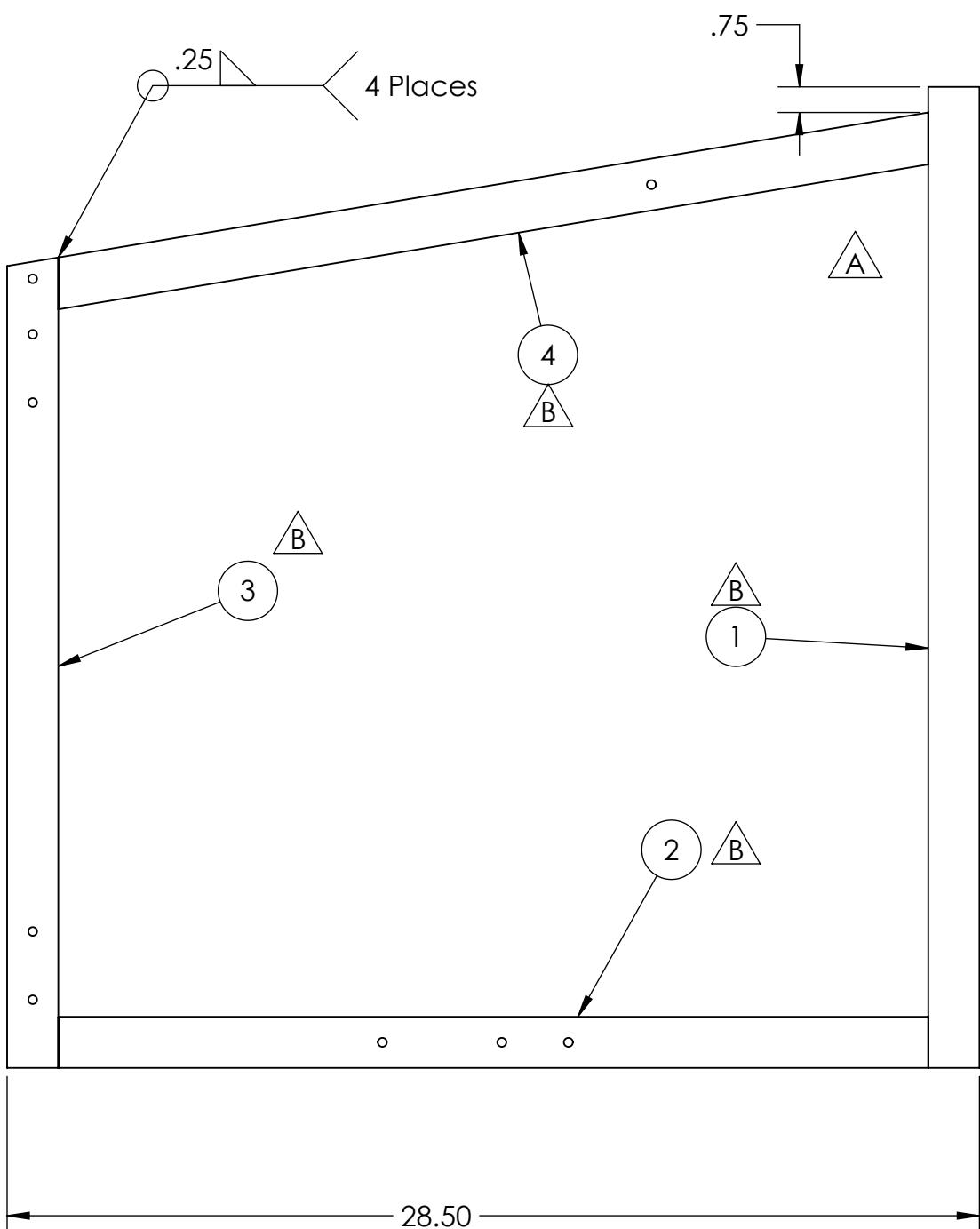
1

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1



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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
B3	A	Redrawn and redesigned	10/10/2018	DAF
A2, A3, B3, B4	B	Renumbered and added material table	10/10/2018	DAF
2-B1	C	Corrected slot size from .26 x .38 to .26 x .5	11/15/2018	JRF
2-B1	D	Added a THRU ALL note to slot	11/15/2018	JRF

ITEM NO.	QTY.	DESCRIPTION	LENGTH
1	1	1.5" x .125" thk Square Tubing, 6061 Aluminum	28.75
2	1	1.5" x .125" thk Square Tubing, 6061 Aluminum	25.5
3	1	1.5" x .125" thk Square Tubing, 6061 Aluminum	23.75
4	1	1.5" x .125" thk Square Tubing, 6061 Aluminum	26.1

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES: FRACTIONAL $\pm 1/16$	CHECKED	
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	ENG APPR.	
		TWO PLACE DECIMAL $\pm .01$	MFG APPR.	
		THREE PLACE DECIMAL $\pm .001$	Q.A.	
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:	
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Cargo Ship Nose Side**

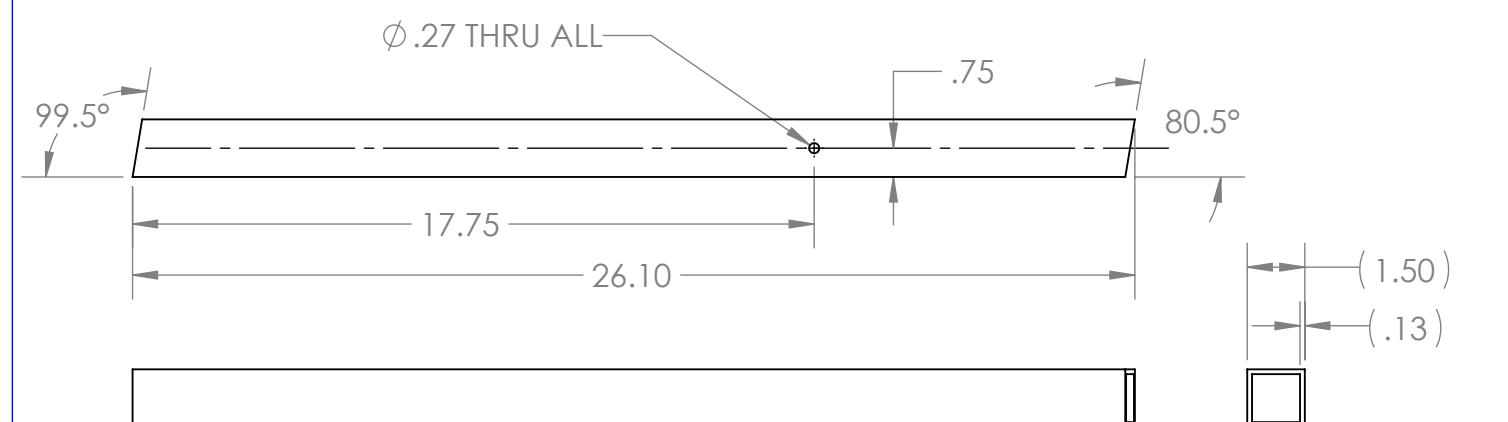
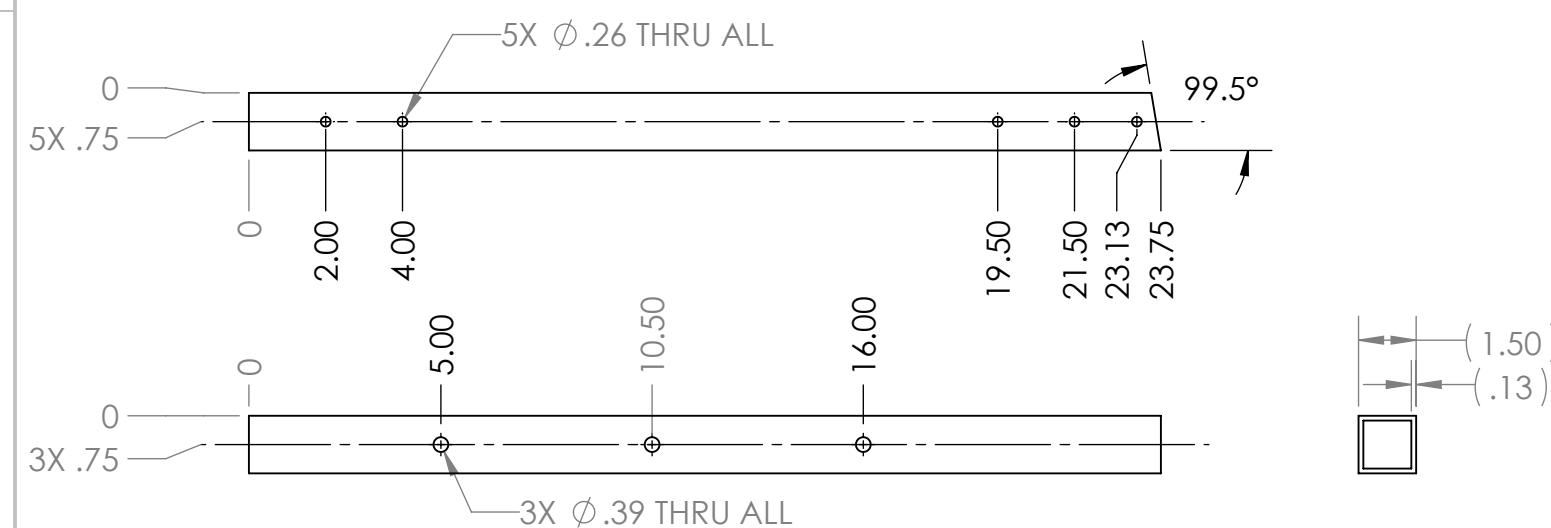
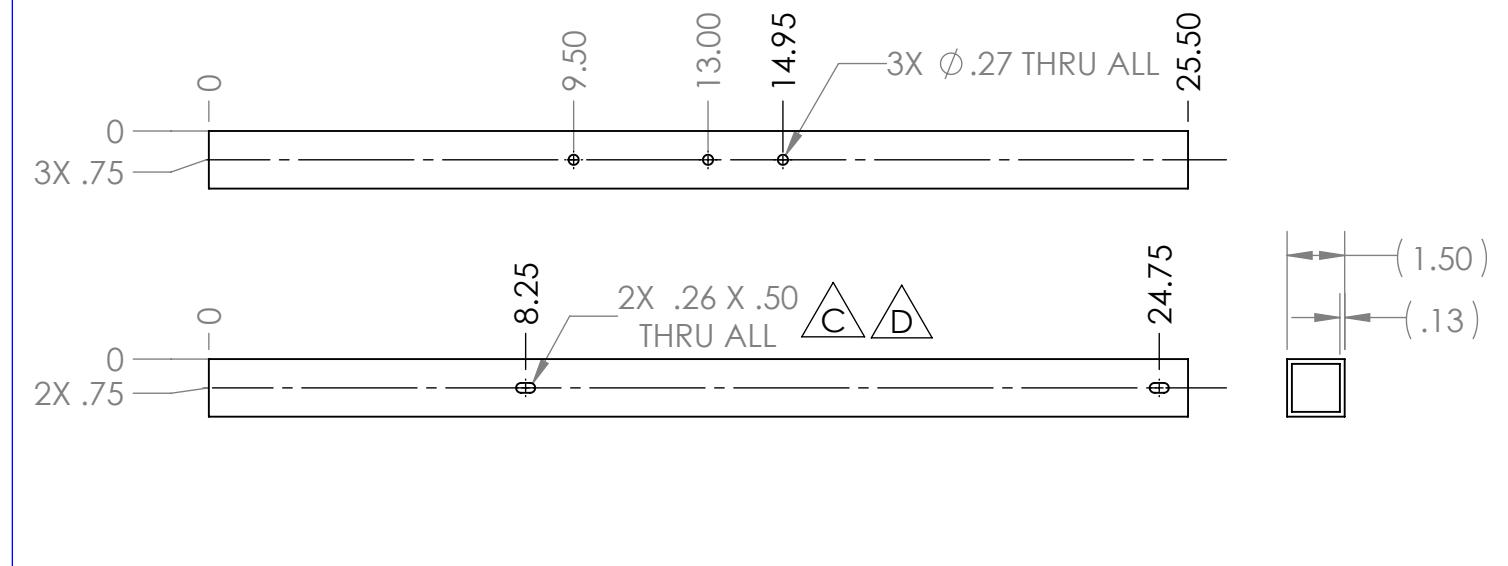
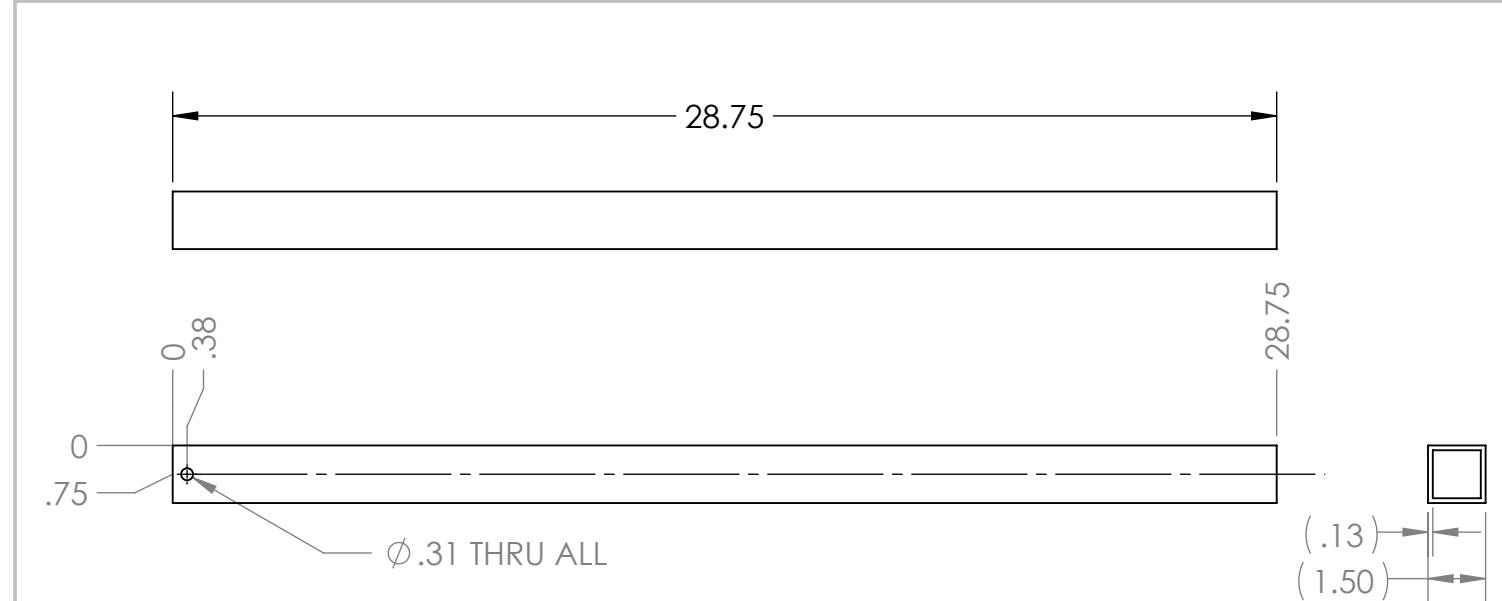
<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19075</b>	<b>D</b>
SCALE: 1:5	WEIGHT:	SHEET 1 OF 2

4

3

2

1



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	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	MATERIAL		
		FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Nose Side**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19075</b>	<b>D</b>
SCALE: 1:5	WEIGHT:	SHEET 2 OF 2

4

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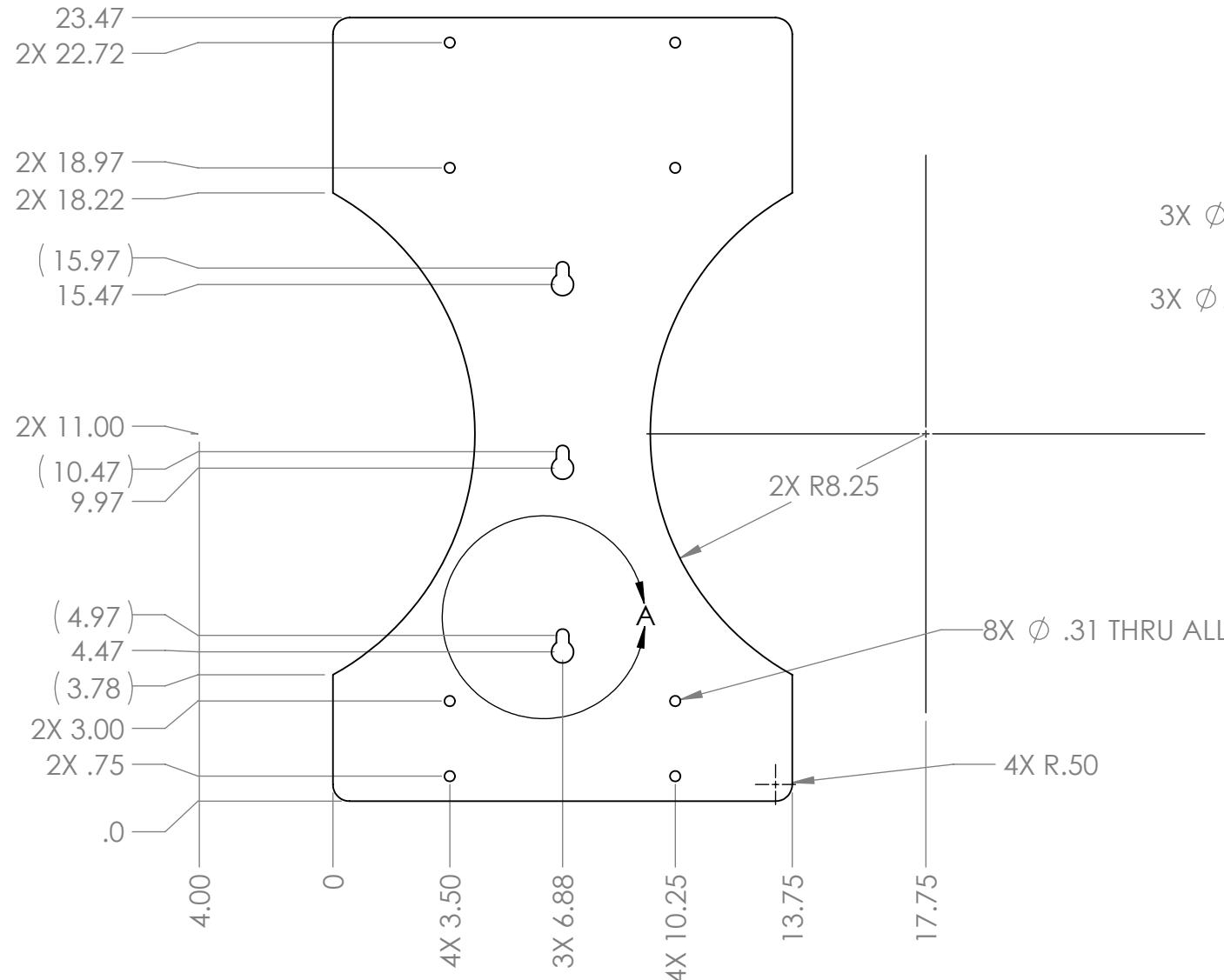
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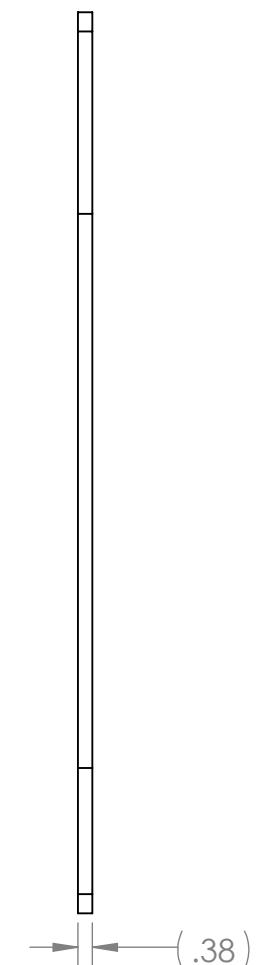
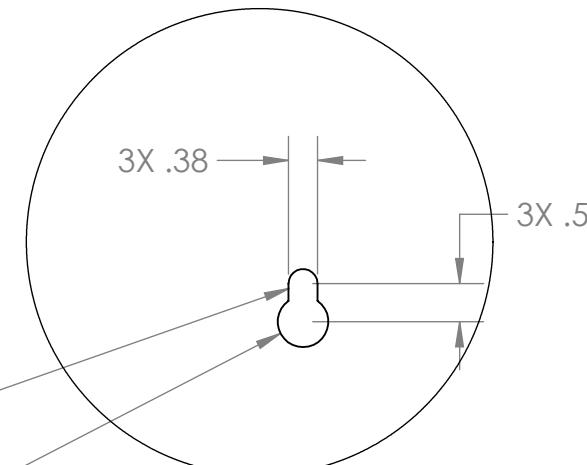
1

B

B



DETAIL A  
SCALE 2 : 5



A

A

Part Number	Color
GE-19076-RED	RED
GE-19076-BLU	BLUE

Note:

Material: 3/8" Thick Polycarbonate Sheet Clear  
Finish: Apply red or blue screen print to one side  
Tag or Label With Part Number  
Remove sharp edges and burrs

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	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
USED ON	MATERIAL			
APPLICATION	FINISH			
	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Cargo Ship Panel Plastic Full

SIZE DWG. NO. REV  
**B GE-19076 B**

SCALE: 1:5 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

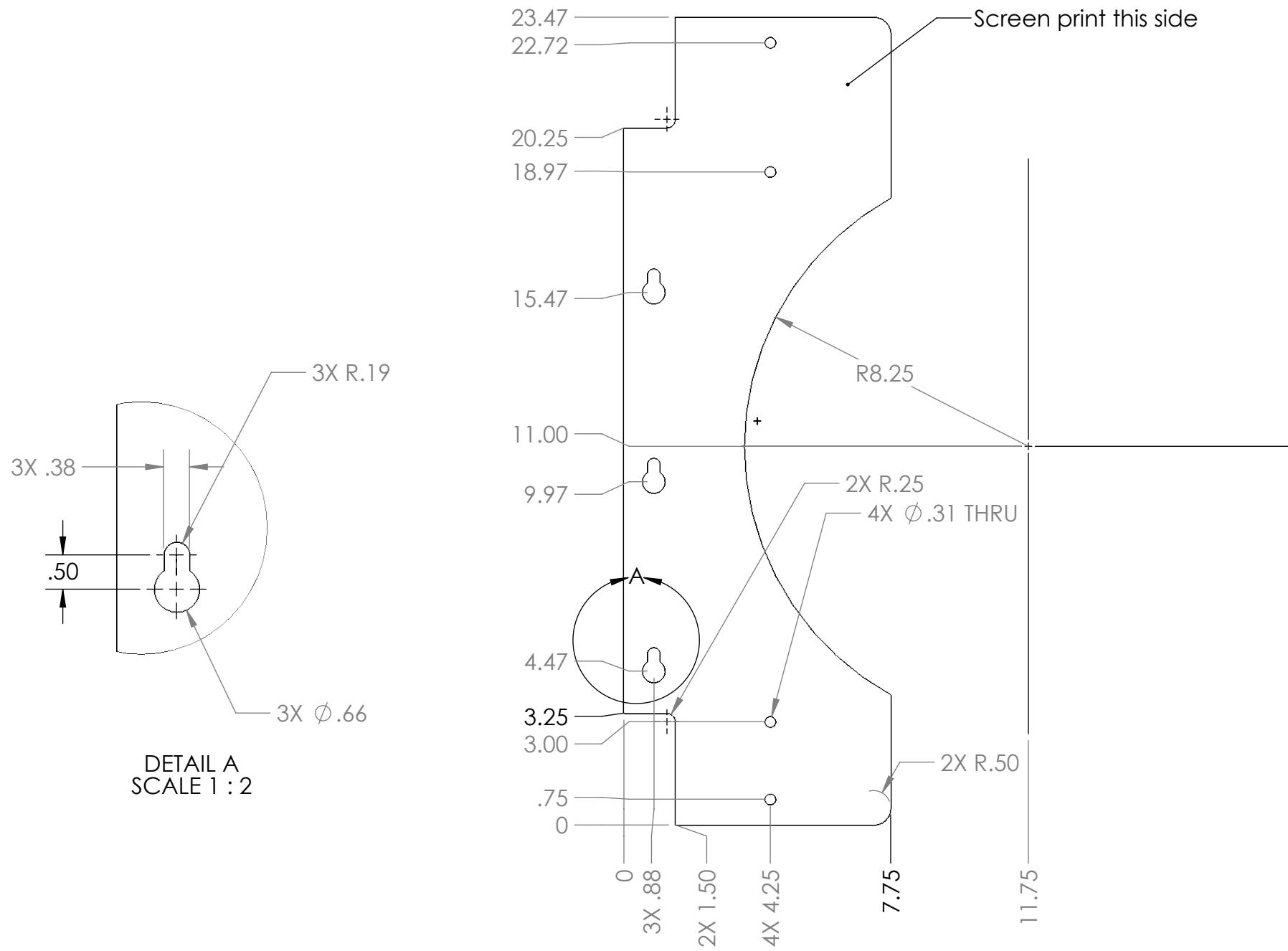
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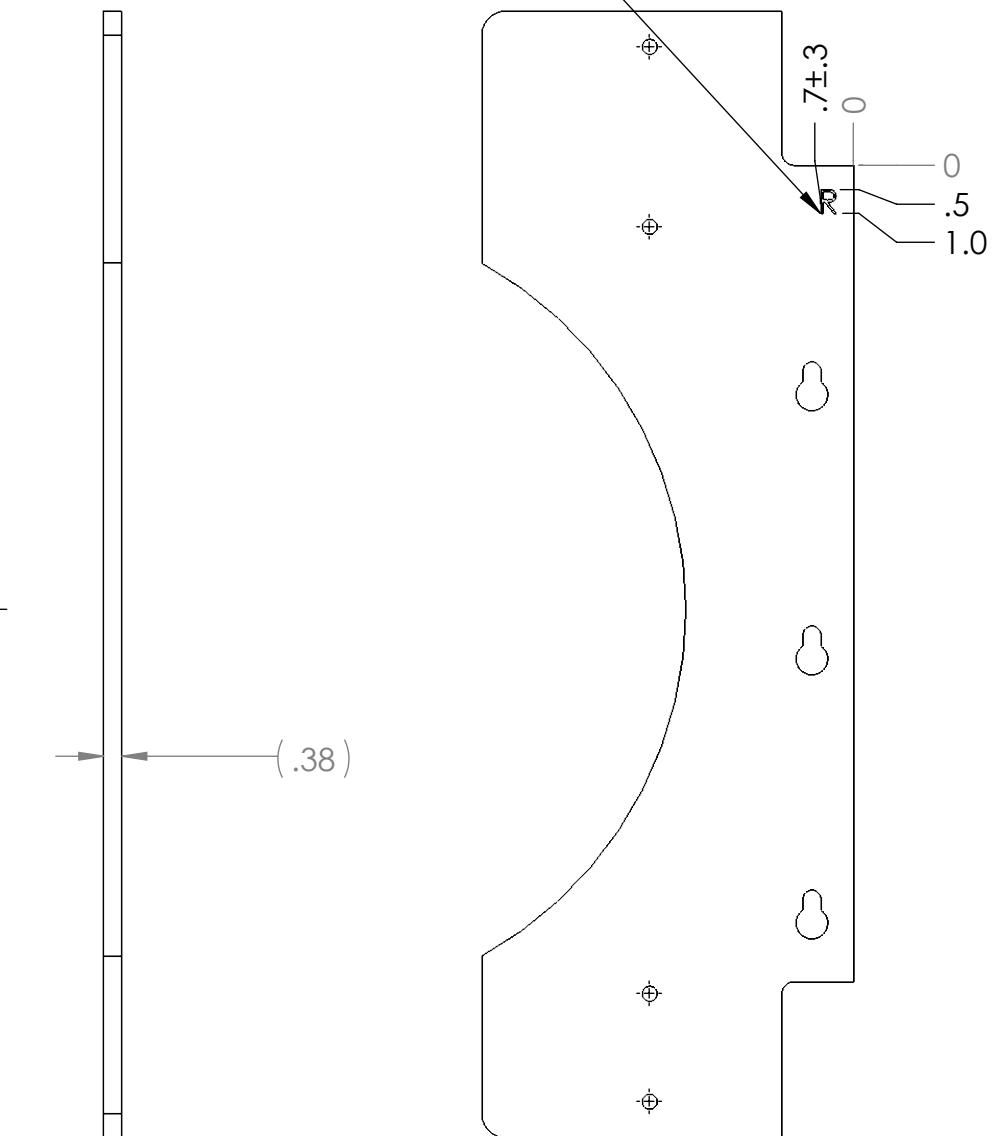
1

B

B



Engrave "R" in  
specified location



Part Number	Color
GE-19077-RED	RED
GE-19077-BLU	BLUE

Note:  
Material: 3/8" Thick Polycarbonate Sheet Clear  
Finish: Apply red or blue screen print to indicated side  
Tag or Label With Part Number  
Remove sharp edges and burrs

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		DIMENSIONS ARE IN INCHES		
		TOLERANCES:		
		FRACTIONAL: ±1/16		
		ANGULAR: MACH ±1° BEND ±1°		
		TWO PLACE DECIMAL: ±.01		
		THREE PLACE DECIMAL: ±.001		
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
			SCALE: 1:4	WEIGHT:
			SHEET 1 OF 1	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Panel Plastic Right**

**B** **GE-19077** **A**

4

3

2

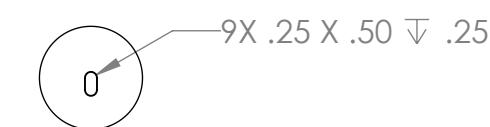
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4

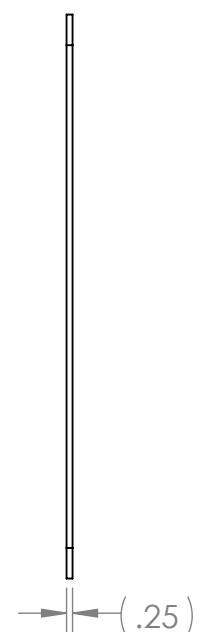
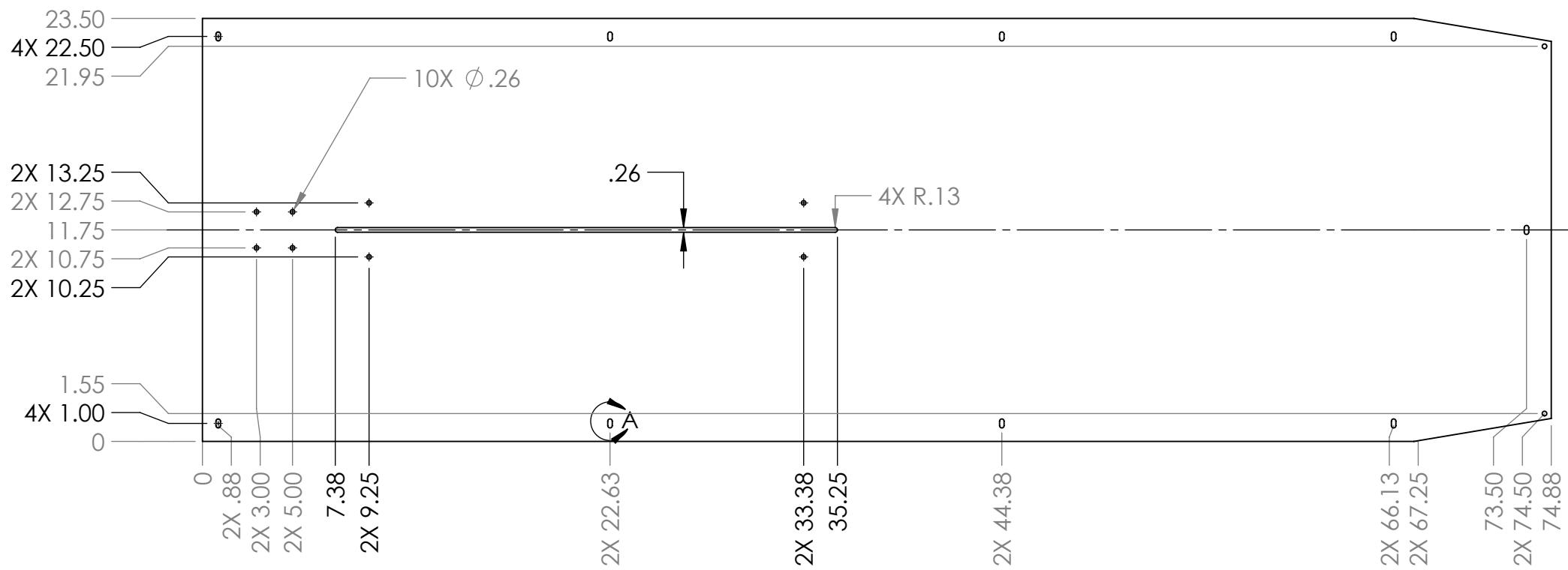
3

2

1



DETAIL A  
SCALE 1 : 4



B

B

A

A

Part Number	Color
GE-19078-RED	RED
GE-19078-BLU	BLUE

Note:  
Material: 1/4" Thick Polycarbonate Sheet Clear  
Finish: Apply red or blue screen print to one side  
Tag and Label With Part Number  
Remove Sharp Edges and Burrs

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**Cargo Ship Top Plastic**

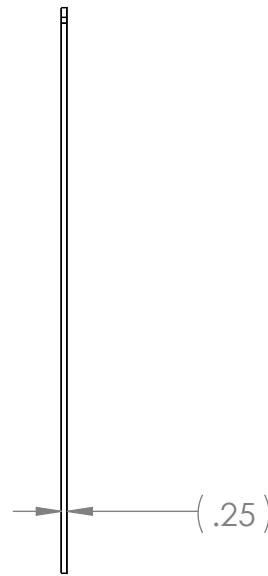
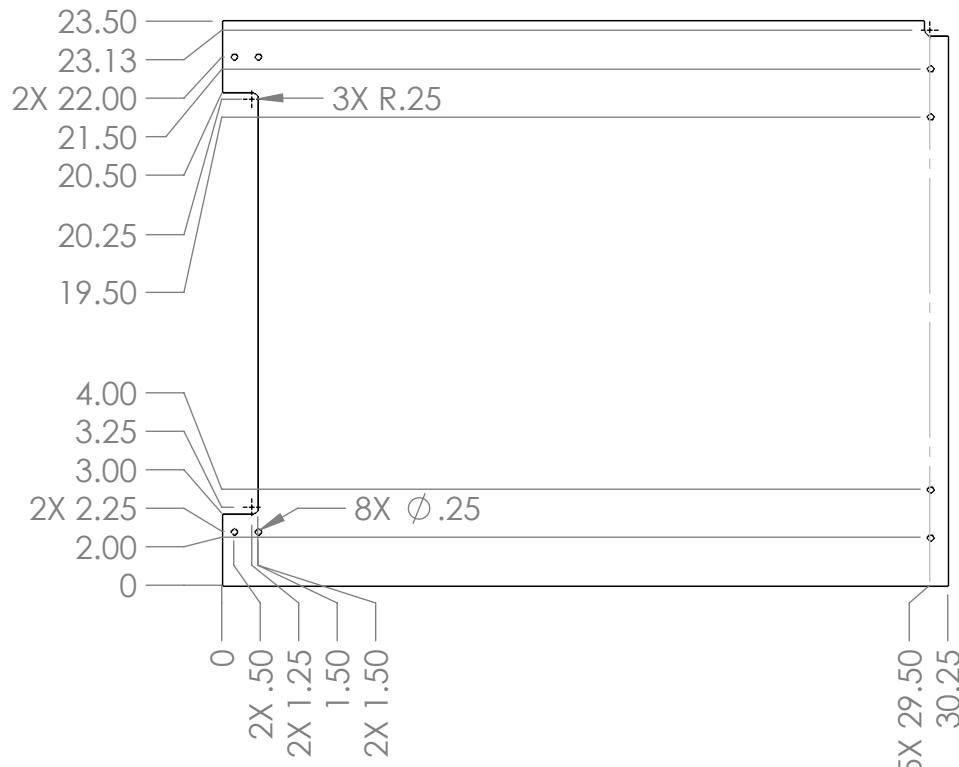
SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19078</b>	<b>B</b>
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

2

1

B

B



Note:  
 Material: 1/4" Thick Polycarbonate Sheet Clear  
 Finish: Vinyl applied to plastic  
 Tag or Label With Part Number  
 Remove sharp edges and burrs

		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE		
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$						
		INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL		CHECKED	ENG APPR.	MFG APPR.		
NEXT ASSY	USED ON	FINISH						
APPLICATION		DO NOT SCALE DRAWING		COMMENTS:				
FIRST	SOLIDWORKS	Modeling Solutions Partner						
TITLE: Cargo Ship Front Side Plastic								
SIZE	DWG. NO.	REV						
A	GE-19079	A						
SCALE: 1:8 WEIGHT: SHEET 1 OF 1								

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2

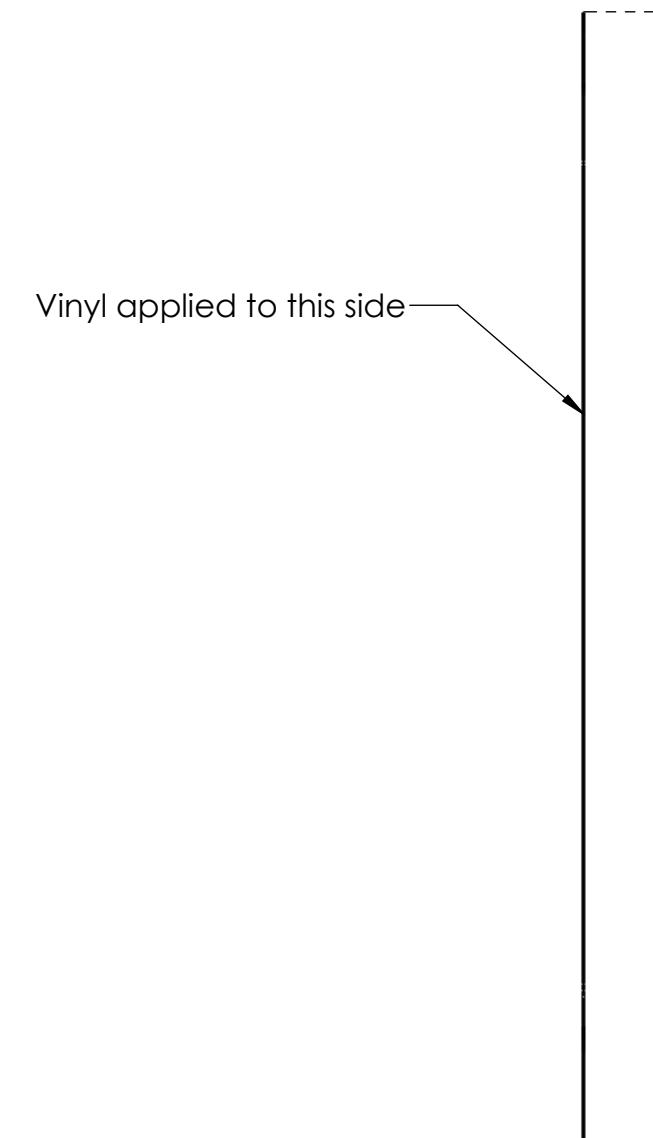
1

4

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2

1



B

B

A

A

Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19079	Cargo Ship Front Side Plastic	1
2	GE-19079-Left-Blue-Vinyl	GE-19079 Left Blue Vinyl	1

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		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$			
		THREE PLACE DECIMAL $\pm .001$			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
	NEXT ASSY	USED ON	FINISH		
	APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Front Side Plastic, Left Blue**

SIZE **B** DWG. NO. **GE-19079-Left-Blue** REV **1**

SCALE: 1:4 WEIGHT: **1** SHEET 1 OF 1

4

3

2

1



Vinyl applied to this side



Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19079	Cargo Ship Front Side Plastic	1
2	GE-19079-Left-Red-Vinyl	GE-19079 Left Red Vinyl	1

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			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
	NEXT ASSY	USED ON	FINISH		
	APPLICATION		DO NOT SCALE DRAWING		
SIZE	DWG. NO.	REV			
<b>B</b>	GE-19079-Left-Red				
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1			

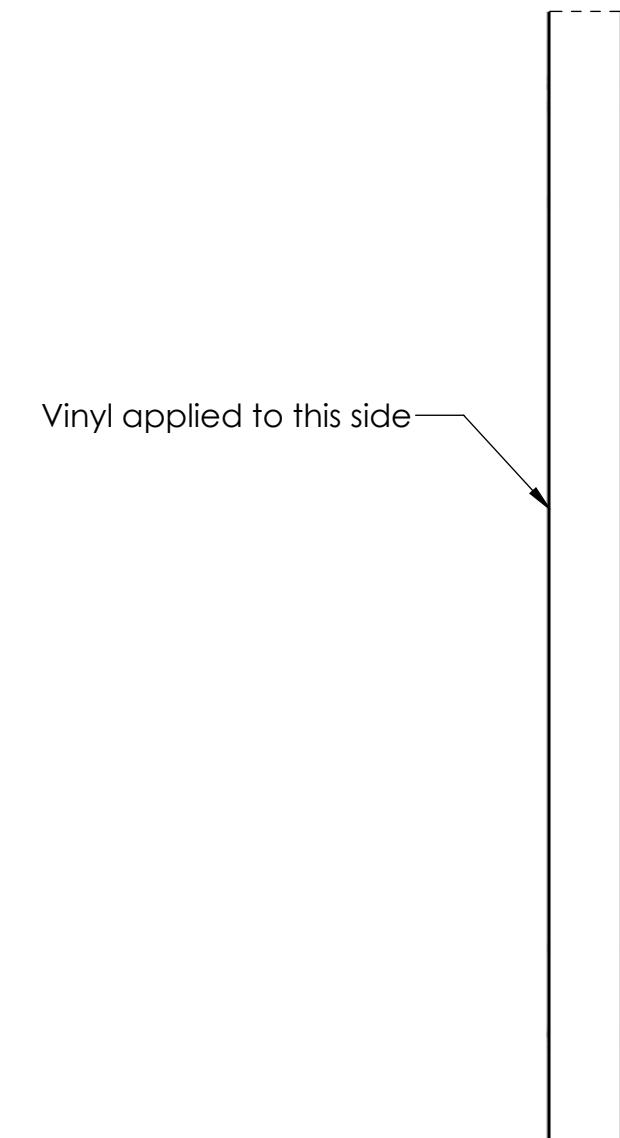
**FIRST**  
**ROBOTICS**  
**COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner  
TITLE: Cargo Ship Front Side Plastic, Left Red  
SIZE: DWG. NO. REV  
**B** GE-19079-Left-Red  
SCALE: 1:4 WEIGHT: SHEET 1 OF 1

4

3

2

1



B

B

A

A

Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19079	Cargo Ship Front Side Plastic	1
2	GE-19079-Right-Blue-Vinyl	GE-19079 Right Blue Vinyl	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Cargo Ship Front Side Plastic Right Blue

**SIZE** DWG. NO. REV  
**B** GE-19079-Right-Blue

SCALE: 1:4 WEIGHT: SHEET 1 OF 1

4

3

2

1



Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19079	Cargo Ship Front Side Plastic	1
2	GE-19079-Right-Red-Vinyl	GE-19079 Right Red Vinyl	1

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		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Cargo Ship Front Side Plastic, Right Red

**SIZE** DWG. NO. REV  
**B** GE-19079-Right-Red

SCALE: 1:4 WEIGHT: SHEET 1 OF 1

4

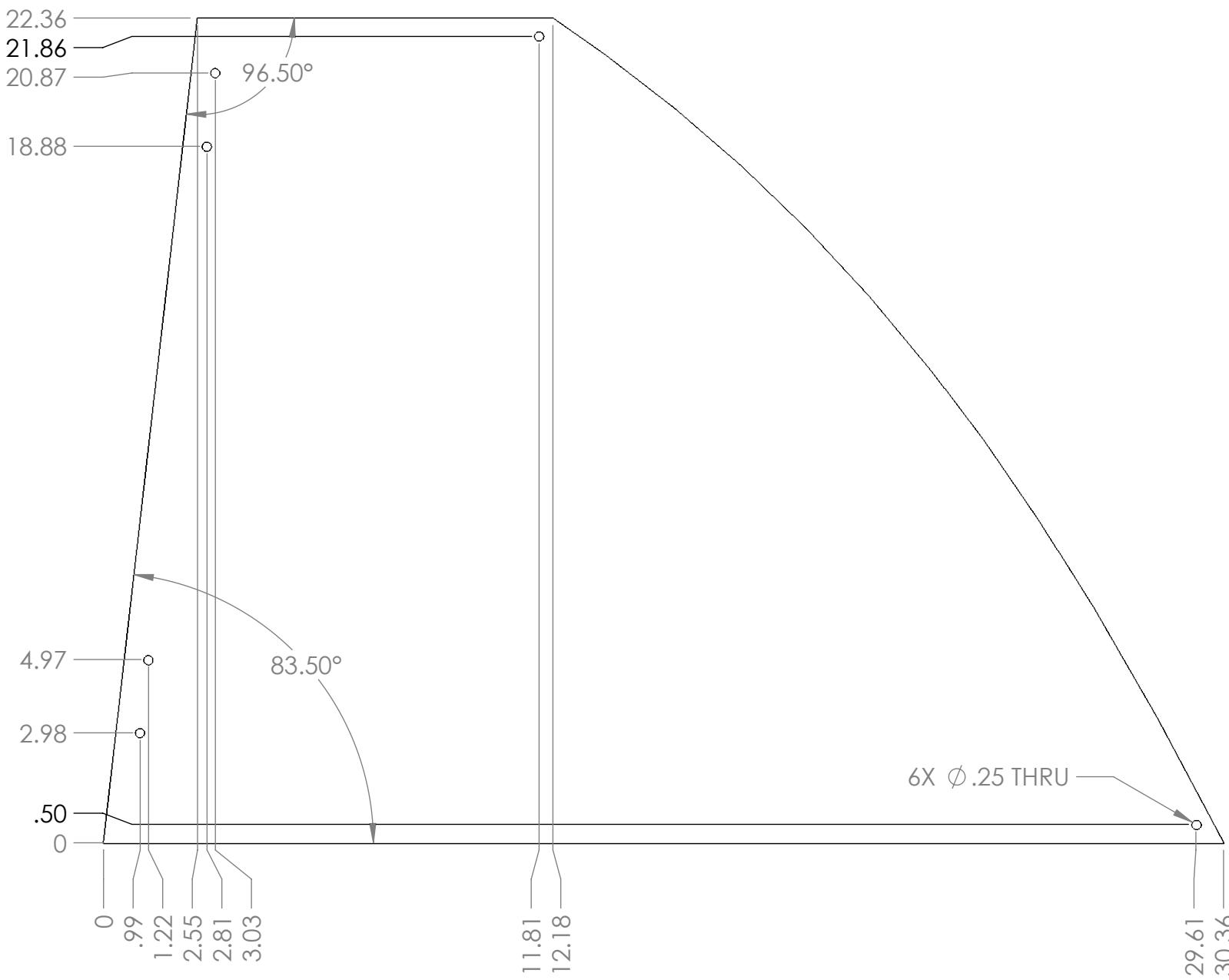
3

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Note:  
 Material: 1/4" Thick Polycarbonate Sheet Clear  
 Finish: Vinyl applied to plastic  
 Tag or Label With Part Number  
 Remove sharp edges and burrs

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19080</b>			
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1		



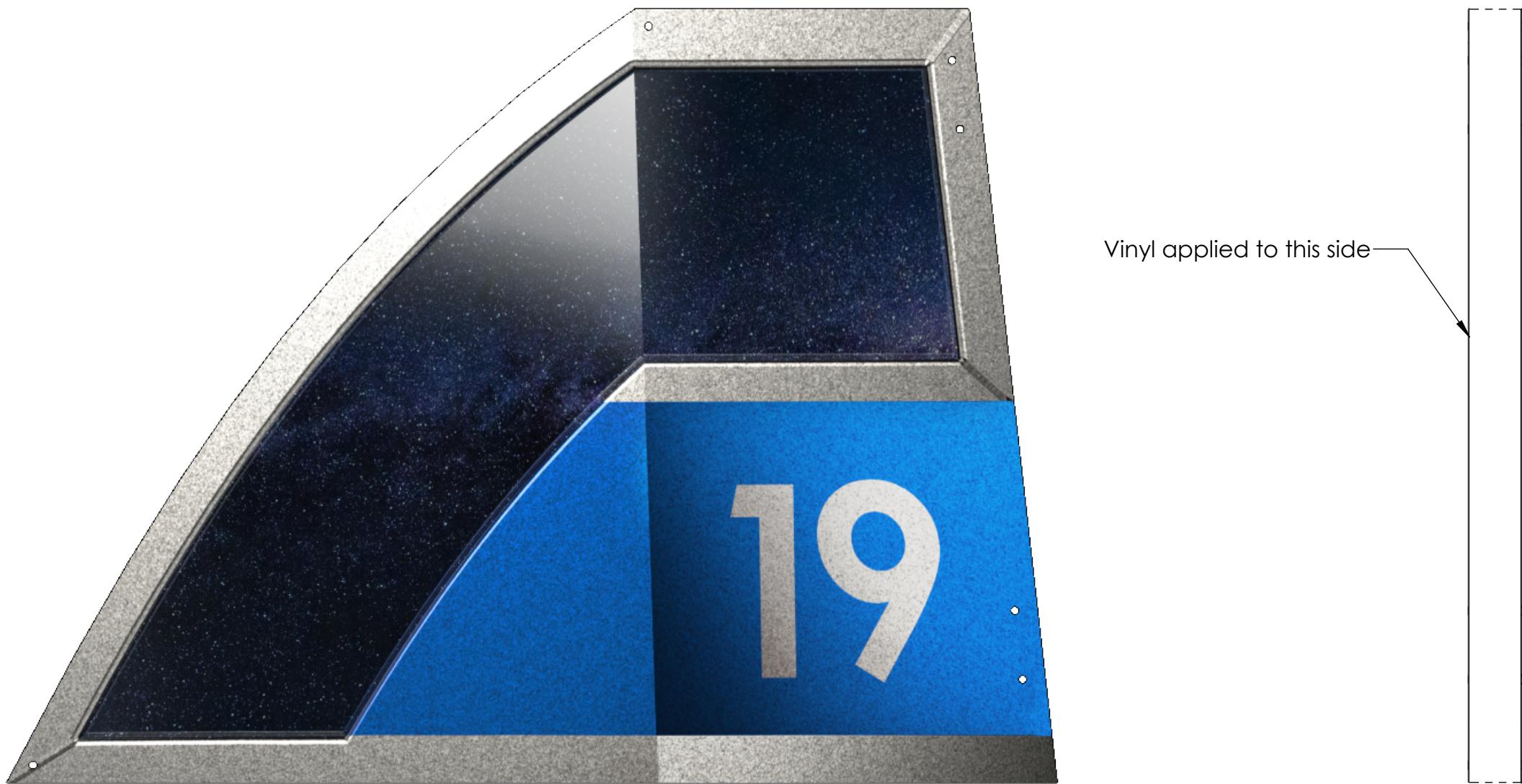
# Cargo Ship Front Top Plastic

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Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19080	Cargo Ship Front Top Plastic	1
2	GE-19080-Left-Blue-Vinyl	GE-19080 Left Blue Vinyl	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Front  
Top Plastic Left Blue**

**SIZE** DWG. NO. REV  
**B** GE-19080-Left-Blue

SCALE: 1:4 WEIGHT: SHEET 1 OF 1

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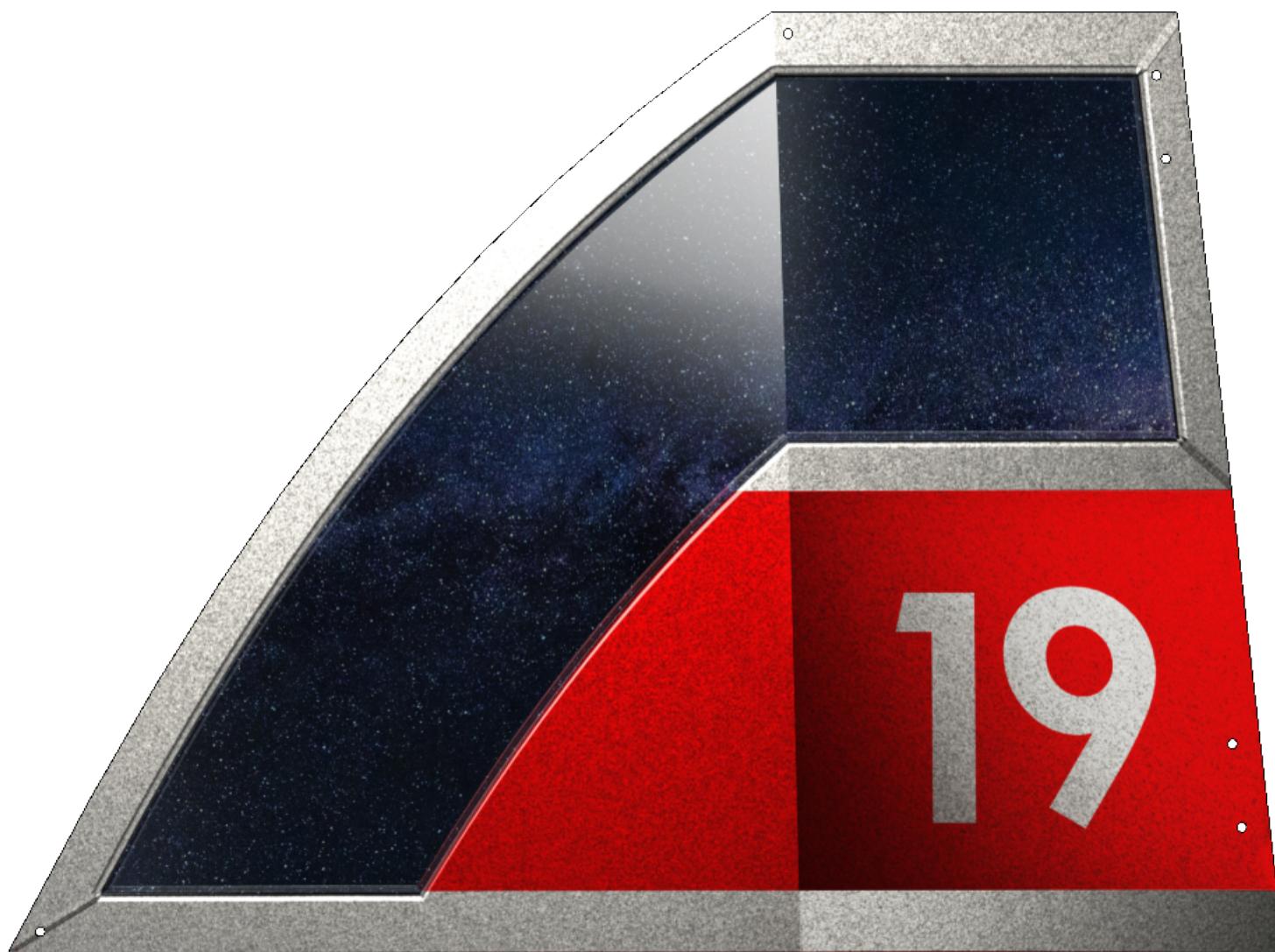
1

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Vinyl applied to this side

Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19080	Cargo Ship Front Top Plastic	1
2	GE-19080-Left-Red-Vinyl	GE-19080 Left Red Vinyl	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST</b> <b>ROBOTICS</b> <b>COMPETITION</b>	<b>TITLE:</b>  <b>Cargo Ship Front</b> <b>Top Plastic Left Red</b>
		DIMENSIONS ARE IN INCHES	DRAWN				
		TOLERANCES:	CHECKED				
		FRACTIONAL $\pm 1/16$	ENG APPR.				
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.				
		TWO PLACE DECIMAL $\pm .01$	Q.A.				
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:				
		INTERPRET GEOMETRIC TOLERANCING PER:					
		MATERIAL					
NEXT ASSY	USED ON	FINISH					
APPLICATION		DO NOT SCALE DRAWING					
			SIZE	DWG. NO.		REV	
			<b>B</b>	GE-19080-Left-Red			
			SCALE: 1:4	WEIGHT:	SHEET 1 OF 1		

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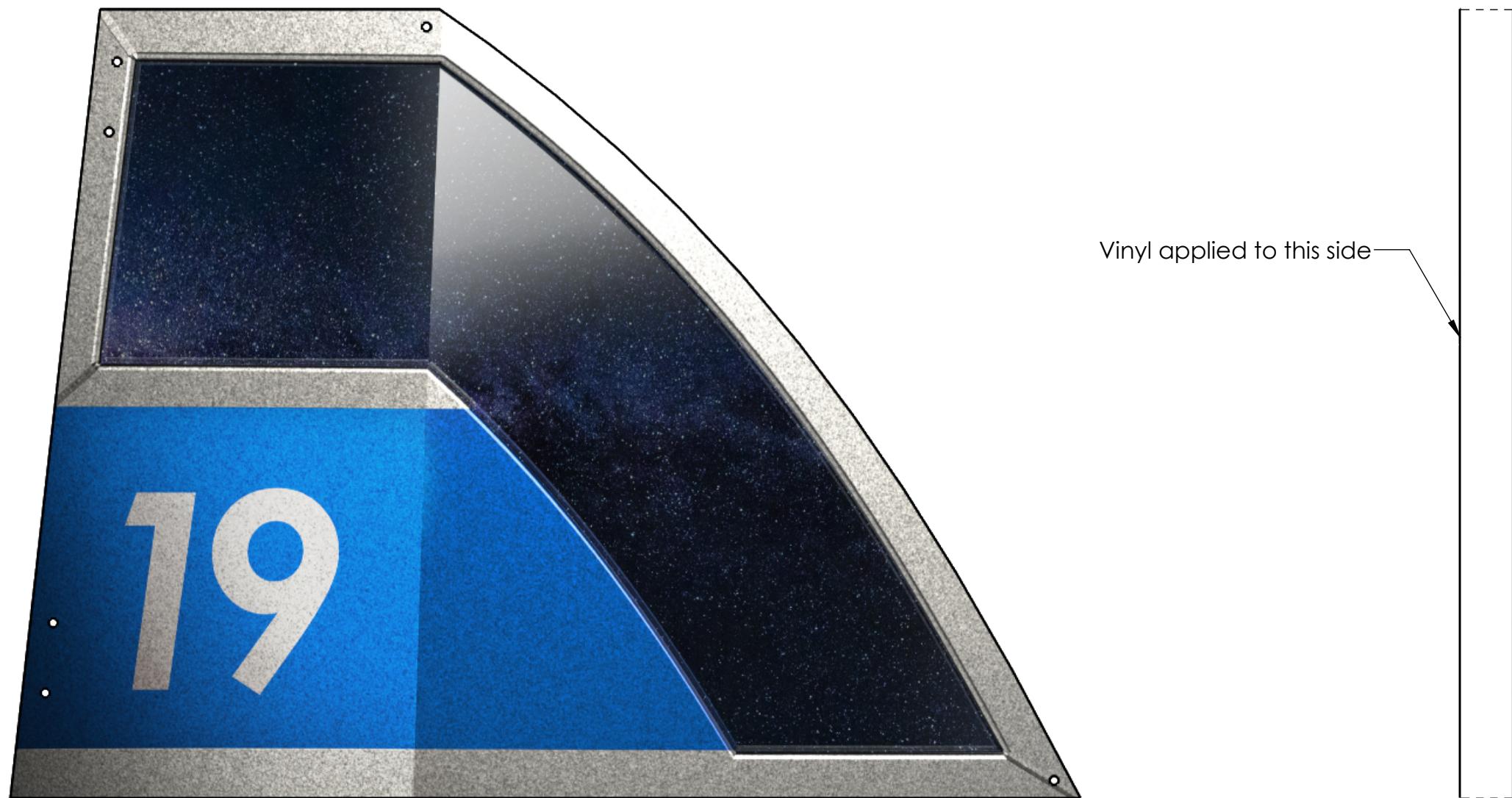
3

2

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Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19080	Cargo Ship Front Top Plastic	1
2	GE-19080-Right-Blue-Vinyl	GE-19080 Right Blue Vinyl	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
			MATERIAL	COMMENTS:	
			NEXT ASSY	USED ON	FINISH
			APPLICATION		DO NOT SCALE DRAWING

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Cargo Ship Front Top Plastic, Right Blue

SIZE DWG. NO. REV  
**B** GE-19080-Right-Blue

SCALE: 1:4 WEIGHT: SHEET 1 OF 1

4

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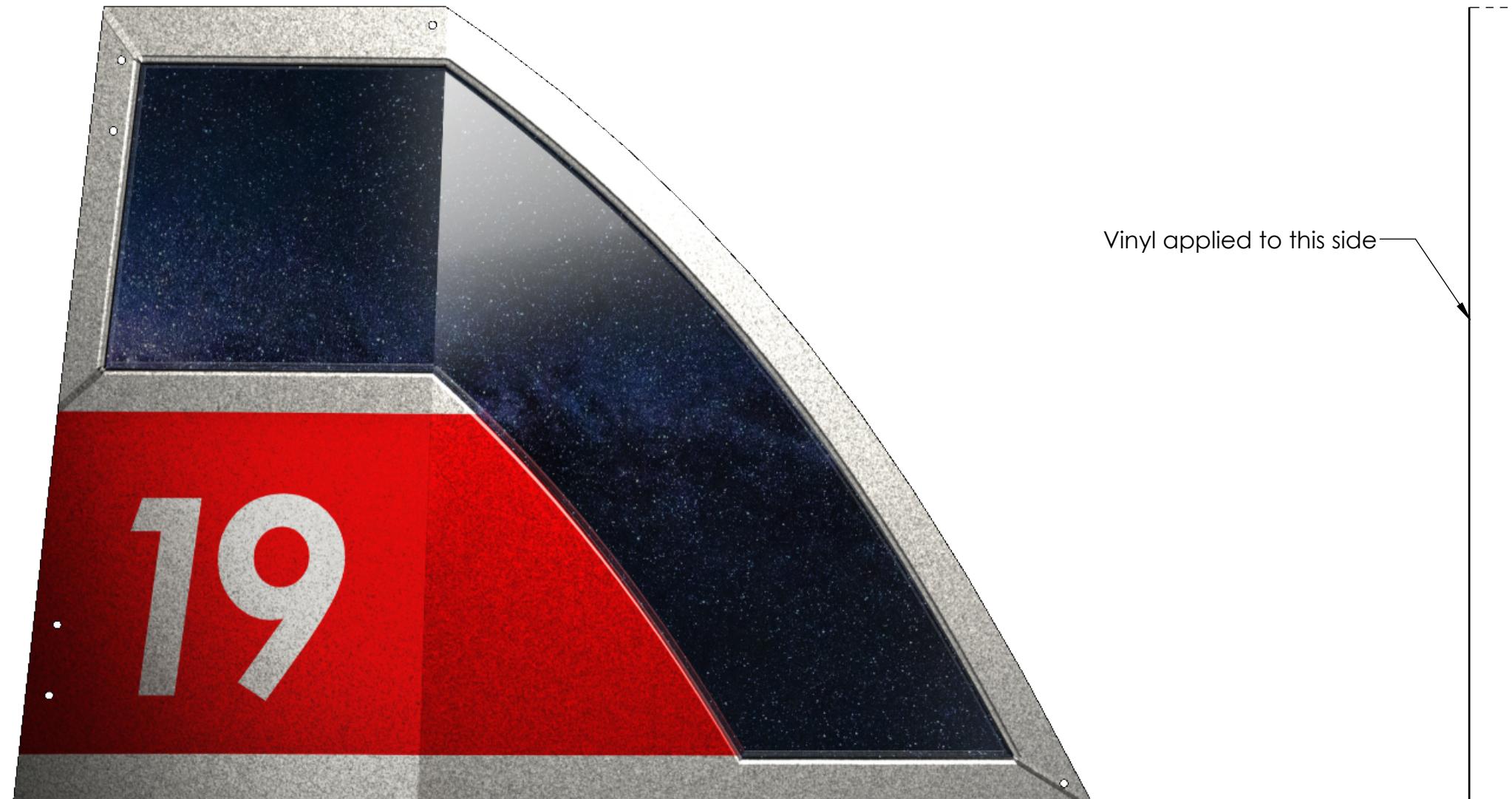
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Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19080	Cargo Ship Front Top Plastic	1
2	GE-19080-Right-Red-Vinyl	GE-19080 Right Red Vinyl	1

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		UNLESS OTHERWISE SPECIFIED:	NAME _____ DATE _____ DRAWN _____ CHECKED _____ ENG APPR. _____ MFG APPR. _____ Q.A. _____ COMMENTS: _____
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001	
		INTERPRET GEOMETRIC TOLERANCING PER:	
		MATERIAL	
		NEXT ASSY	
		USED ON	
		FINISH	
		APPLICATION	DO NOT SCALE DRAWING

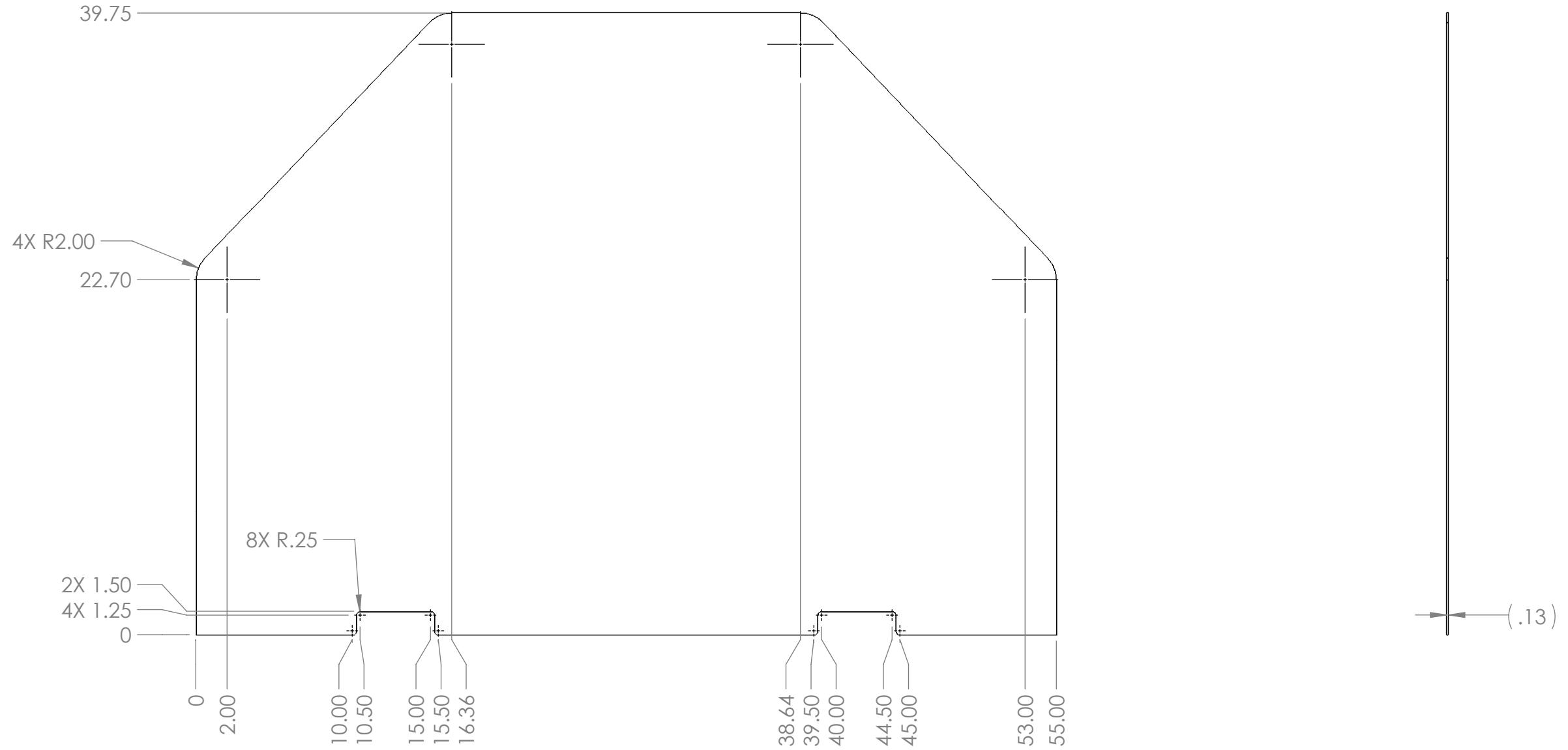
**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner  
TITLE: Cargo Ship Front  
Top Plastic Right  
Red  
SIZE DWG. NO. REV  
**B** GE-19080-Right-Red  
SCALE: 1:4 WEIGHT: SHEET 1 OF 1

4

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Note:  
Material: 1/8" Thick HDPE  
Tag or Label With Part Number  
Remove sharp edges and burrs

Part Number	Color
GE-19081-RED	RED
GE-19081-BLU	BLUE

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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN			
			CHECKED			
			ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
<span style="float: right;">SIZE    DWG. NO.    REV</span> <span style="font-size: 2em; float: right;">B    GE-19081    A</span> <span style="float: right;">SCALE: 1:8    WEIGHT:    SHEET 1 OF 1</span>						

4

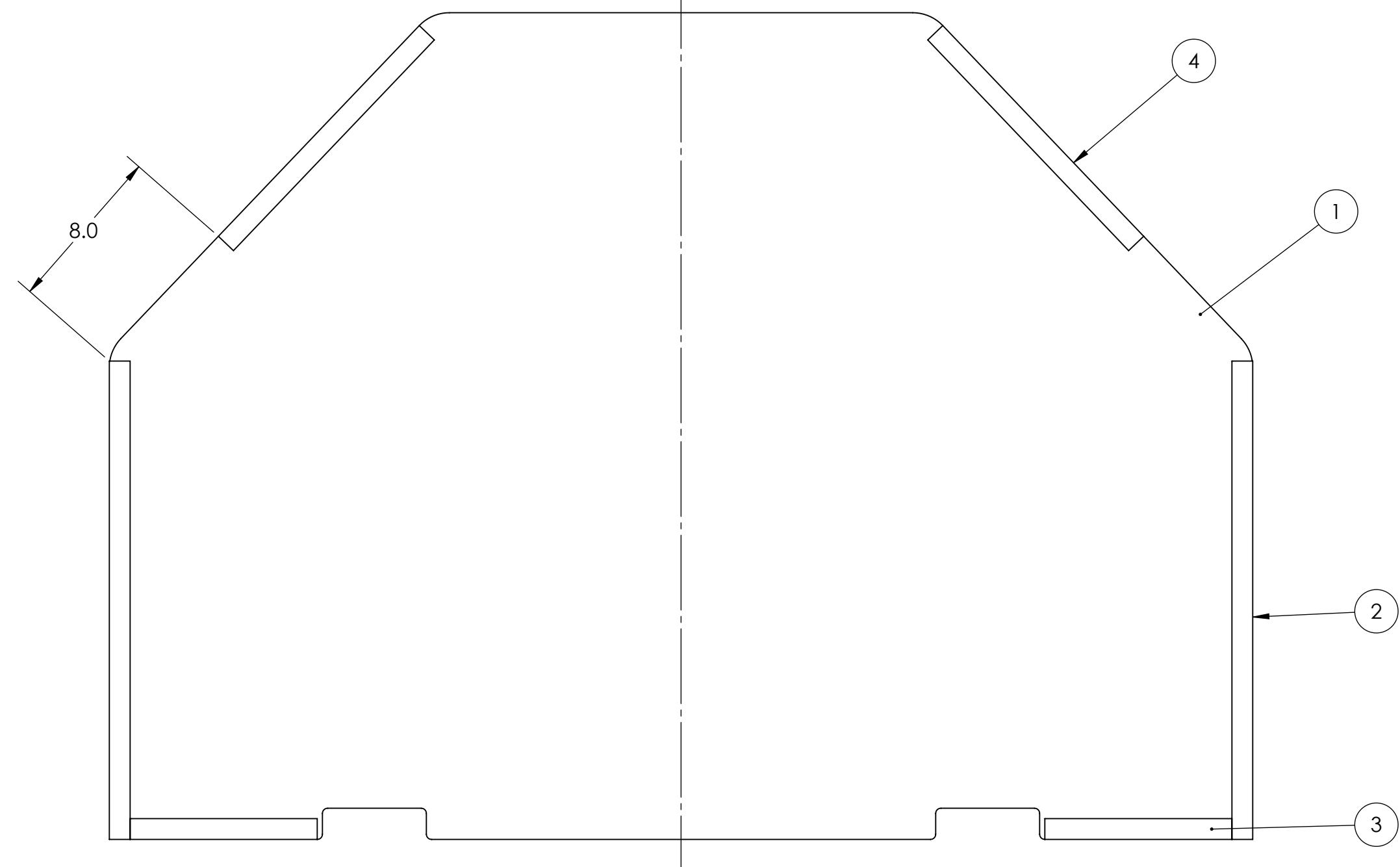
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## Notes:

1. Assembly exists in red and blue configurations.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	GE-19081	Cargo Ship Back Plastic	1
2	Loop_1_23	1" Loop, 23" Long	2
3	Loop_1_9	1" x 9" Loop, Adhesive Backed	2
4	Loop_1_14	1" x 14" Loop, Adhesive Backed	2

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
	APPLICATION	DO NOT SCALE DRAWING		
SIZE	DWG. NO.		REV	
<b>B</b>	GE-19081-Assembly			
SCALE: 1:8	WEIGHT:		SHEET 1 OF 1	

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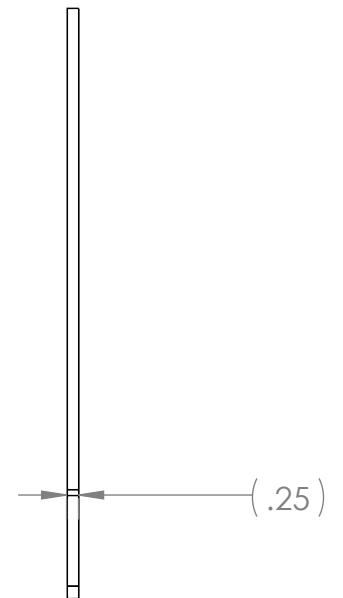
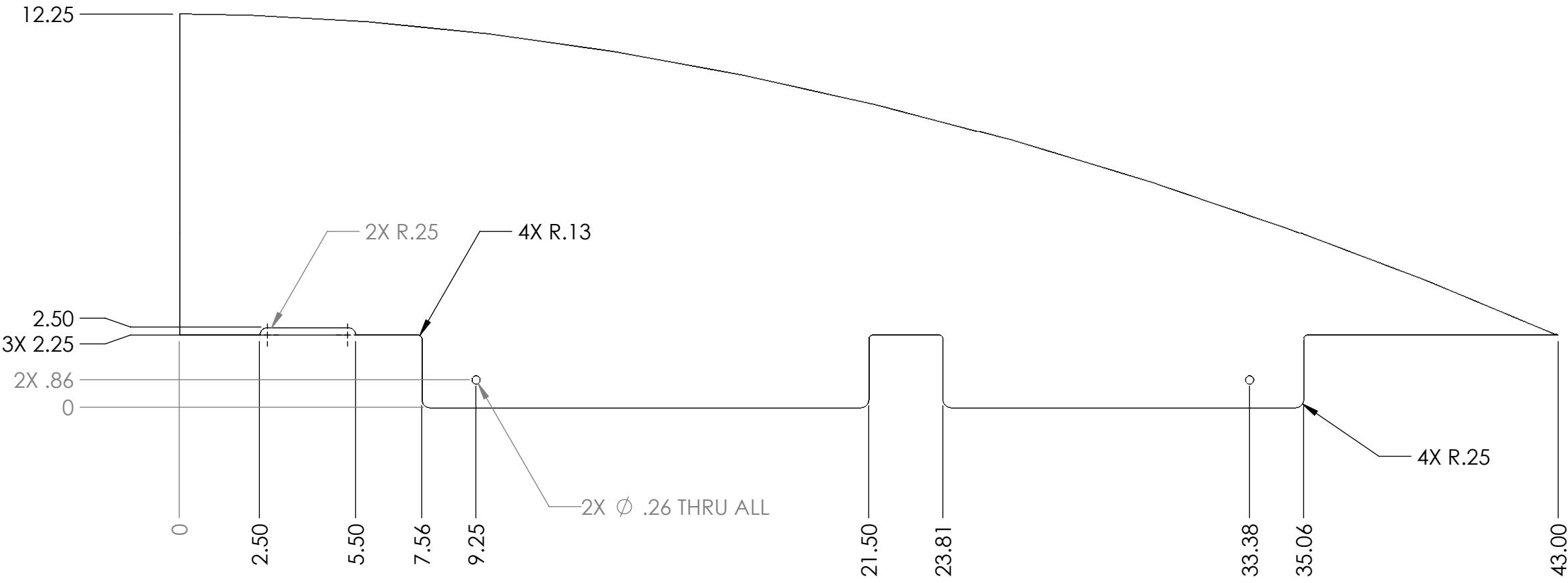
3

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## Notes:

Material: 1/4" Thick Clear Polycarbonate Sheet  
 Finish: Vinyl applied to plastic  
 Remove all sharp edges and burrs  
 Tag Or Label With Part Number

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
 Modeling Solutions Partner

**Cargo Ship Fin**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19082</b>	
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

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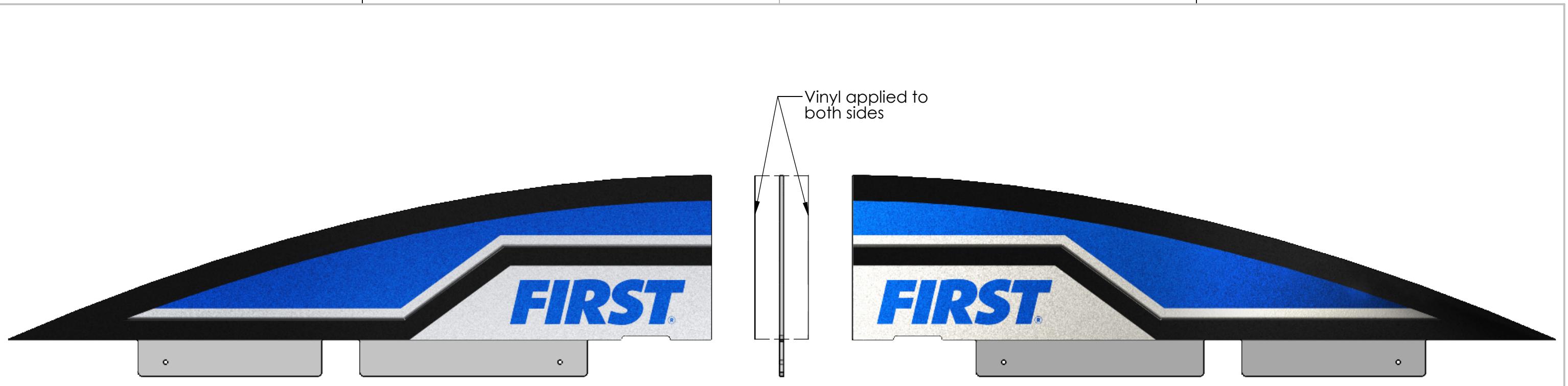
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Notes:  
Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19082	Cargo Ship Fin	1
2	GE-19082-Left-Blue-Vinyl	GE-19082 Blue Left Vinyl	1
3	GE-19082-Right-Blue-Vinyl	GE-19082 Blue Right Vinyl	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
			MATERIAL	COMMENTS:	
			FINISH		
NEXT ASSY	USED ON				
APPLICATION		DO NOT SCALE DRAWING			
SCALE: 1:6		WEIGHT:	SHEET 1 OF 1		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Fin, Blue**

**B** **GE-19082-Blue**

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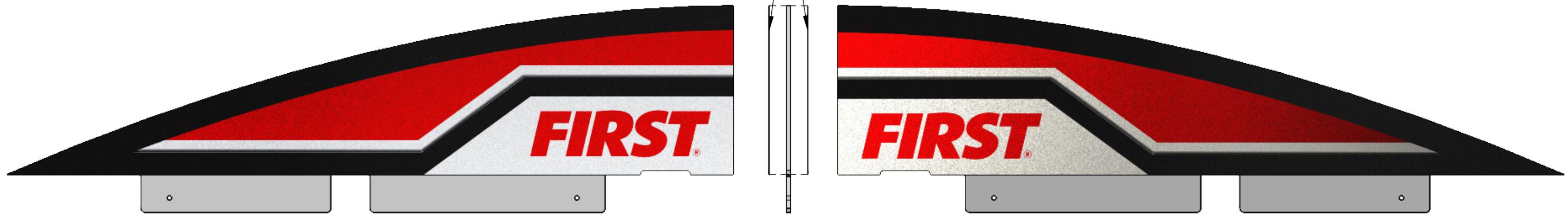
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## Notes:

Quantity per field: 1

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19082	Cargo Ship Fin	1
2	GE-19082-Left-Red-Vinyl	GE-19082 Left Red Vinyl	1
3	GE-19082-Right-Red-Vinyl	GE-19082 Right Red Vinyl	1

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:	
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**TITLE:** Cargo Ship Fin, Red

**SIZE** DWG. NO. **B** GE-19082-Red **REV**

SCALE: 1:6 WEIGHT: SHEET 1 OF 1

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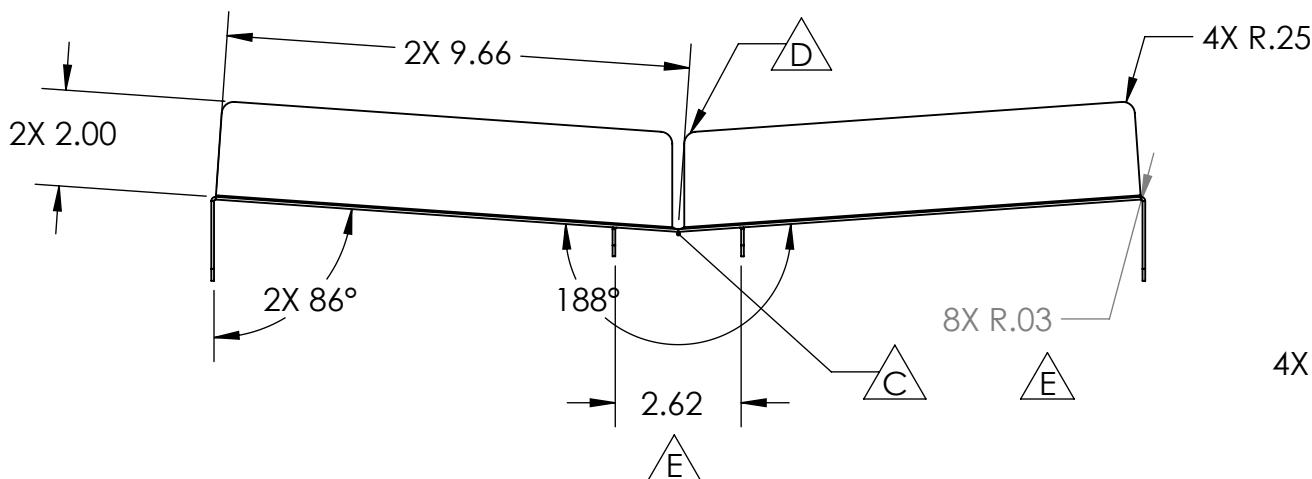
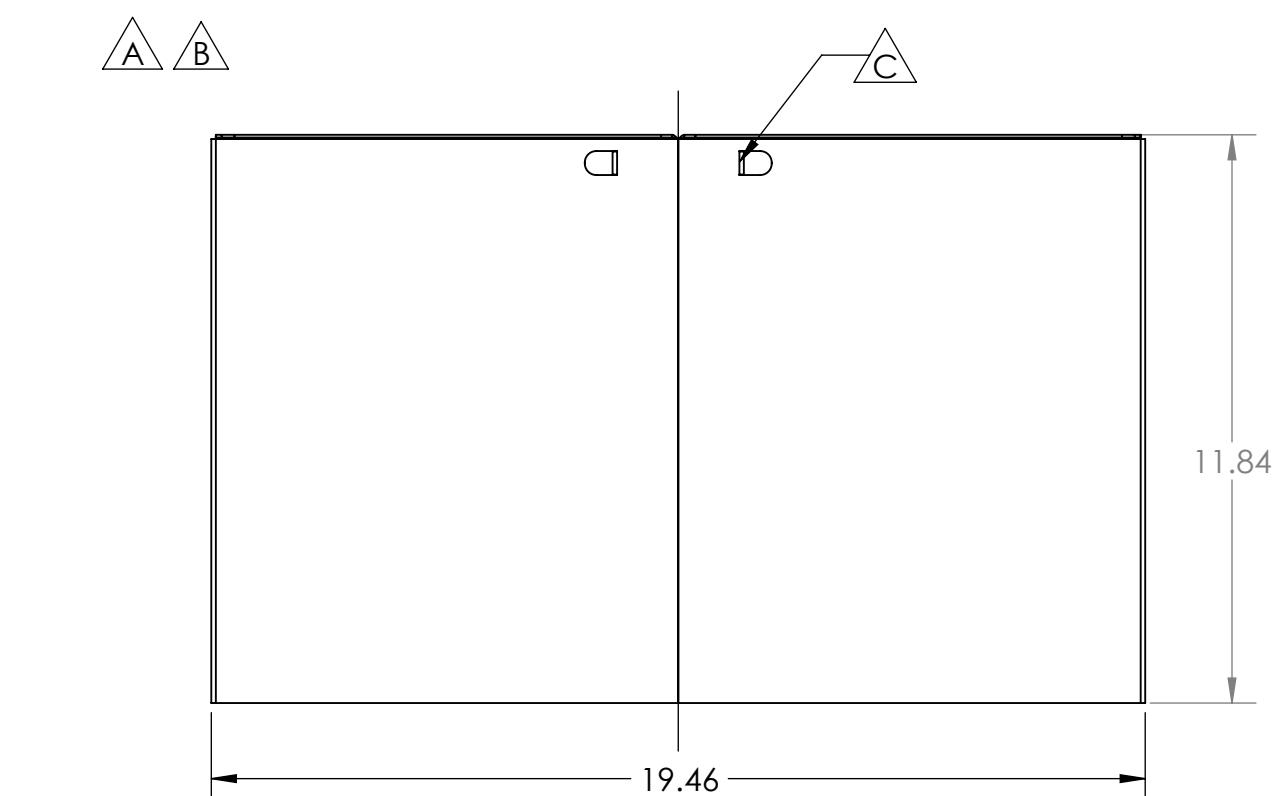
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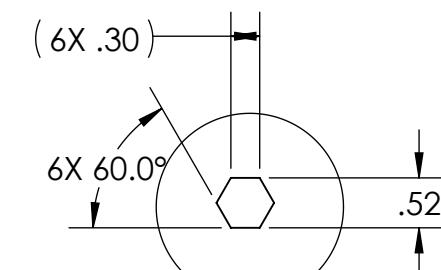
REVISIONS				
ONE	REV.	DESCRIPTION	DATE	APPROVED
B4	A	General redesign of part	7/13/2018	JRF
B4	B	General redesign of part	8/13/2018	JRF
.3, B3	C	Added tabs, change bend profile	09/27/2018	JRF
A3, 2- A1	D	Tab geometry modified; added fillets	10/16/2018	JRF
A3, 2- B3	E	Modified bend radius, added missing dimension	11/2/2018	JRF
A2-A1	F	Tab geometry modified; slot size increased	11/7/2018	JRF



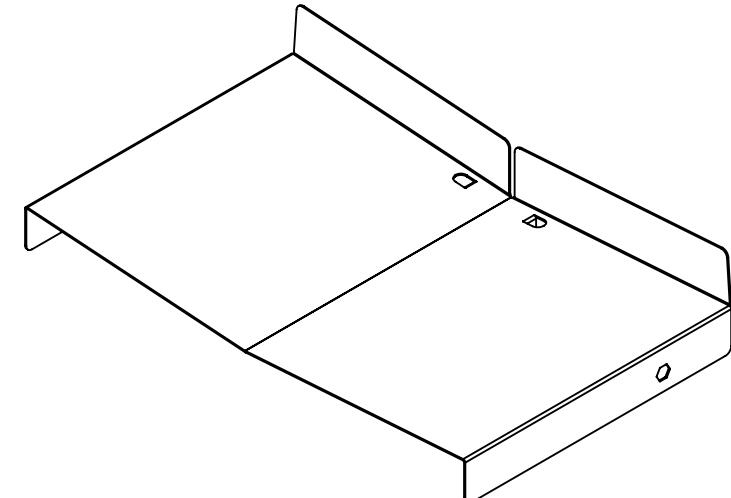
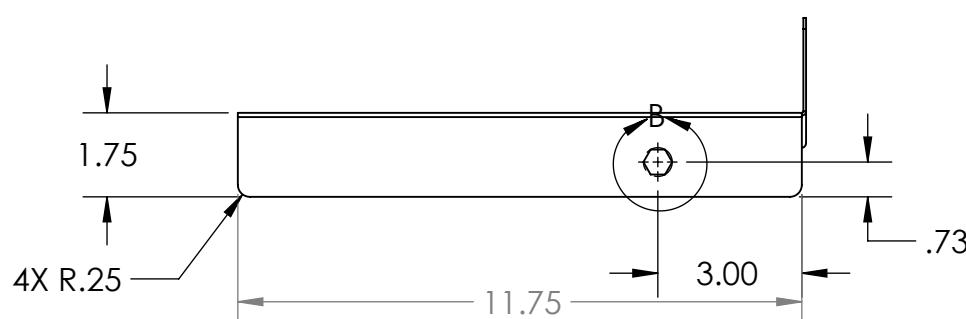
Notes:

1. Remove all sharp edges and burrs
2. Material: 16 Gauge Steel, galvanized/Preplated or similar
3. Tag with part number

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DETAIL B  
SCALE 1 : 2



		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b>	<b>TITLE:</b> <h1>Tray Flip Plate</h1>	
		DIMENSIONS ARE IN INCHES	DRAWN					
		TOLERANCES:	CHECKED					
		FRACTIONAL $\pm 1/16$	ENG APPR.					
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.					
		TWO PLACE DECIMAL $\pm .01$	Q.A.					
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:					
		MATERIAL						
NEXT ASSY	USED ON	FINISH						
APPLICATION		DO NOT SCALE DRAWING						
						SIZE	DWG. NO.	REV
						<b>B</b>	<b>GE-19085</b>	<b>F</b>
						SCALE: 1:4	WEIGHT:	SHEET 1 OF 2

# Tray Flip Plate

**FIRST**  
**ROBOTICS**  
**COMPETITION**

 SOLIDWORKS  
Modeling. Simulation. Design.

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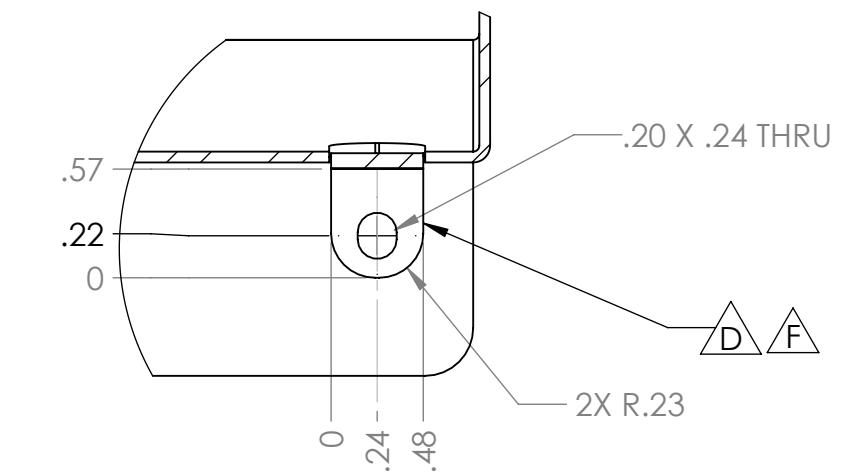
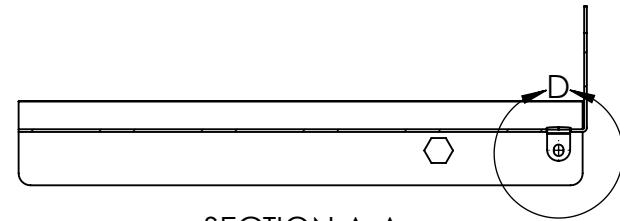
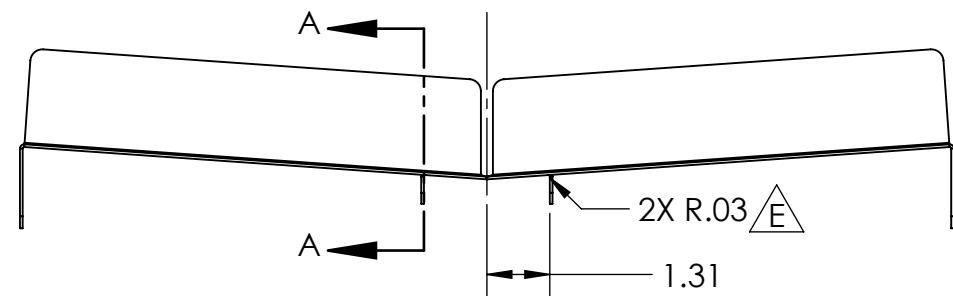
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DETAIL D  
SCALE 1 : 1

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	
<b>B</b>	<b>GE-19085</b>	<b>F</b>			
SCALE: 1:4	WEIGHT:	SHEET 2 OF 2			

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Tray Flip Plate**

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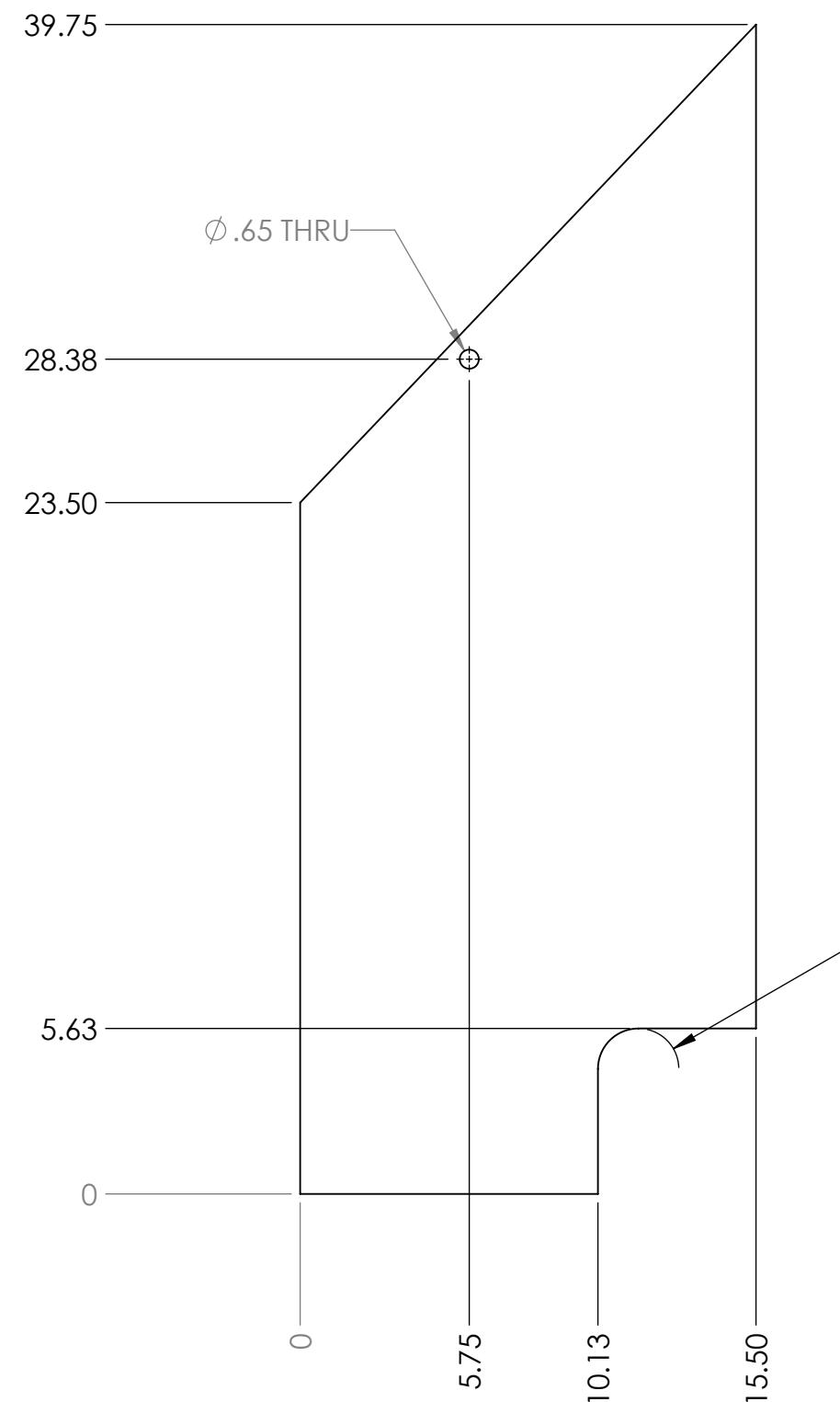
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- Notes:
1. Material: 1/8" Thick Clear Polycarbonate Sheet
  2. Remove all sharp edges and burrs
  3. Tag Or Label With Part Number

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
		APPLICATION	DO NOT SCALE DRAWING	

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Cargo Ship Divider Side

SIZE **B** DWG. NO. **GE-19088** REV **A**

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

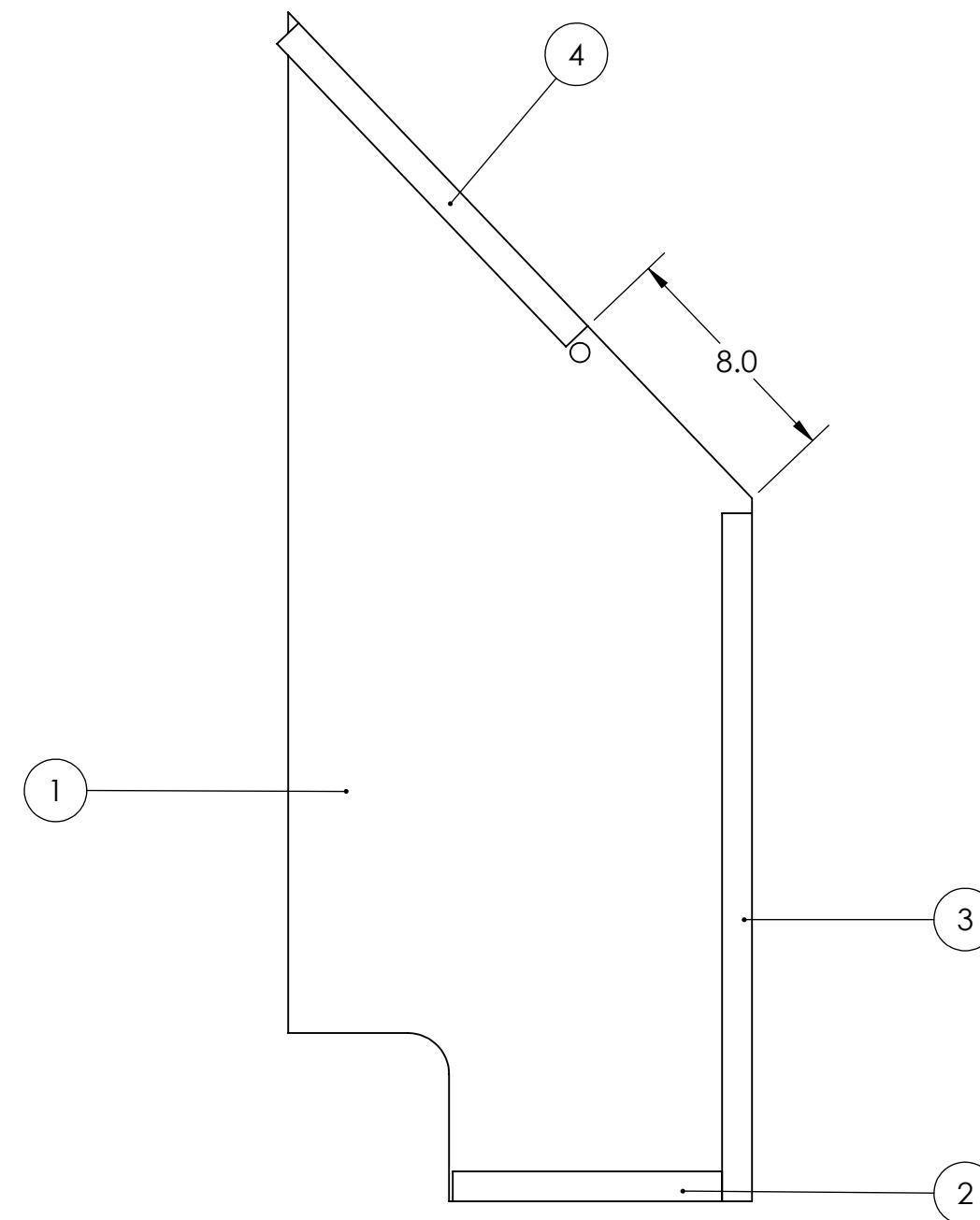
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	GE-19088	Cargo Ship Divider Side	1
2	Loop_1_9	1" x 9" Loop, Adhesive Backed	1
3	Loop_1_23	1" Loop, 23" Long	1
4	Loop_1_14	1" x 14" Loop, Adhesive Backed	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
			MATERIAL		
			NEXT ASSY	USED ON	FINISH
			APPLICATION	DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Divider Side, Left**

**SIZE** DWG. NO. REV  
**B** GE-19088-Left-Assembly

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

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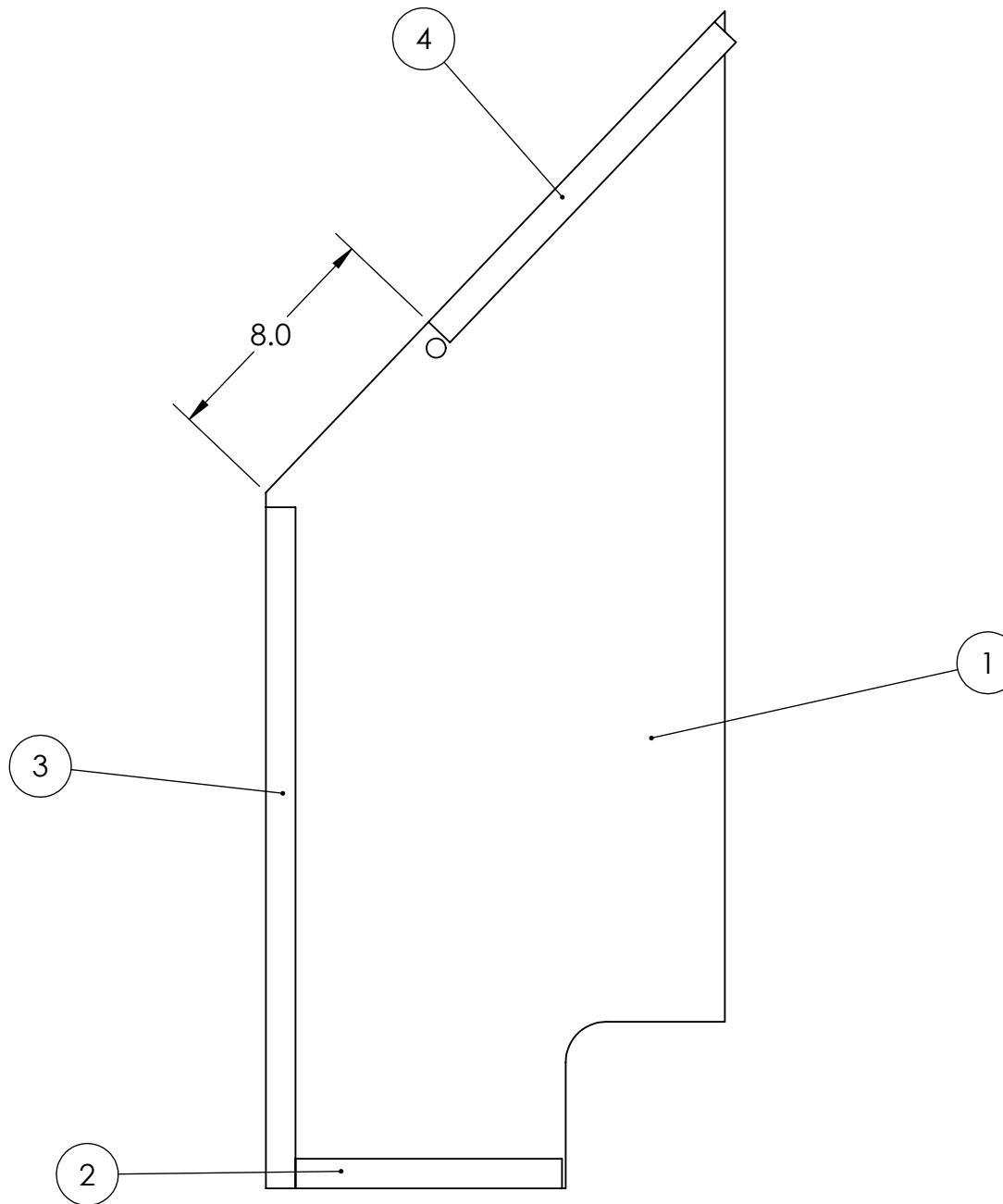
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A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	GE-19088	Cargo Ship Divider Side	1
2	Loop_1_9	1" x 9" Loop, Adhesive Backed	1
3	Loop_1_23	1" Loop, 23" Long	1
4	Loop_1_14	1" x 14" Loop, Adhesive Backed	1

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001		
		INTERPRET GEOMETRIC TOLERANCING PER:	ENG APPR.	
		MATERIAL	MFG APPR.	
		FINISH	Q.A.	
	NEXT ASSY	USED ON	COMMENTS:	
	APPLICATION			
	DO NOT SCALE DRAWING			

**FIRST** ROBOTICS COMPETITION **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Cargo Ship Divider Side, Right

SIZE	DWG. NO.	REV
<b>B</b>	GE-19088-Right-Assembly	
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

4

3

2

1

4

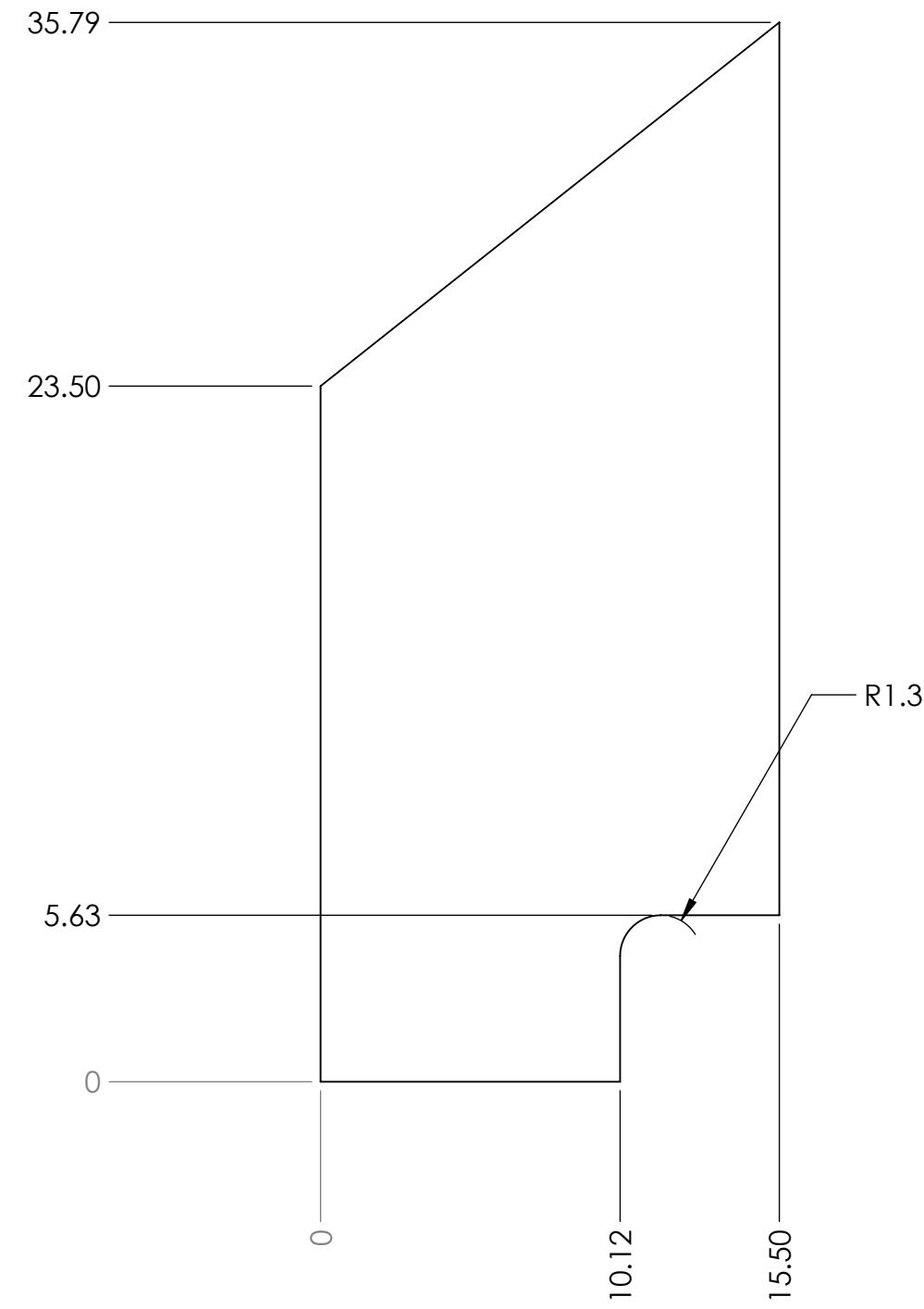
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1

B

B



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		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL: ±1/16			
		ANGULAR: MACH ±1° BEND ±1°			
		TWO PLACE DECIMAL ±.01			
		THREE PLACE DECIMAL ±.001			
		INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:	
		MATERIAL			
		NEXT ASSY			
		USED ON			
		FINISH			
		APPLICATION			
		DO NOT SCALE DRAWING			

4

3

2

1

**Cargo Ship  
Divider Front**

SIZE **B** DWG. NO. **GE-19089** REV **A**

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

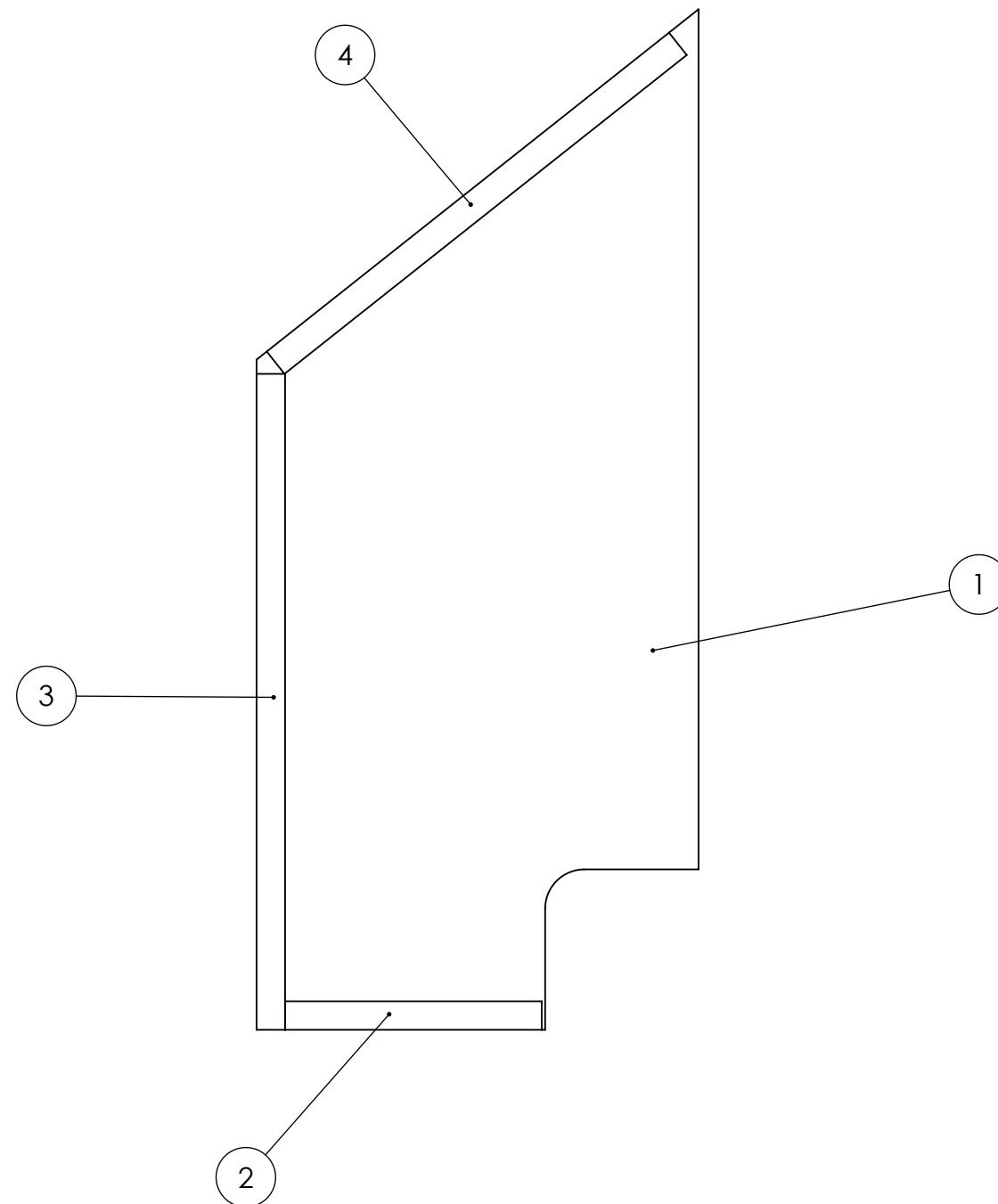
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19089	Cargo Ship Divider Front	1
2	Loop_1_9	1" x 9" Loop, Adhesive Backed	1
3	Loop_1_23	1" Loop, 23" Long	1
4	Loop_1_18	1" x 18" Loop, Adhesive Backed	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** GE-19089, with Loop

**SIZE** DWG. NO. REV  
**B** GE-19089-Assembly

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

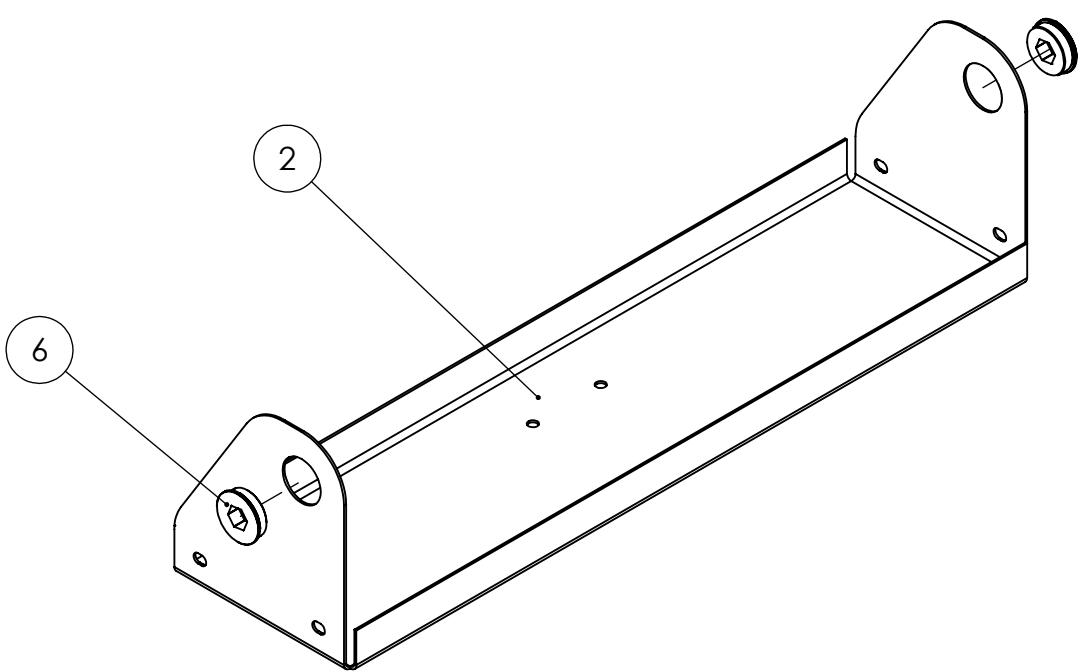
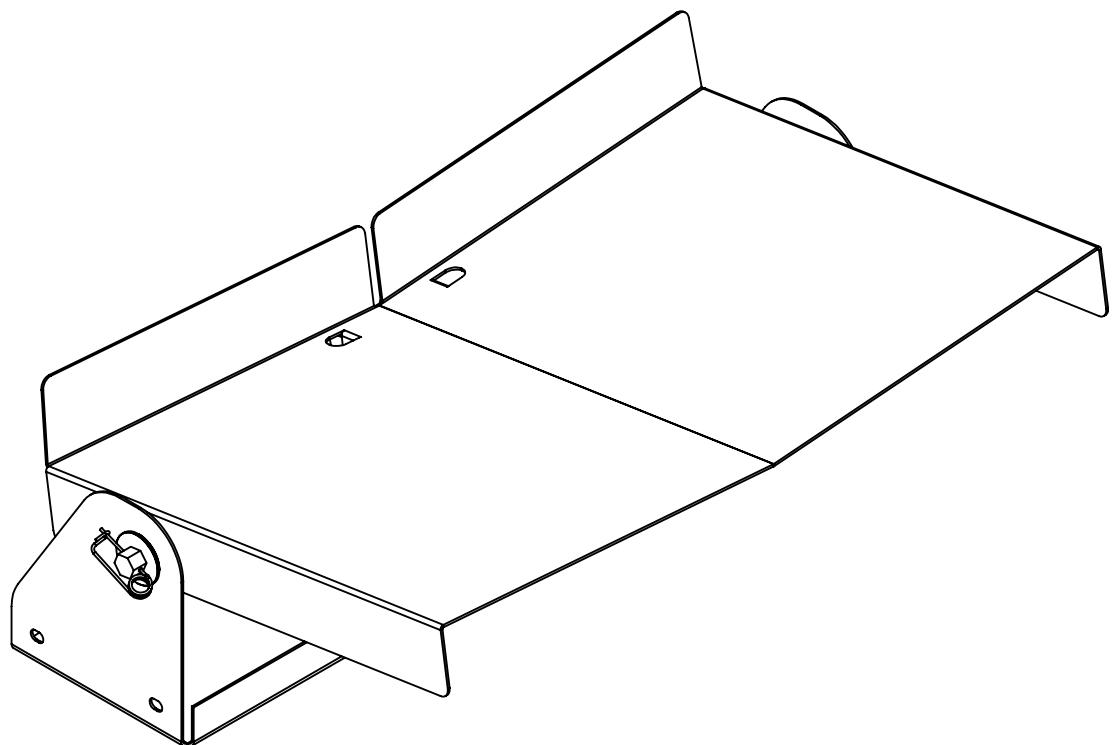
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19085	Tray Flip Plate	1
2	GE-19095	Tray Bracket	1
3	GE-19096	Tray Hex Shaft	1
4	GE-19097	Tray Magnet Block	1
5	GE-19099	Tray Steel Block	1
6	GE-19215	1/2" Hex Bearing	2
7	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	2
8	round_hex_10_32_.625_full	Round Hex Head, #10-32 x 5/8" long, fully threaded	2
9	pin_bentwire_.0625_1.0_625	Bent Wire Locking Pin, 1/16" diameter, 1-1/16" usable length	2
10	VHB_Tape	VHB Tape, 2.5" Long	2
11	Magnet	Magnet	1

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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN			
			CHECKED			
			ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
			SCALE: 1:12	WEIGHT:		SHEET 1 OF 3

4

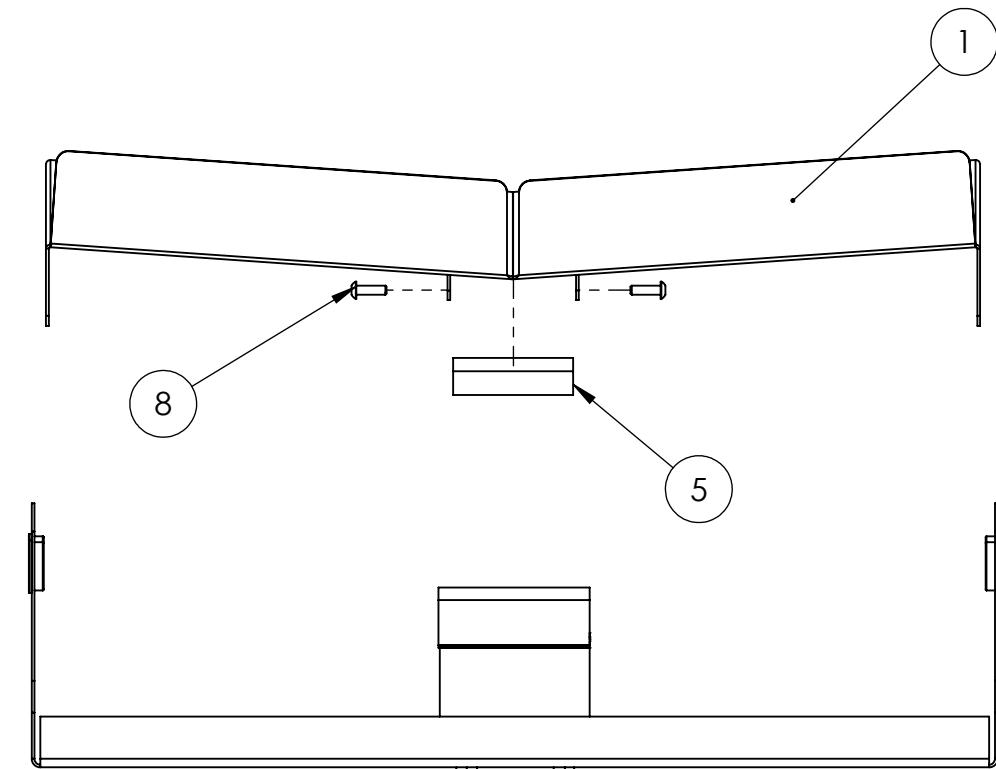
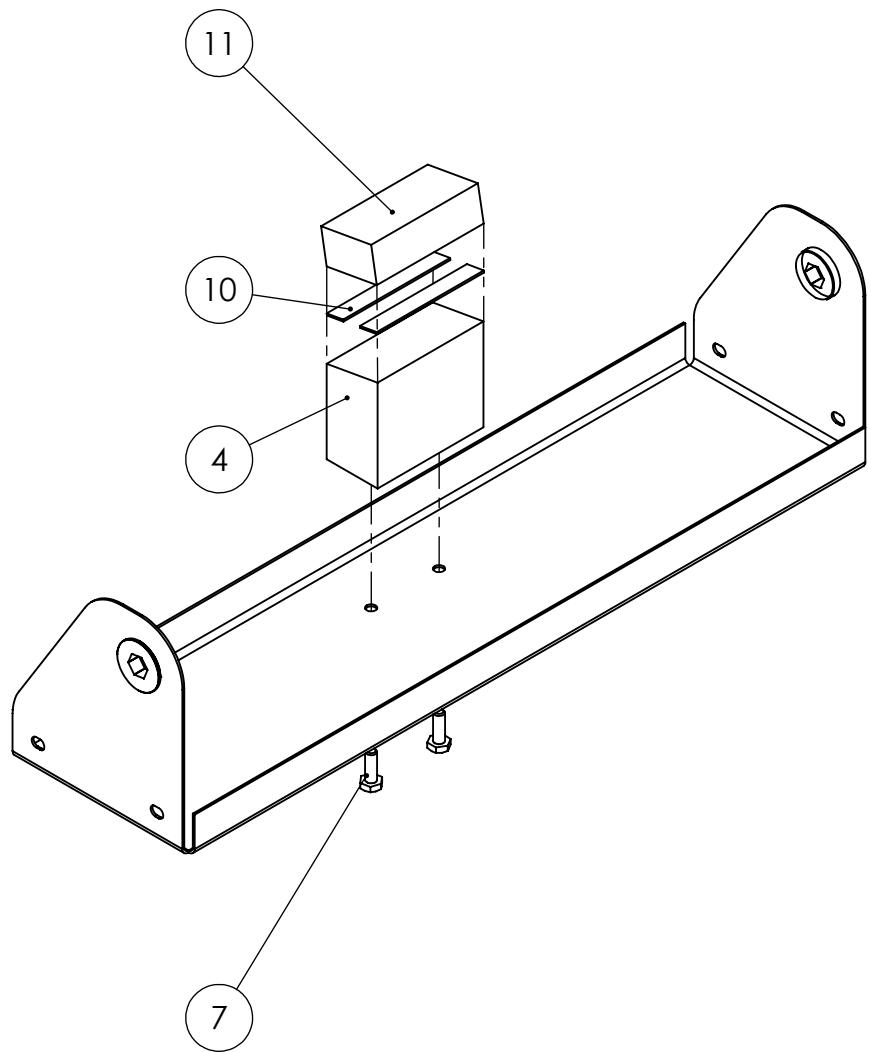
3

2

1

B

B

**Notes:**

Do not fully tighten bolts. Item 5 should be able to spin freely.

A

A

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
SIZE	DWG. NO.			REV	
<b>B</b>	<b>GE-19092</b>				
SCALE: 1:4	WEIGHT:			SHEET 2 OF 3	

4

3

2

1

4

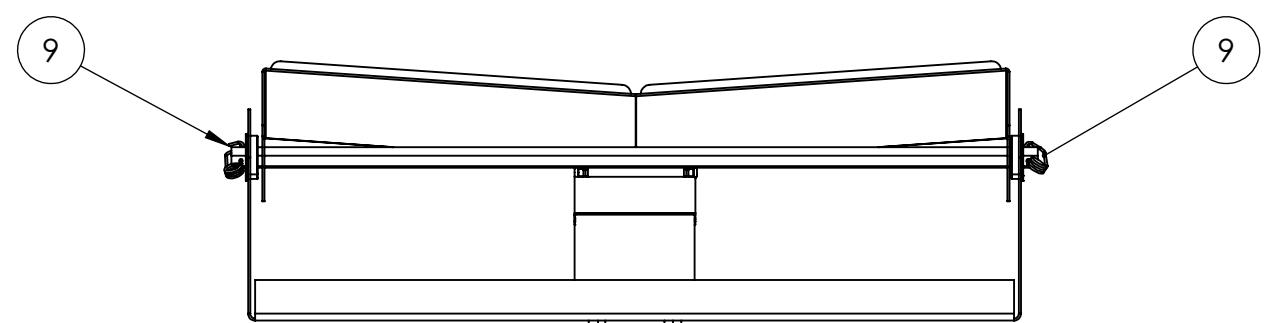
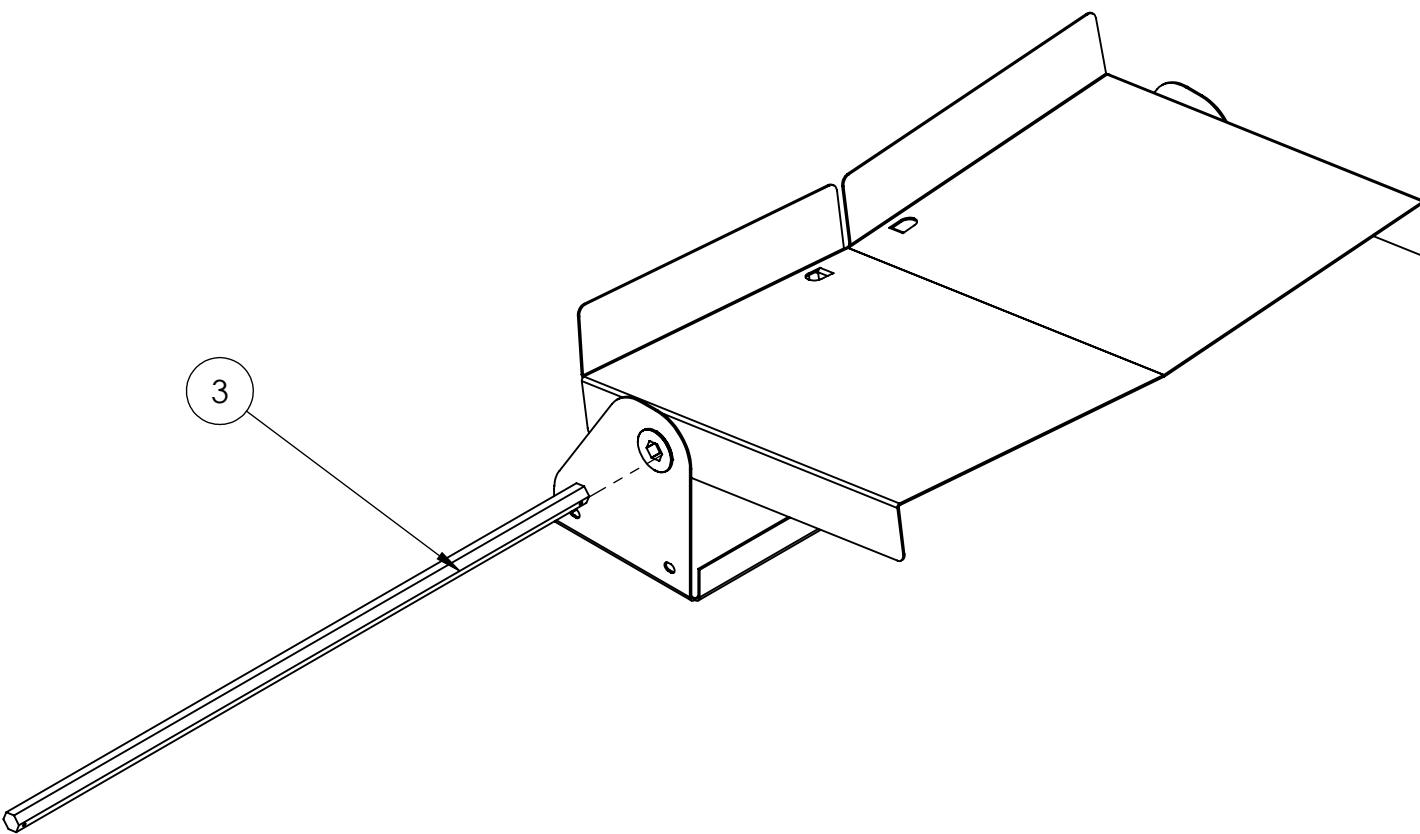
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2

1

B

B



4

3

2

1

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

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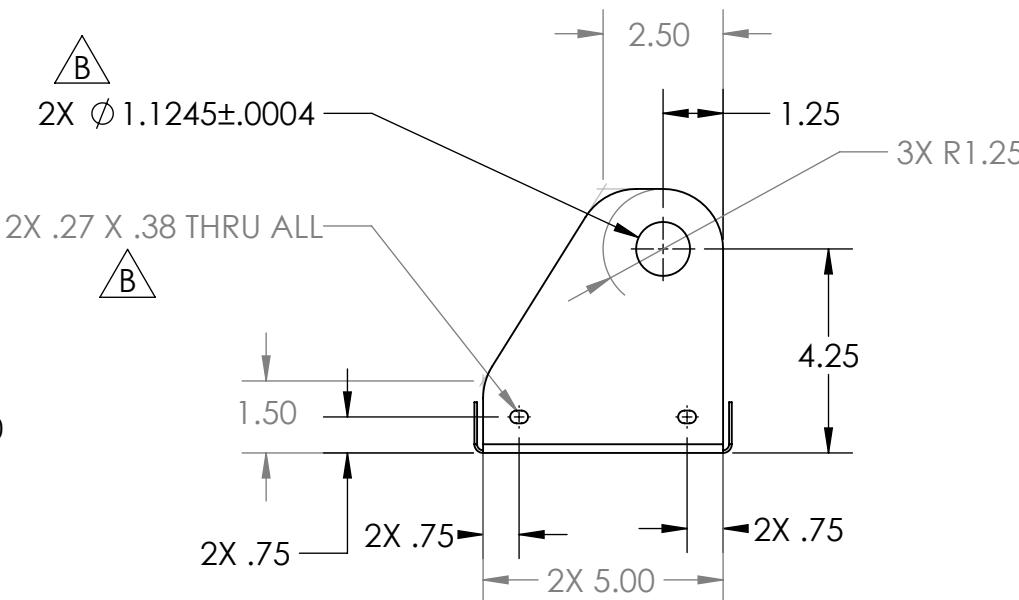
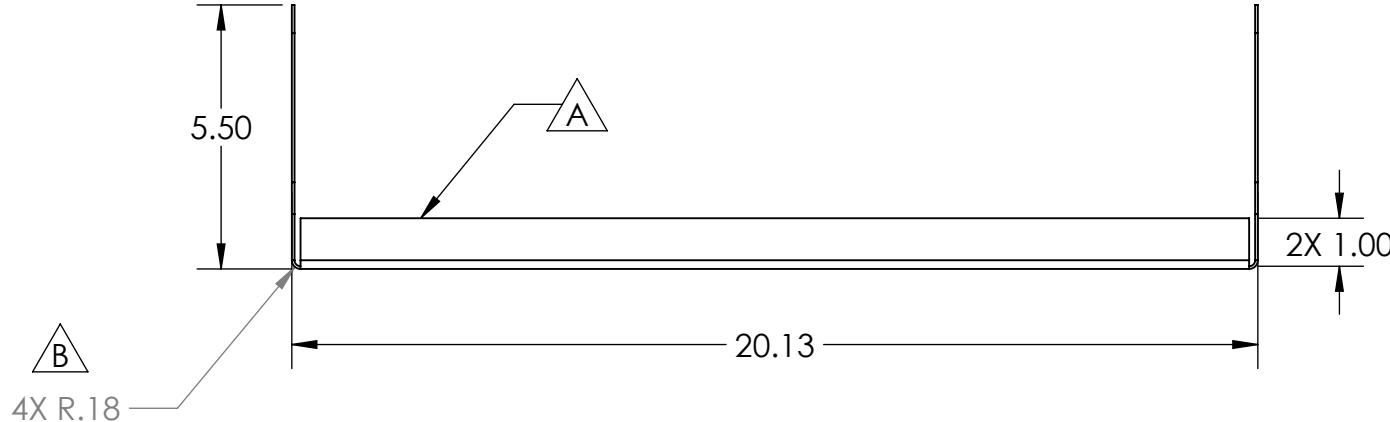
TITLE:  
**Cargo Ship Tray  
Assembly**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19092</b>	
SCALE: 1:5	WEIGHT:	SHEET 3 OF 3

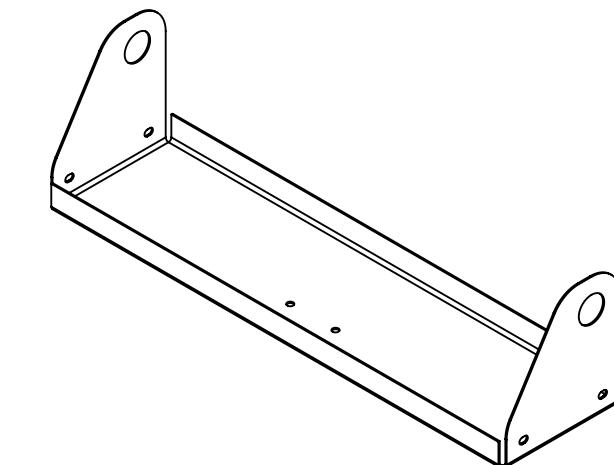
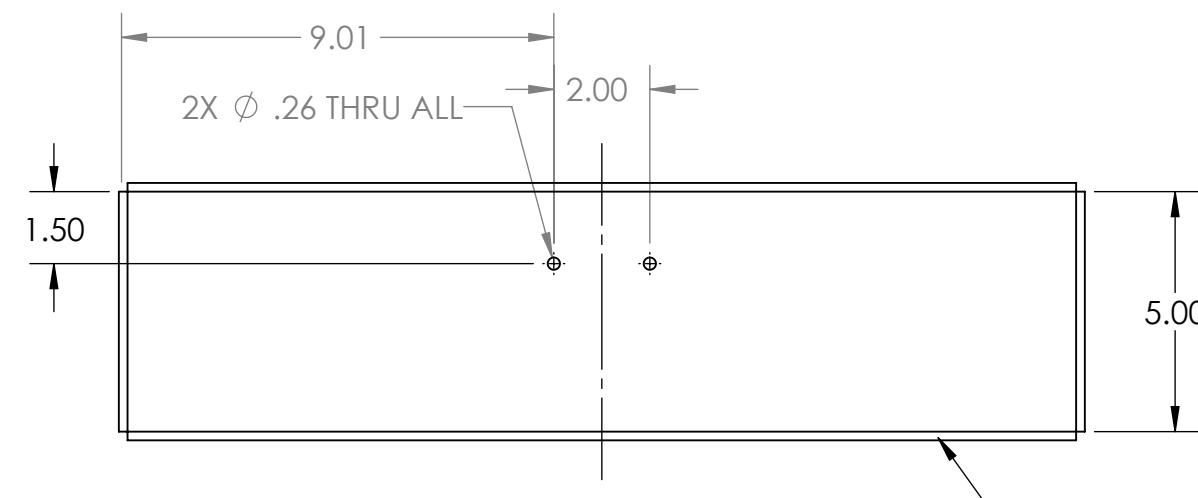
## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B4	A	Added flange	10/4/2018	JRF
A3, B2, B4	B	Holes changed to slots; changed tolerance on 1.12" hole; added second flange, decreased bend radius	10/30/2018	JRF

B



A



- Notes:
1. Material: 16 Gauge Steel, galvanized
  2. Remove all sharp edges and burrs
  3. Tag with part number

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DRAWN				
CHECKED				
ENG APPR.				
MFG APPR.				
Q.A.				
COMMENTS:				
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19095</b>	<b>B</b>		
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1		

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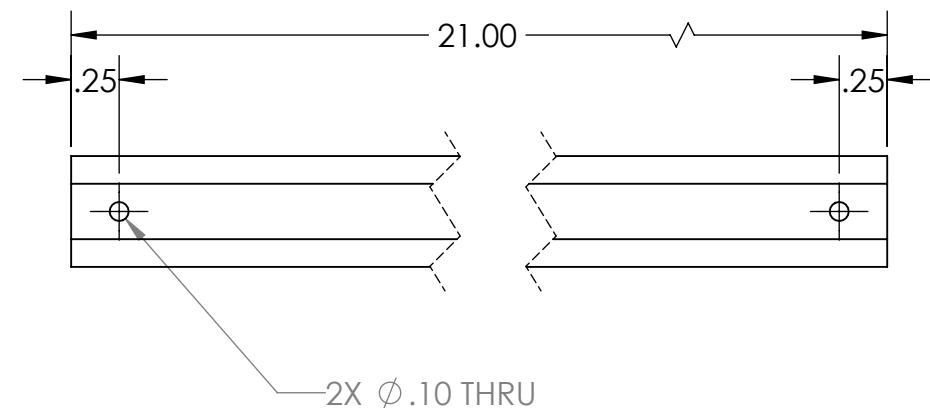
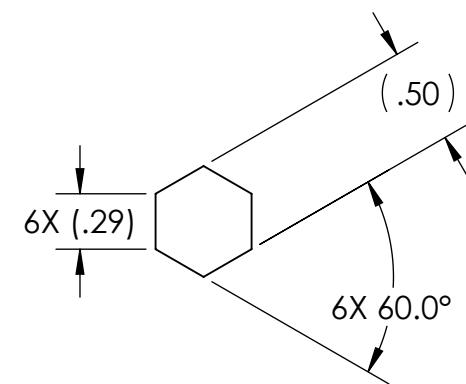
TITLE:  
**Tray Bracket**

4

3

2

1



- Notes:
1. Remove all sharp edges and burrs
  2. Material: AndyMark Aluminum Hex Shaft, 1/2 in. width (am-2291)
  3. Tag with part number

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE DWG. NO. REV		B GE-19096 A		
SCALE: 1:4		WEIGHT:		SHEET 1 OF 1

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**Tray Hex Shaft**

4

3

2

1

4

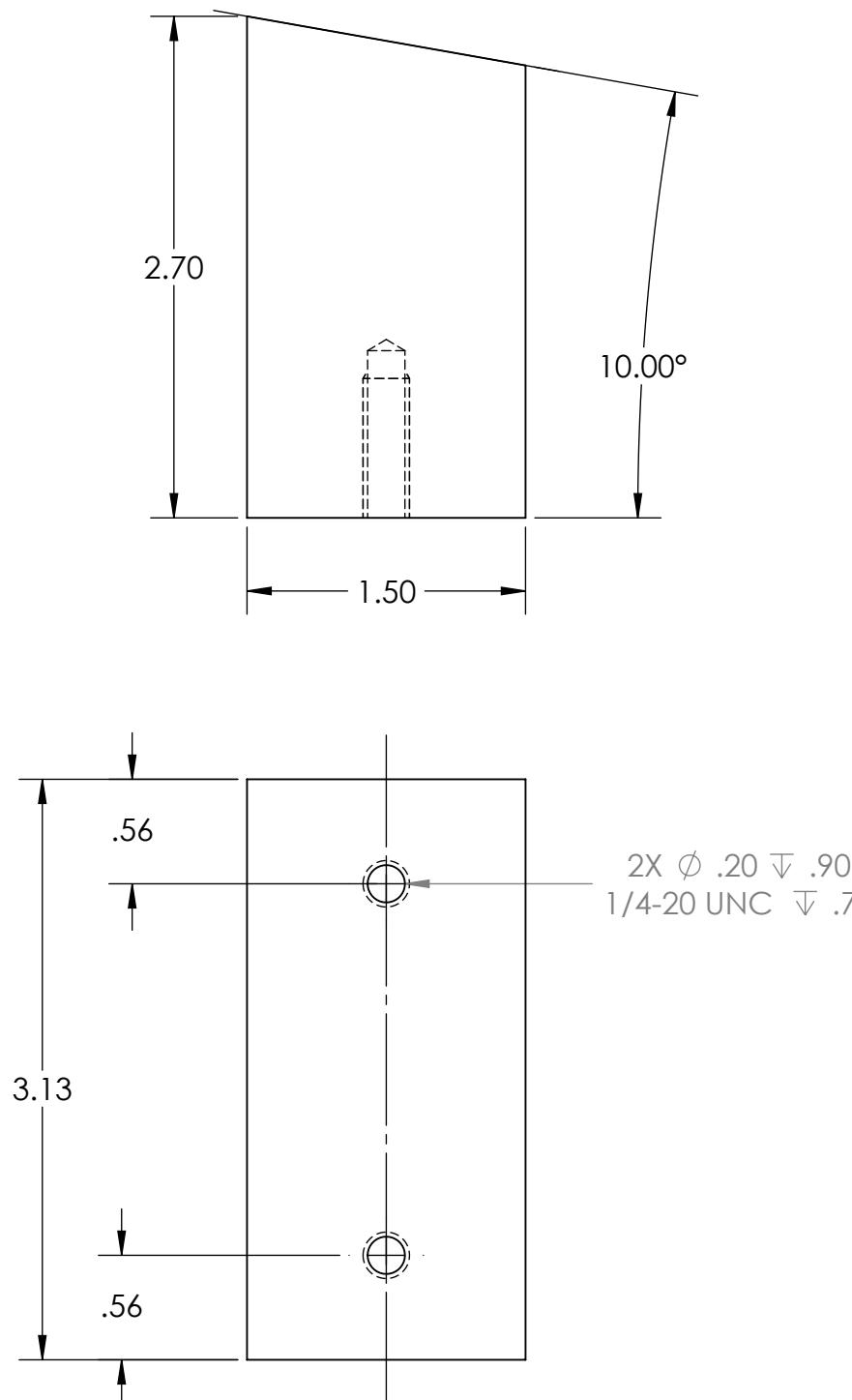
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2

1

B

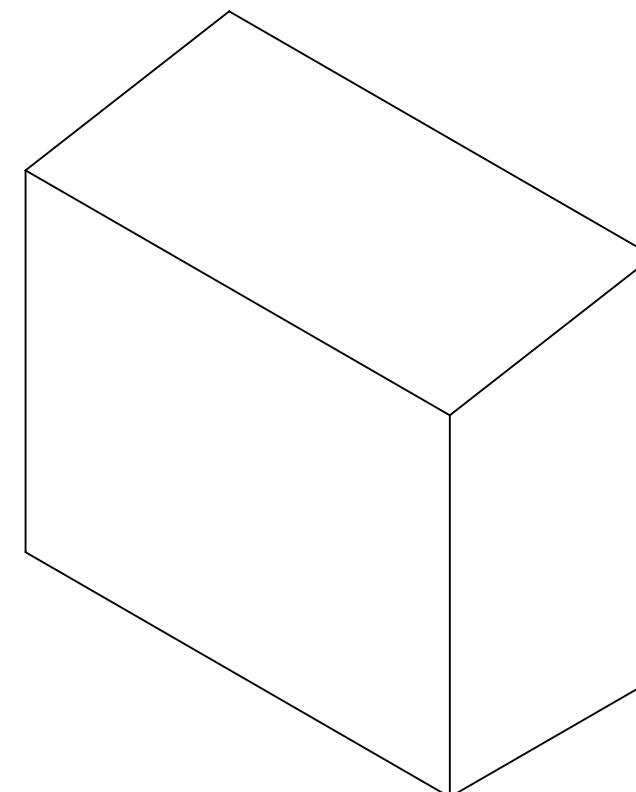
B



- Notes:
1. Remove all sharp edges and burrs
  2. Material: ABS Plastic, smooth, any color
  3. Tag or label with part number

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		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001			
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			
SIZE		DWG. NO.	REV		
<b>B</b>		<b>GE-19097</b>			
SCALE: 1:1		WEIGHT:	SHEET 1 OF 1		



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**COMPETITION**

**SOLIDWORKS**  
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**Tray Magnet  
Block**

4

3

2

1

4

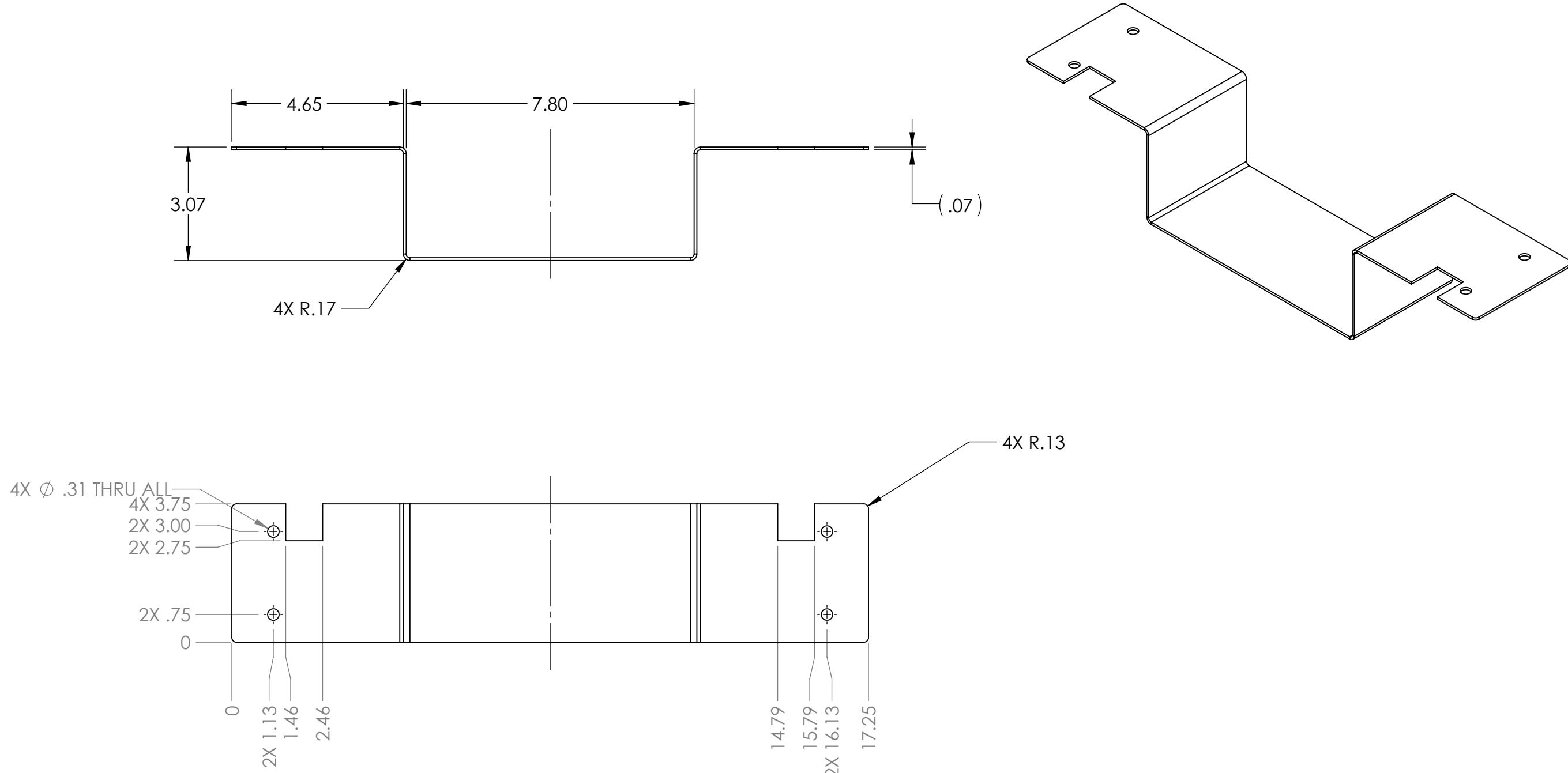
3

2

1

B

B

**Notes:**

1. Material: 14 gauge A-366/1008 Pre-Plated Steel.
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SCALE: 1:4	WEIGHT:			SHEET 1 OF 1

 **FIRST**  
**ROBOTICS**  
**COMPETITION**  **SOLIDWORKS**  
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**TITLE:**  
**Keyhole Insert**  
**Bottom**

**SIZE** DWG. NO. **B** **GE-19098** **A** **REV**

4

3

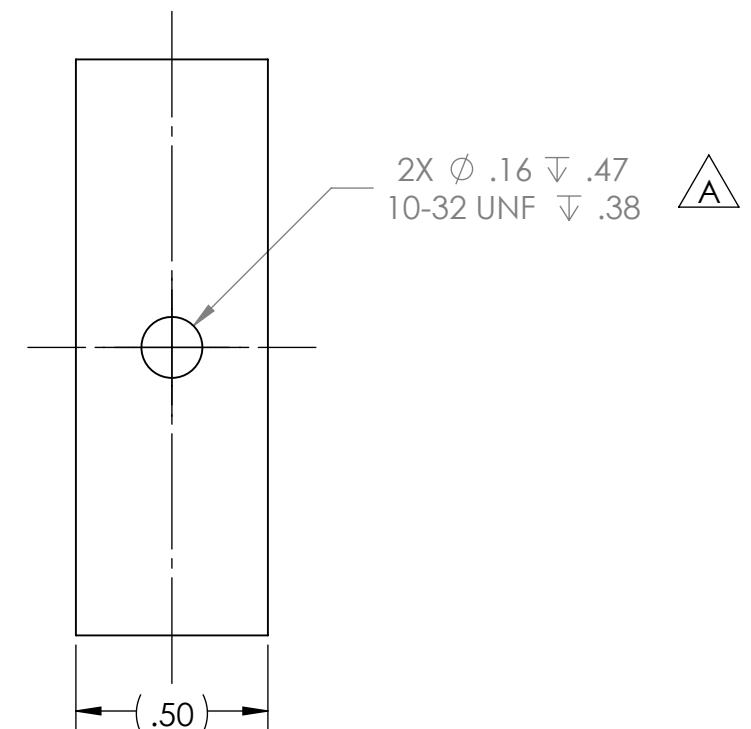
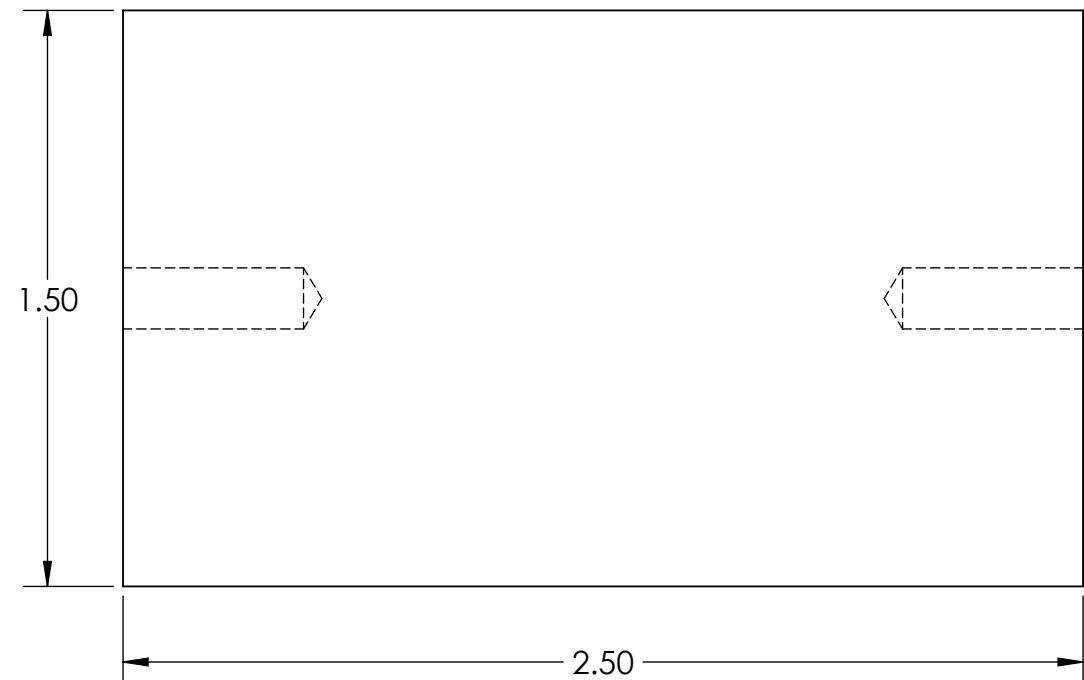
2

1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A4, B1	A	Changed thru hole to two tapped #10-32 holes	11/7/2018	JRF

B



## Notes:

1. Remove all sharp edges and burrs
2. Material: 0.5" Galvanized steel/ preplated or similar

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.			REV
B	GE-19099			A
SCALE: 2:1	WEIGHT:			SHEET 1 OF 1

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
Tray Steel Block

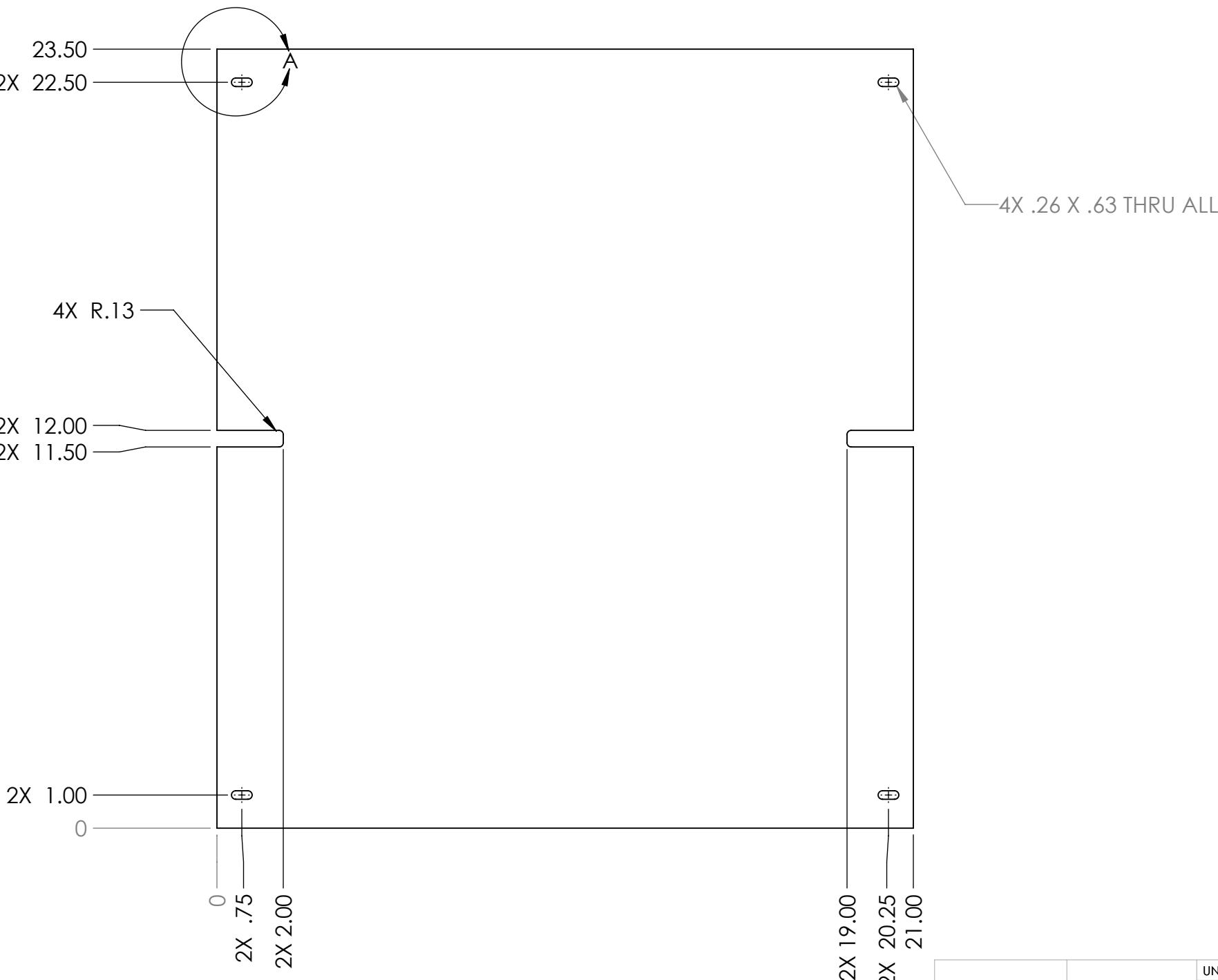
4

3

2

1

B



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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.		REV	
<b>B</b>	<b>GE-19100</b>			
SCALE: 1:8	WEIGHT:		SHEET 1 OF 1	

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Bridge Plastic  
Top**

4

3

2

1

B

A

4

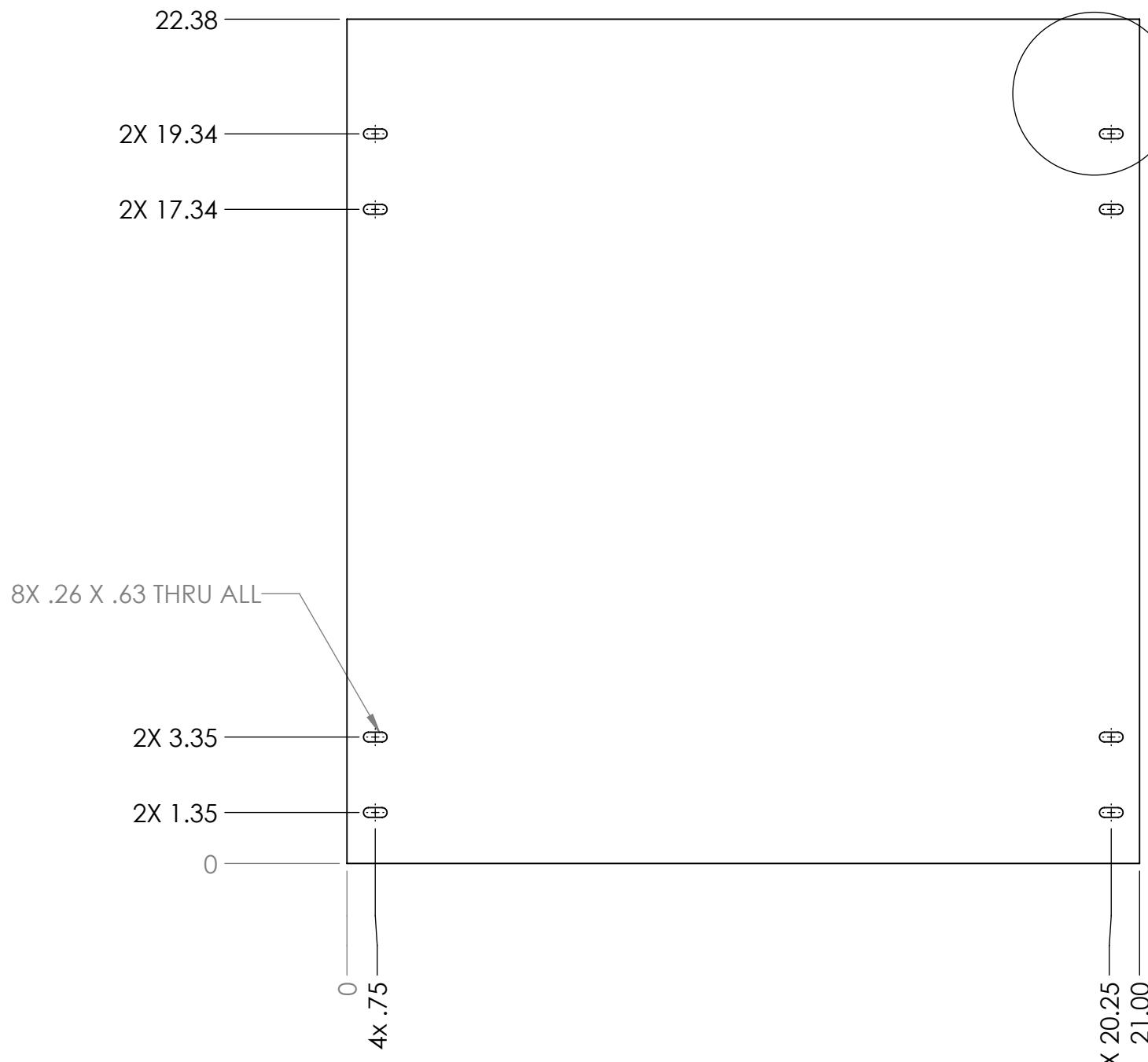
3

2

1

B

B



## Notes:

1. Material: 1/8" Thick Clear Polycarbonate Sheet
2. Remove all sharp edges and burrs
3. Tag Or Label With Part Number

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.			REV
<b>B</b>	<b>GE-19101</b>			
SCALE: 1:8	WEIGHT:			SHEET 1 OF 1



# Bridge Plastic Top Side

4

3

2

1

A

A

4

3

2

1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A2, A4, B2, B4	A	Updated slots	11/15/2018	

23.50

2X 16.00

4X R.13

2X 11.38

2X 9.63

2X 5.00

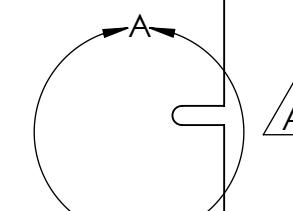
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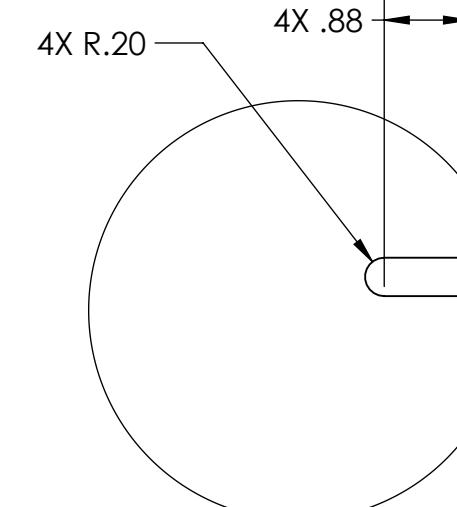
1.50

19.50

21.00



A

DETAIL A  
SCALE 1 : 2

(.13)

## Notes:

- Material: 1/8" Thick Clear Polycarbonate Sheet
- Remove all sharp edges and burrs
- Tag Or Label With Part Number

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	

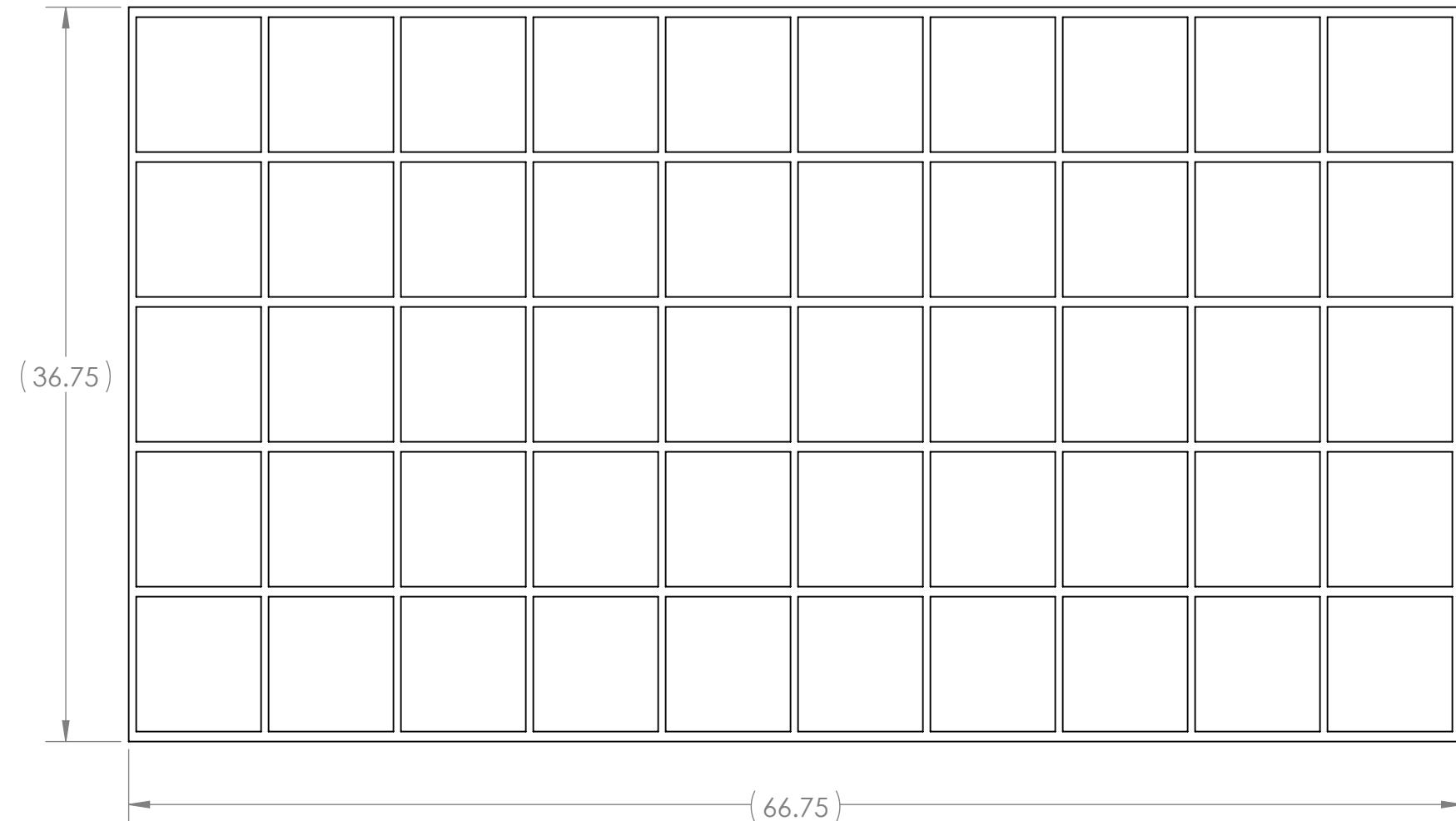
**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Bridge Plastic Side

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19102</b>	<b>A</b>
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

B

B



## Notes:

1. 36 in. x 60 in. (unstretched) Extended Bed Mini-Truck Cargo Net
2. Source: Harbor Freight
3. Part Number: 69618
4. Equivalent Substitutions Allowed

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		UNLESS OTHERWISE SPECIFIED:  DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
 Modeling Solutions Partner

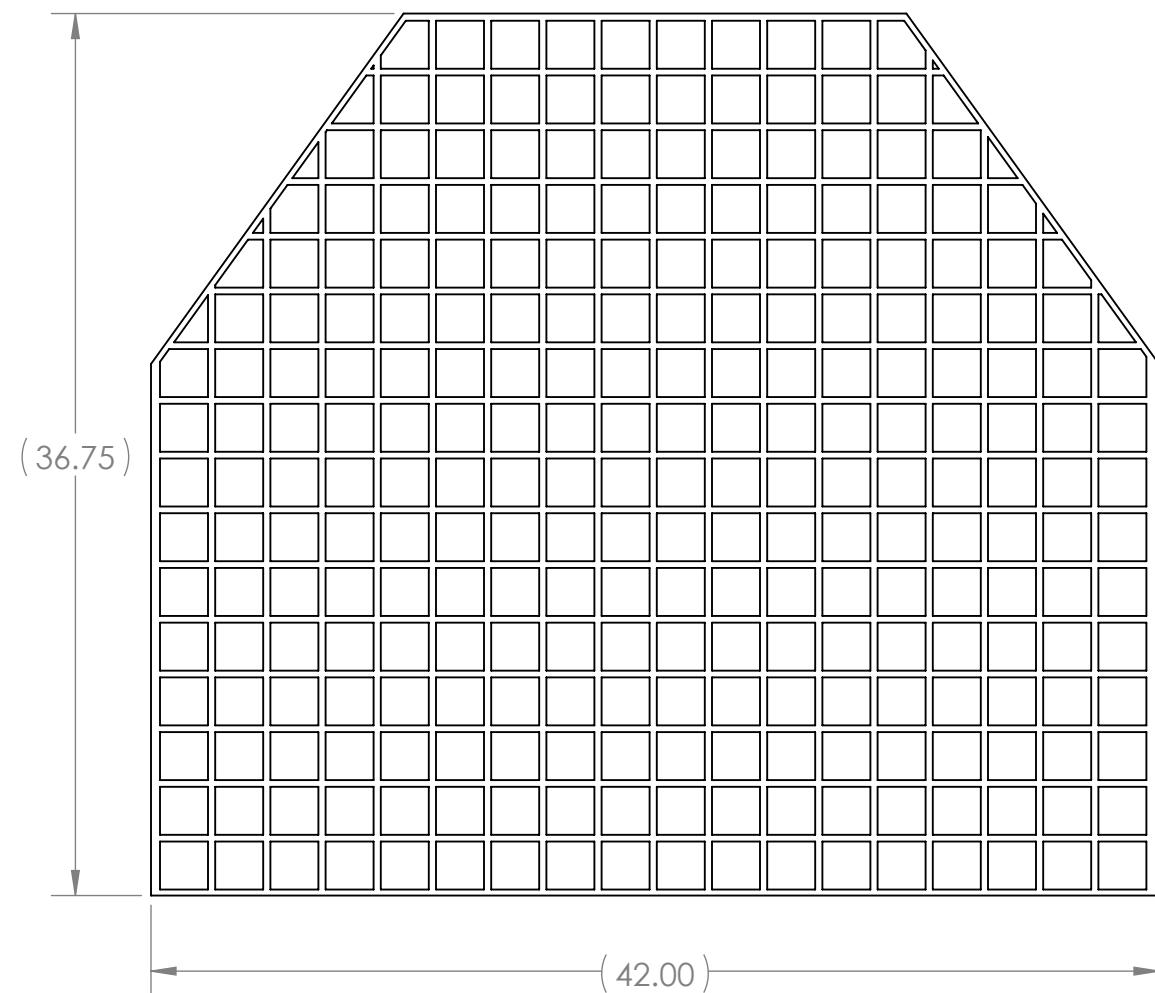
**Cargo Net Side**

**B** **GE-19103**

SIZE DWG. NO. REV  
 SCALE: 1:8 WEIGHT: SHEET 1 OF 1

B

B



## Notes:

1. 24"x36" (unstretched) PowerTye® Mfg Extra Large Cargo Net featuring 10 Adjustable Hooks & Tight 2"x2" Mesh, Black
2. Source: PowerTye
3. Part Number: 50362
4. Equivalent Substitutions Allowed

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
<b>B</b>	<b>GE-19104</b>				
SCALE: 1:8	WEIGHT:				
					SHEET 1 OF 1

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Net Front**

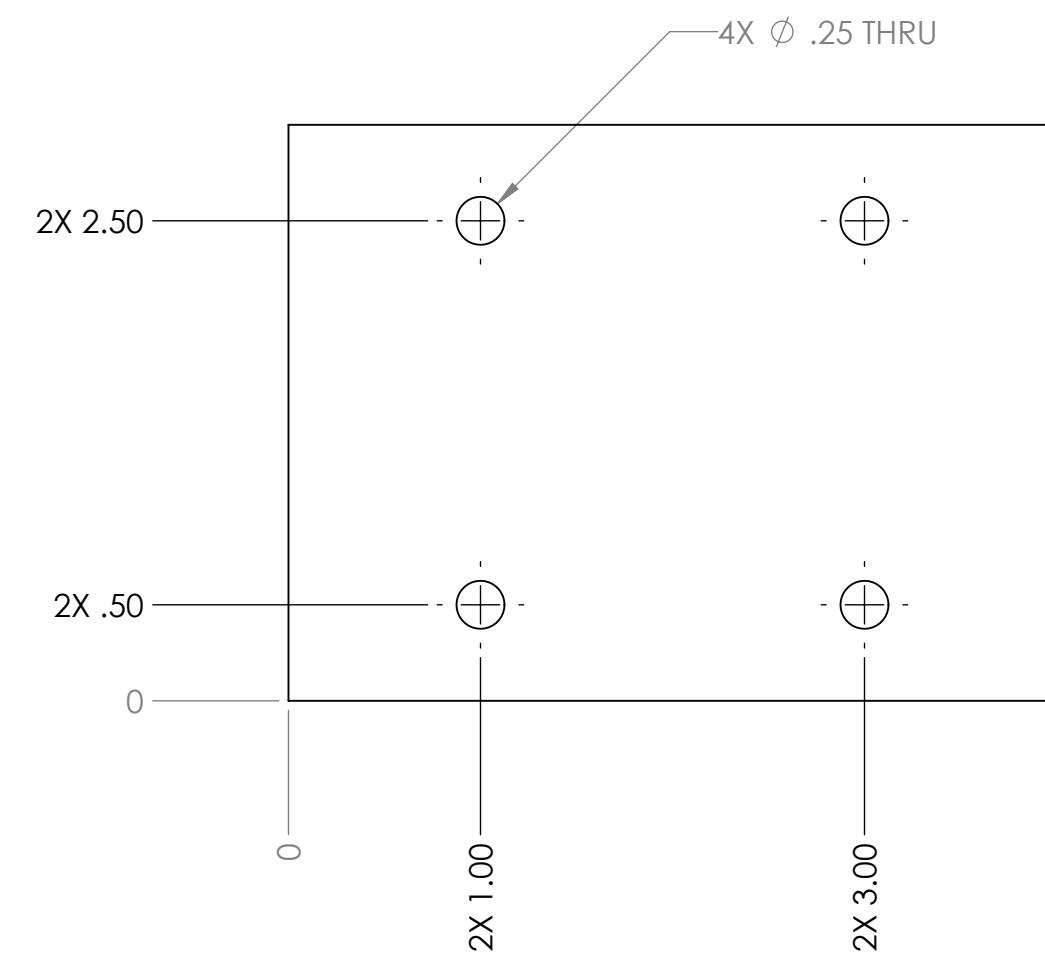
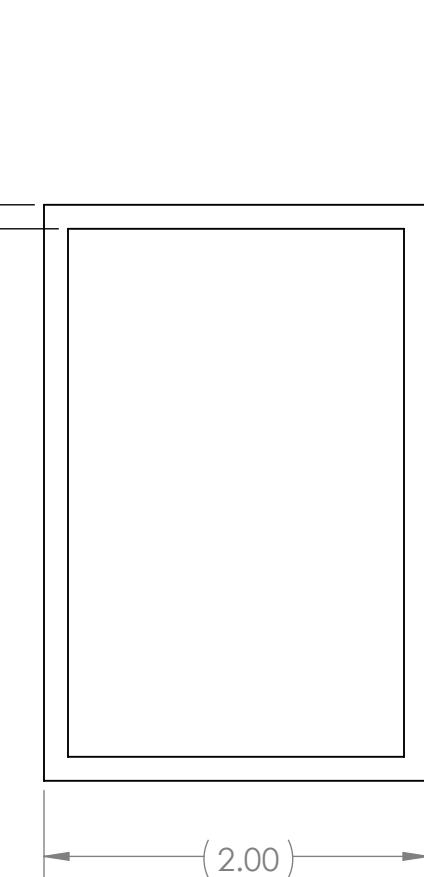
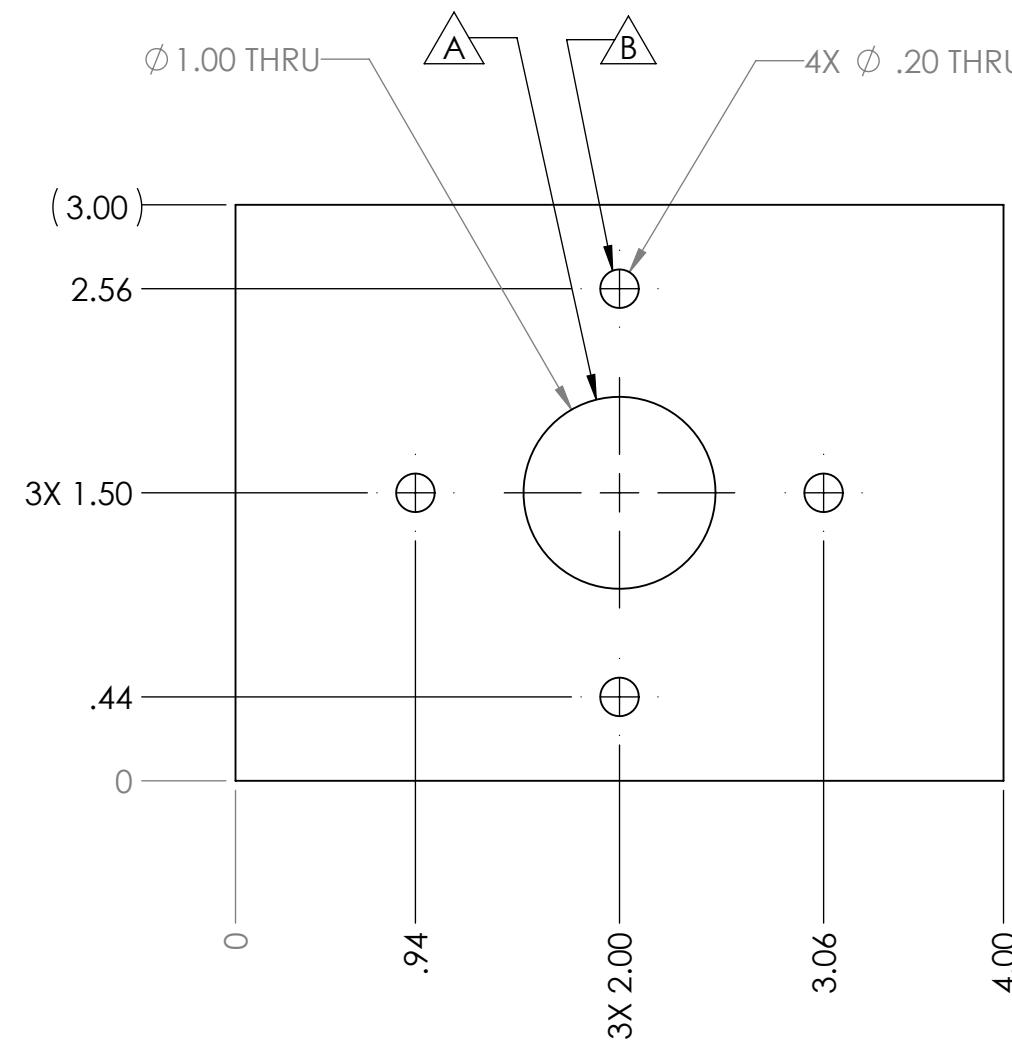
4

3

2

1

REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
B4	A	Added 1" hole	10/22/2018	JRF
B4	B	Modified hole size, from .23 to .20	10/24/2018	JRF



Notes:

1. Material: 3" x 2" x .125" thk. Rectan
2. Remove all sharp edges and burrs
3. Tag Or Label With Part Number

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST</b> <b>ROBOTICS</b> <b>COMPETITION</b>	<b>TITLE:</b>  <h1>Light Mount</h1>
		DIMENSIONS ARE IN INCHES	DRAWN				
		TOLERANCES:	CHECKED				
		FRACTIONAL $\pm 1/16$	ENG APPR.				
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.				
		TWO PLACE DECIMAL $\pm .01$	Q.A.				
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:				
		MATERIAL					
NEXT ASSY	USED ON	FINISH					
APPLICATION		DO NOT SCALE DRAWING	SIZE	DWG. NO.		REV	
			<b>B</b>	<b>GE-19105</b>		<b>B</b>	
			SCALE: 1:1	WEIGHT:	SHEET 1 OF 1		

4

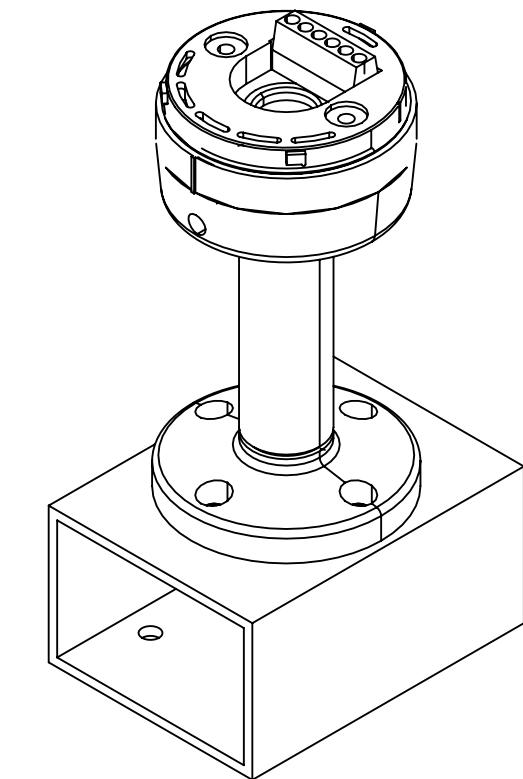
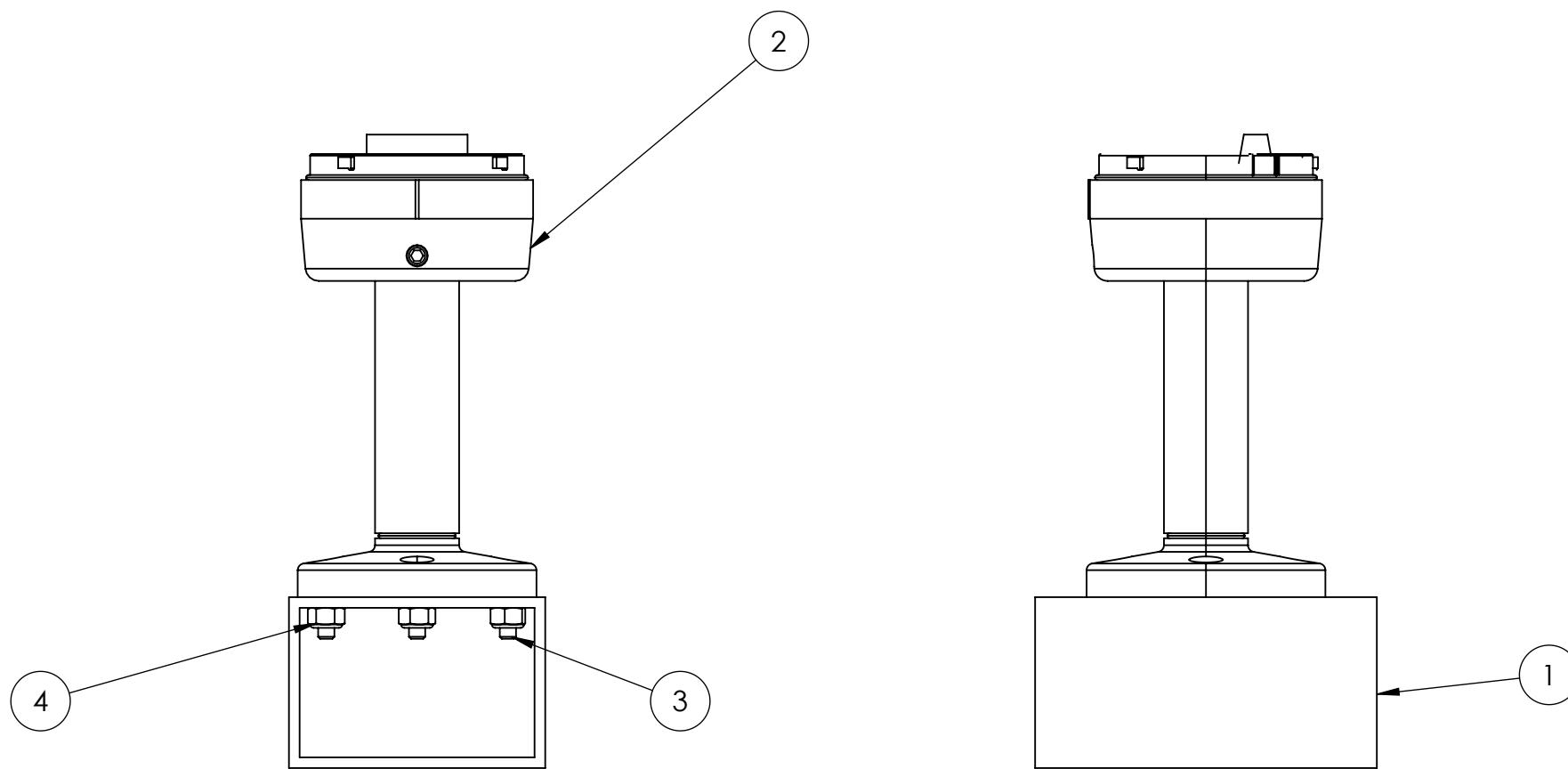
3

2

1

B

B



## Notes:

- Stack light not shown, but is part of the assembly.

A

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19105	Light Mount	1
2	855t-bpm10	Stack Light Mount with pole	1
3	round_hex_10_32_.625_full	Round Hex Head, #10-32 x 5/8" long, fully threaded	4
4	nylock_10_32	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size	4

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Title:** Light Sub Assembly

**Size:** DWG. NO. **B** **GE-19106** **Rev:**

**Scale:** 1:2 **Weight:**

**Sheet 1 of 1**

4

3

2

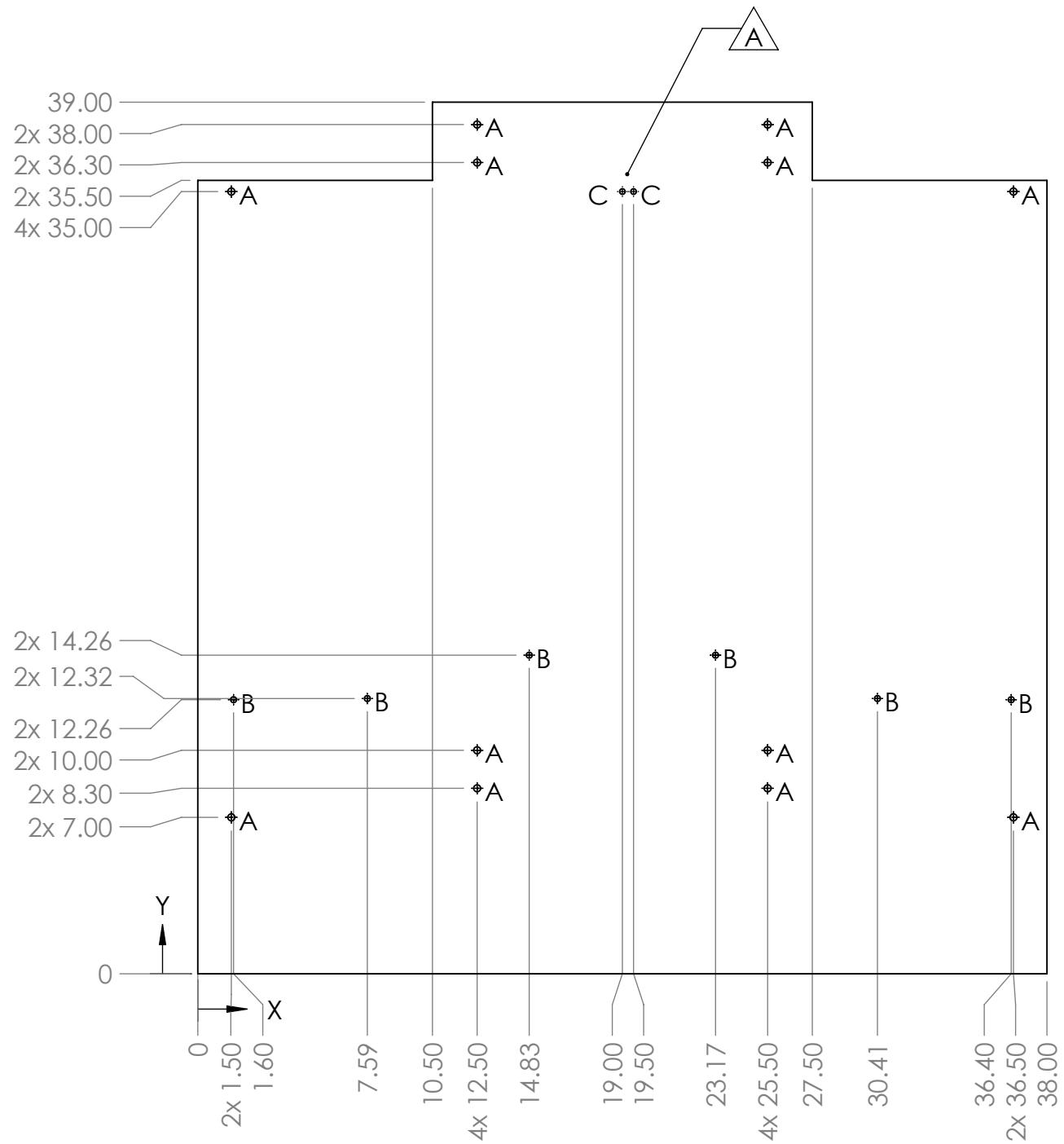
1

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1



## Notes

1. Material: 1/8" thick, clear polycarbonate
  2. Remove all burrs and sharp edges.
  3. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b>  <b>SOLIDWORKS</b> <small>Modeling Solutions Partner</small>
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN			
			CHECKED			
			ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING		SIZE	DWG. NO.	REV
			B	GE-19109		A
			SCALE: 1:7	WEIGHT:	SHEET 1 OF 1	

4

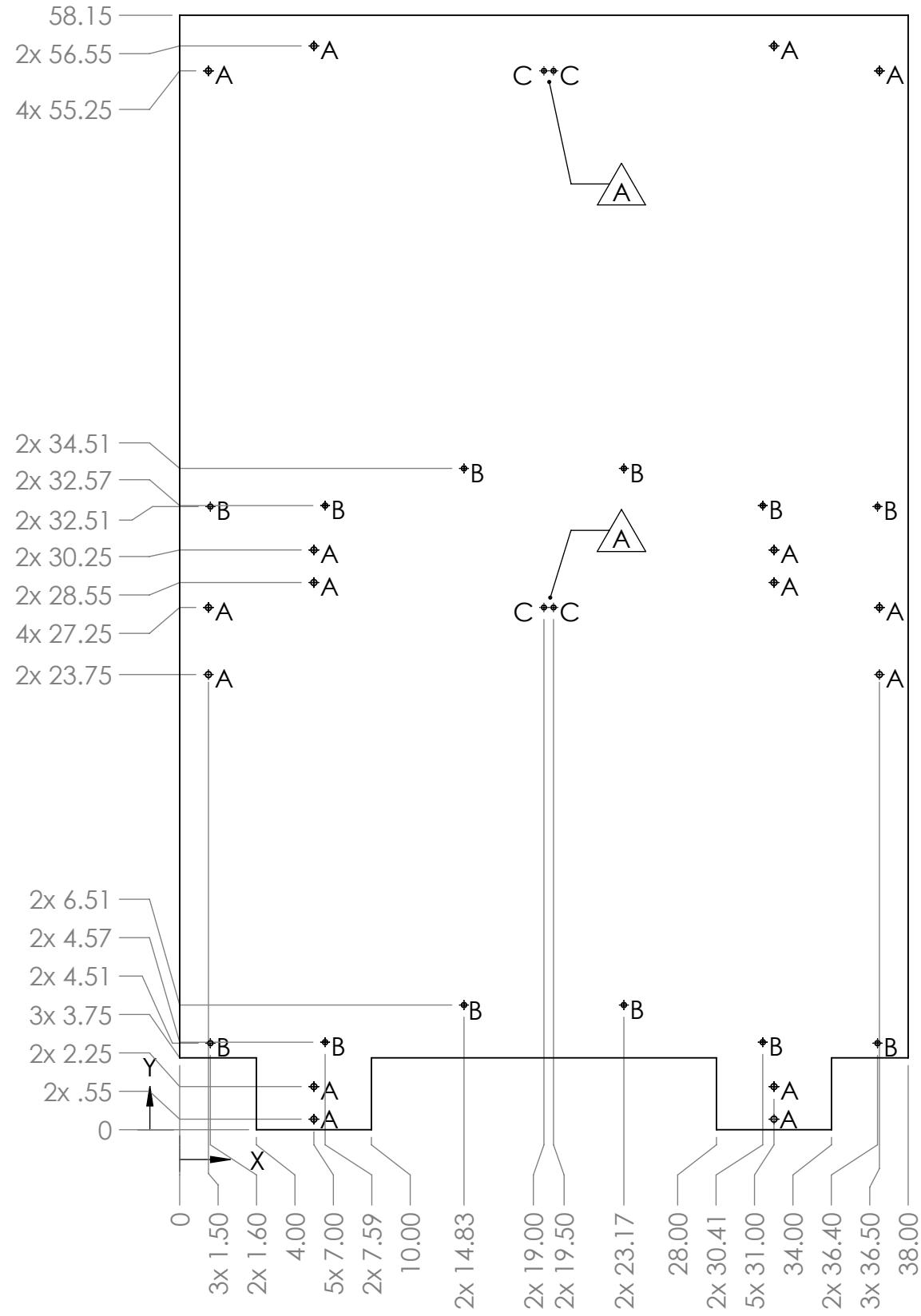
3

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B

B



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## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B3	A	1/4" diameter holes added.	10/29/2018	CPO

TAG	SIZE	QUANTITY
A	Ø .31 THRU ALL	16
B	Ø .27 THRU ALL	12
C	Ø .25 THRU ALL	4

	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
	DRAWN		
	CHECKED		
	ENG APPR.		
	MFG APPR.		
	Q.A.		
	COMMENTS:		
NEXT ASSY	USED ON	INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL	
		FINISH	
APPLICATION	DO NOT SCALE DRAWING		
SCALE: 1:10	WEIGHT:	SHEET 1 OF 1	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Panel Plastic Top**

**SIZE DWG. NO. REV**  
**B GE-19110 A**

4

3

2

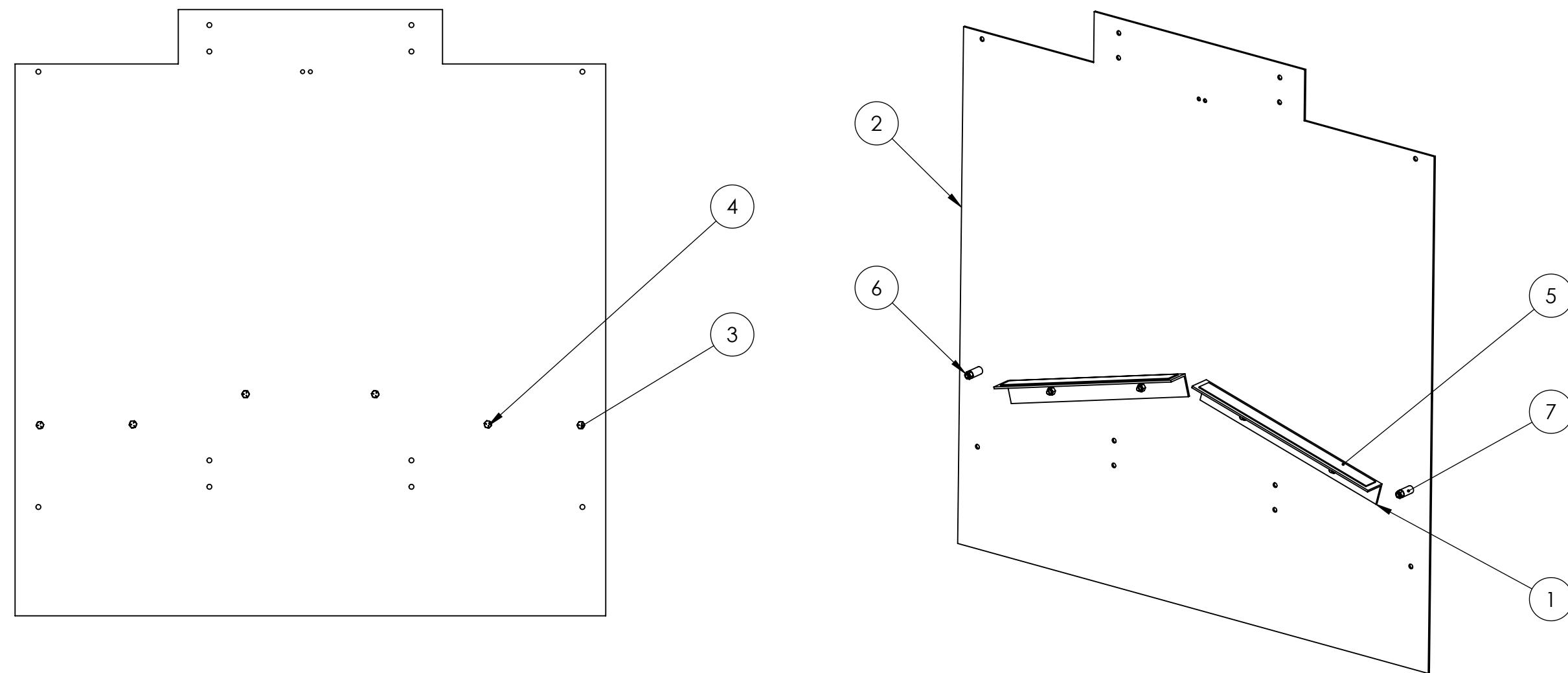
1

4

3

2

1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19028	Rocket Ramp Support Back	2
2	GE-19109	Rocket Back Plastic Bottom	1
3	hex_.25_20_1.5	Steel Hex Head Screw, 1/4"-20 x 1-1/2" long, fully threaded	2
4	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	4
5	Hook_1_14	1" x 14" Hook, Adhesive Backed	2
6	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	6
7	spacer_.257_1_.5	Spacer, .257" ID, 1/2" OD, 1" thk	2

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	
SCALE: 1:8 WEIGHT: SHEET 1 OF 1				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Rocket Back Bottom Assembly

**SIZE** DWG. NO. REV  
**B** GE-19113

4

3

2

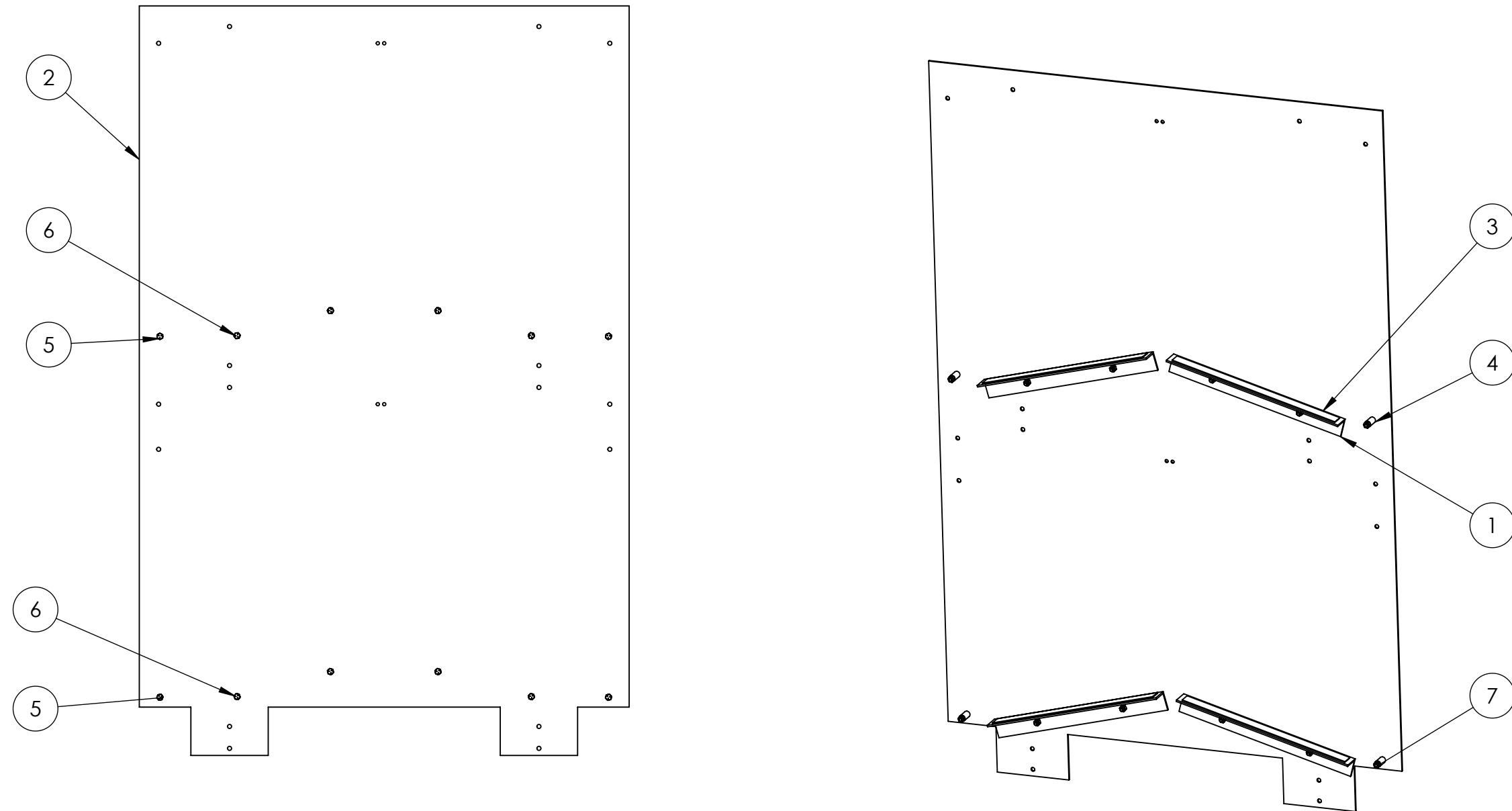
1

4

3

2

1



B

B

A

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19028	Rocket Ramp Support Back	4
2	GE-19110	Rocket Panel Plastic Top	1
3	Hook_1_14	1" x 14" Hook, Adhesive Backed	4
4	spacer_.257_1_.5	Spacer, .257" ID, 1/2" OD, 1" thk	4
5	hex_.25_20_1.5	Steel Hex Head Screw, 1/4"-20 x 1-1/2" long, fully threaded	4
6	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	8
7	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	12

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Notes:  
1. Item 3 attaches to the top of item 1, centered.

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ , BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

TITLE: Rocket Back Top Assembly

SIZE DWG. NO. REV  
**B** GE-19114

SCALE: 1:10 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

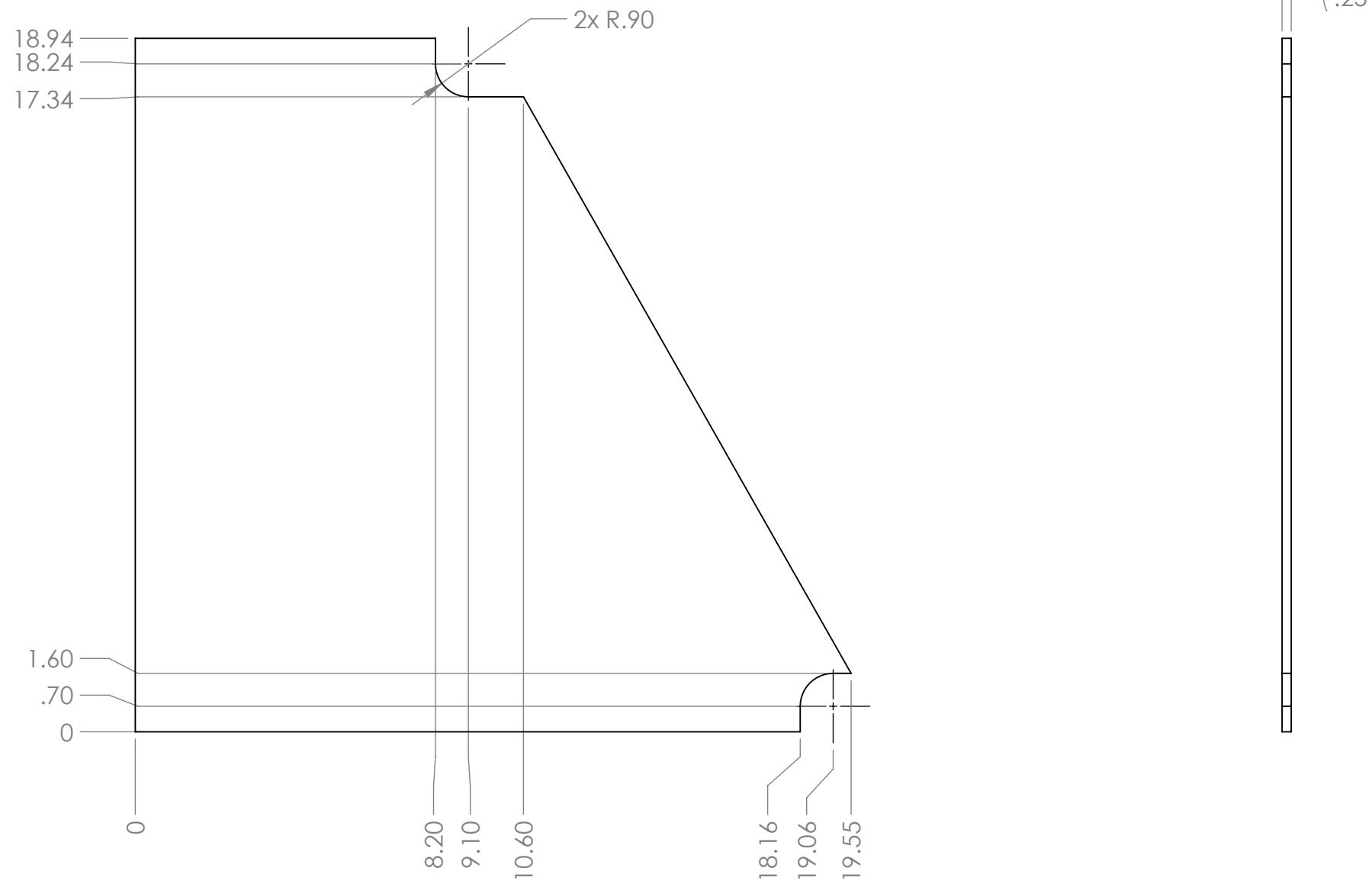
3

2

1

B

B



A

A

**Notes:**

1. Material: 1/4" thick, clear polycarbonate.
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19115</b>			
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1		

4

3

2

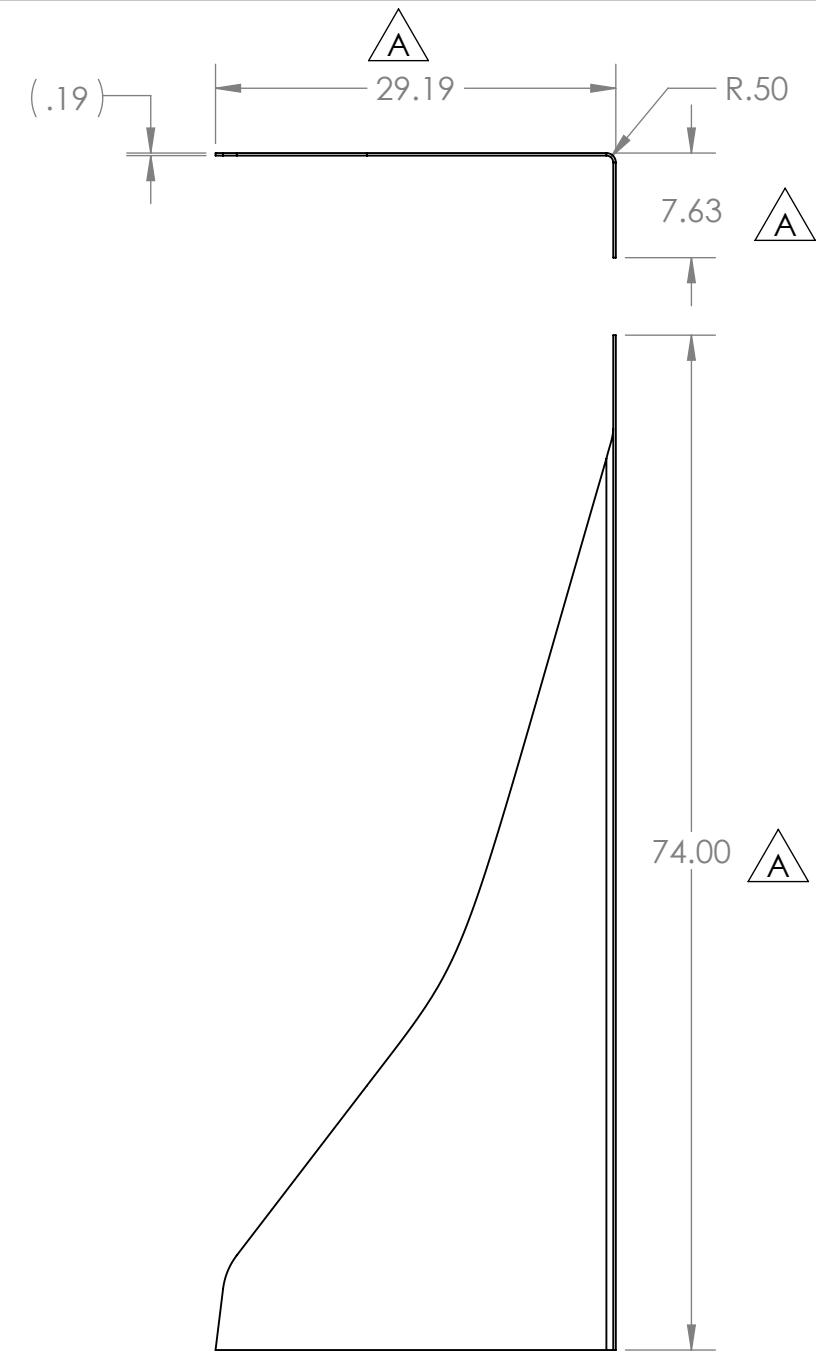
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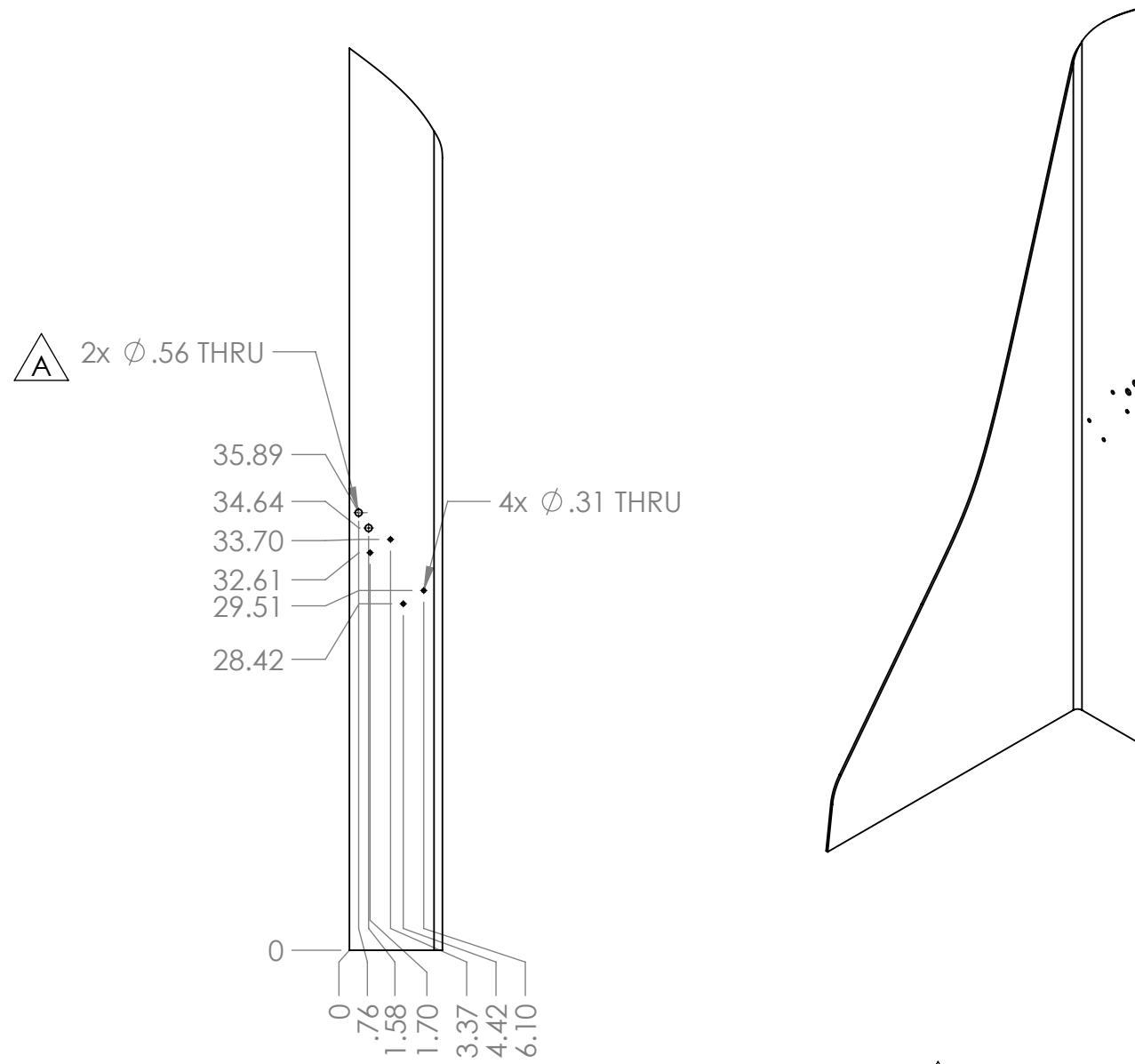
3

2

1



REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
A1, A3, B3	A	Overall dimensions changed to make part larger. 2 clearance holes added. Notes updated. Part name and number updated.	9/25/2018	CPO



- Notes:
1. Material: 3/16" thick, clear polycarbonate.
  2. Remove all burrs and sharp edges.
  3. Tag or label with part number.
  4. Finish: Vinyl applied to face.

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		DRAWN CHECKED ENG APPR. MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL	Q.A.	COMMENTS:
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		
B	GE-19116	A		
SCALE: 1:14	WEIGHT:	SHEET 1 OF 1		

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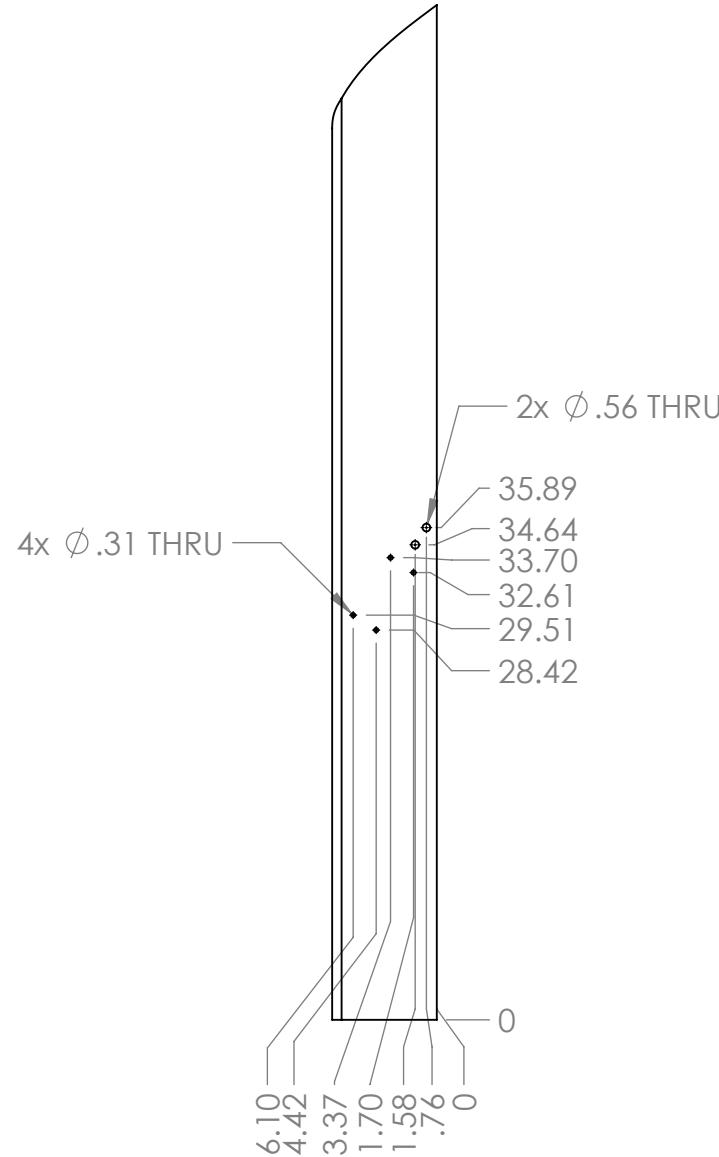
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2

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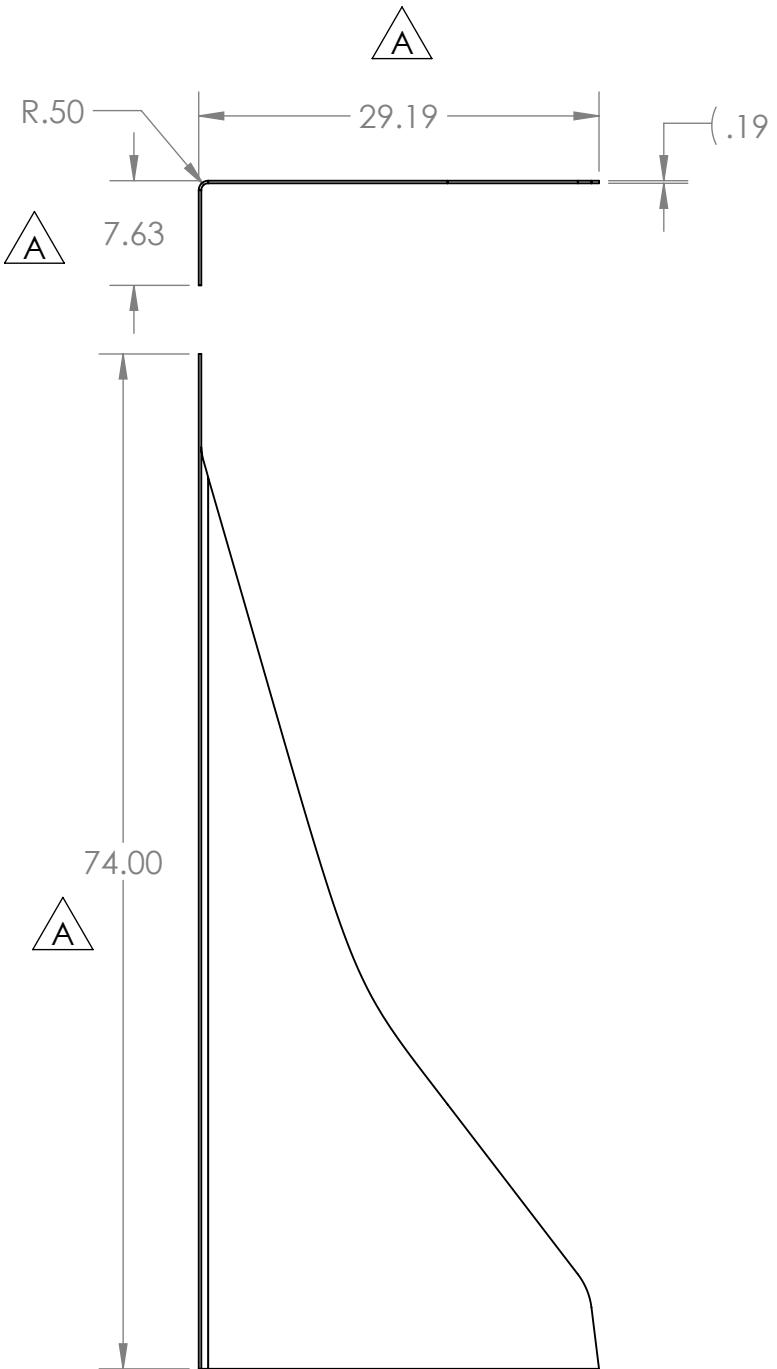
B

B



- Notes:
1. Material: 3/16" thick, clear polycarbonate.
  2. Remove all burrs and sharp edges.
  3. Tag or label with part number.
  4. Finish: Vinyl applied to face.

A



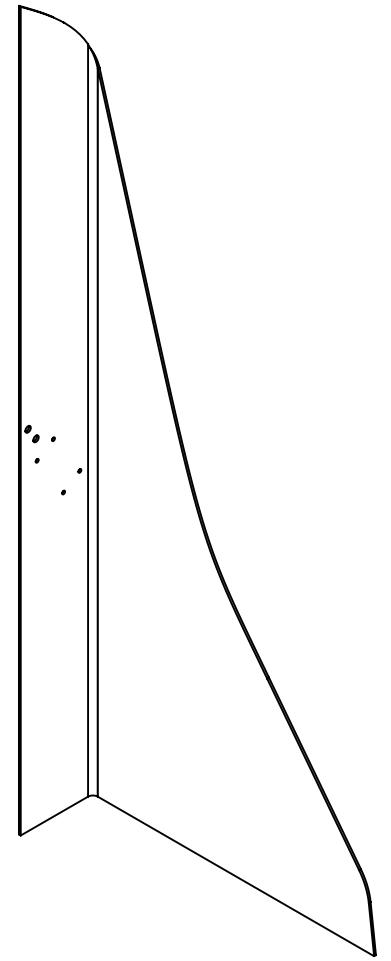
3

2

1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A1, A3, B3	A	Overall dimensions changed to make part larger. 2 clearance holes added. Notes updated. Part name and number updated.	9/25/2018	CPO



		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
SIZE	DWG. NO.			REV
B	GE-19117			A
SCALE: 1:14	WEIGHT:	SHEET 1 OF 1		

FIRST  
ROBOTICS  
COMPETITIONSOLIDWORKS  
Modeling Solutions PartnerTITLE:  
Fin, Right

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4

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4

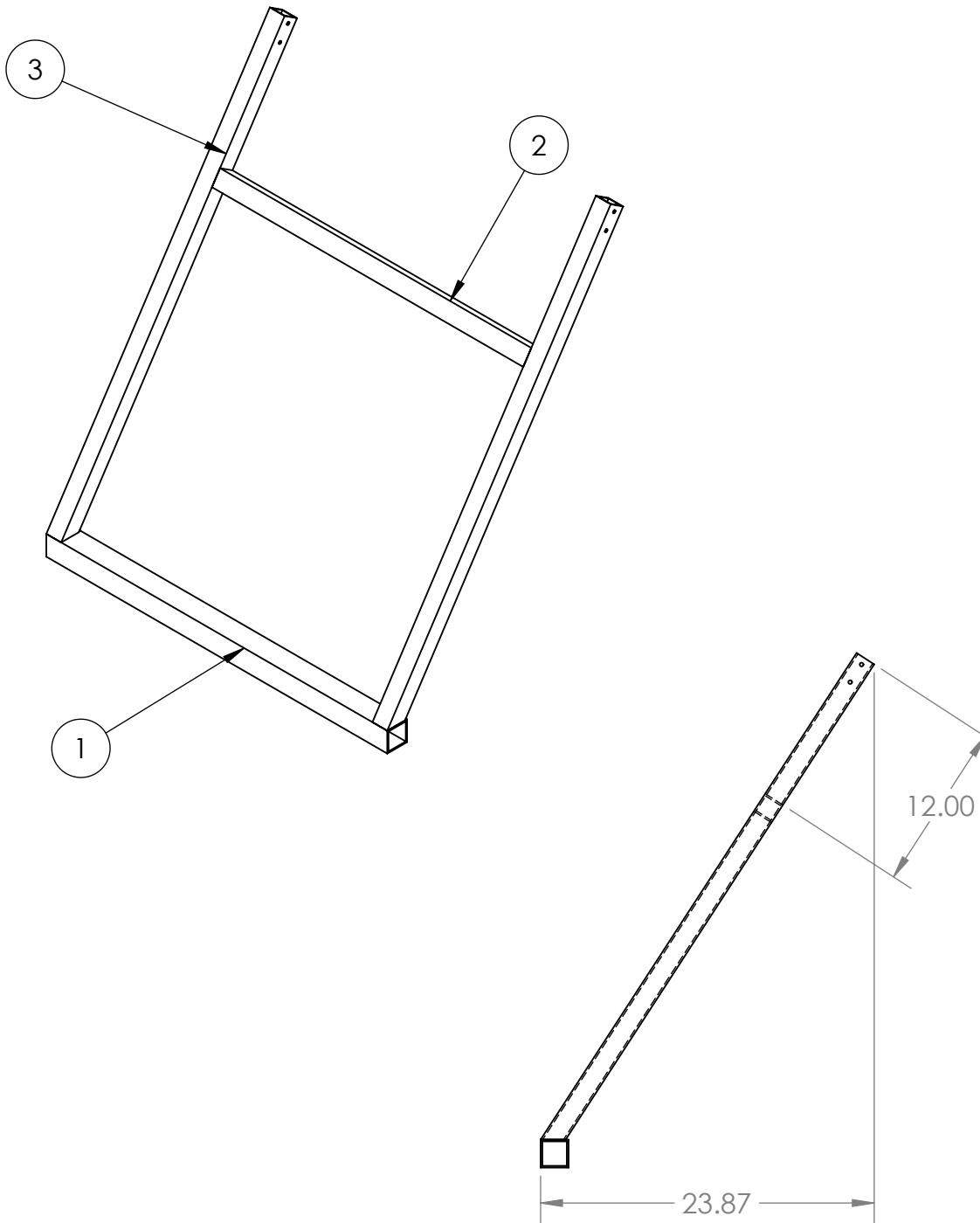
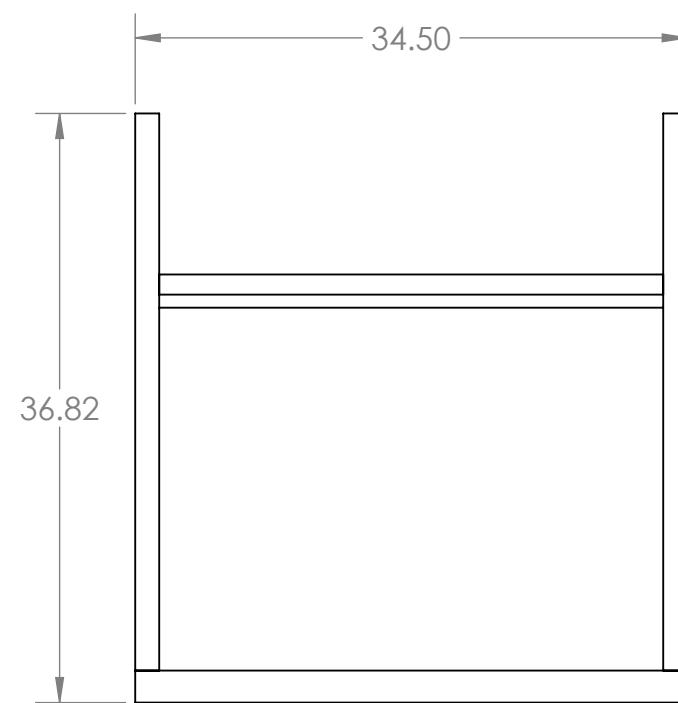
3

2

1

B

B



## Notes:

1. Tag or label with part number.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19118-01	2" x .125" thk. Square Tube, 6063 Aluminum	1
2	GE-19118-02	1.5" x .125" thk. Square Tube, 6063 Aluminum	1
3	GE-19118-03	1.5" x .125" thk. Square Tube, 6063 Aluminum	2

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
	NEXT ASSY	USED ON		
		APPLICATION	DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Outrigger**

**SIZE DWG. NO. REV**  
**B GE-19118**

**SCALE: 1:12 WEIGHT: SHEET 1 OF 3**

4

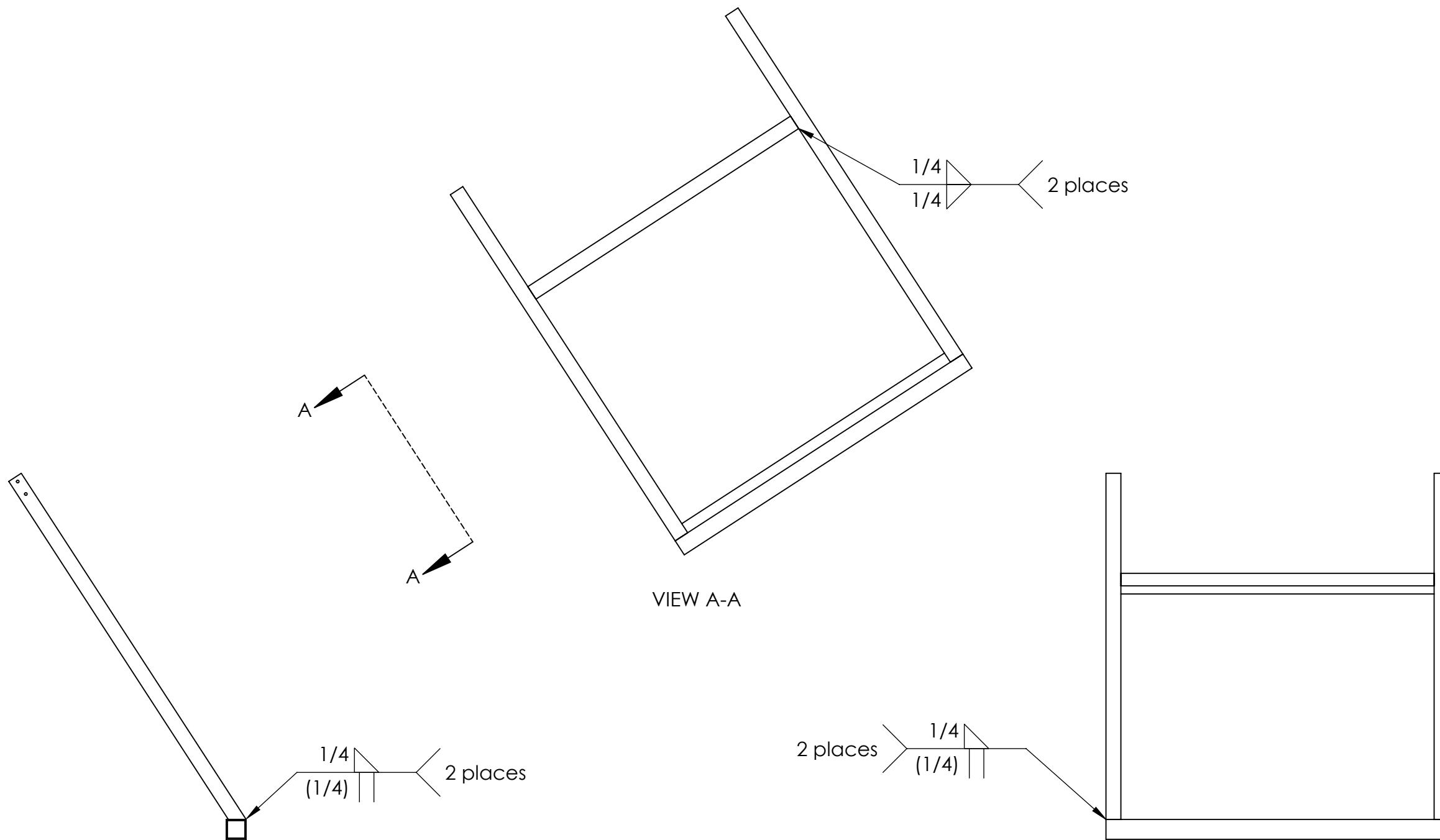
3

2

1

B

B



A

A

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Outrigger**

**SIZE** DWG. NO. REV  
**B** **GE-19118**

SCALE: 1:12 WEIGHT: SHEET 2 OF 3

4

3

2

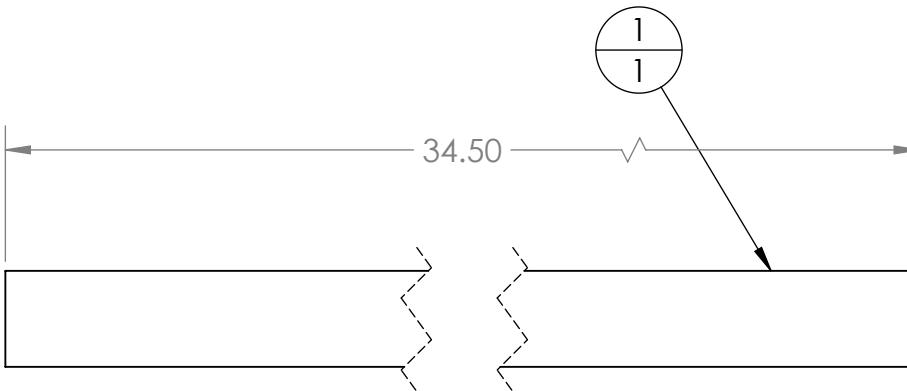
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4

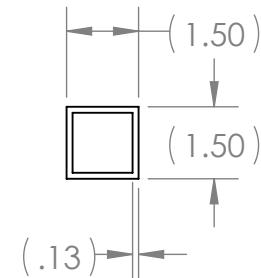
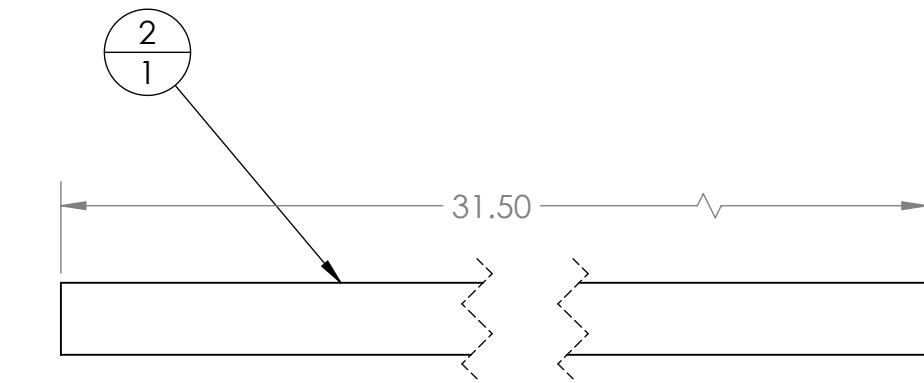
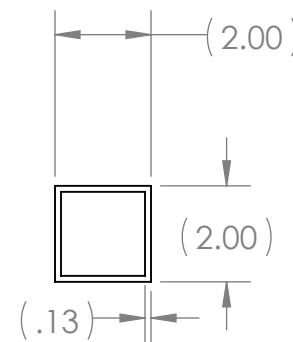
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2

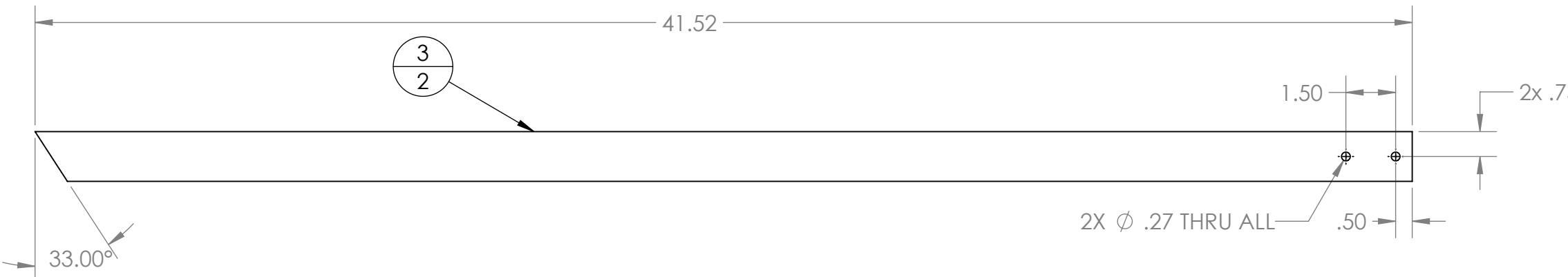
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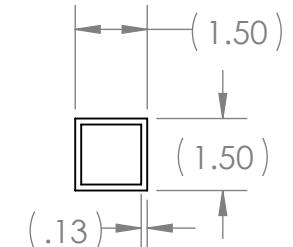
Material: 2" x 2" x .125" thk. Rectangular Tube, 6063 Aluminum  
Scale: 1:4



B



Material: 1.5" x .125" thk. Square Tube, 6063 Aluminum  
Scale: 1:4



A

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL $\pm 1/16$				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$				
INTERPRET GEOMETRIC TOLERANCING PER:		Q.A.	COMMENTS:	
MATERIAL		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

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FIRST ROBOTICS COMPETITION SOLIDWORKS  
Modeling Solutions Partner

## Rocket Outrigger

SIZE DWG. NO. REV  
**B** GE-19118

SCALE: 1:4 WEIGHT: SHEET 3 OF 3

4

3

2

1

4

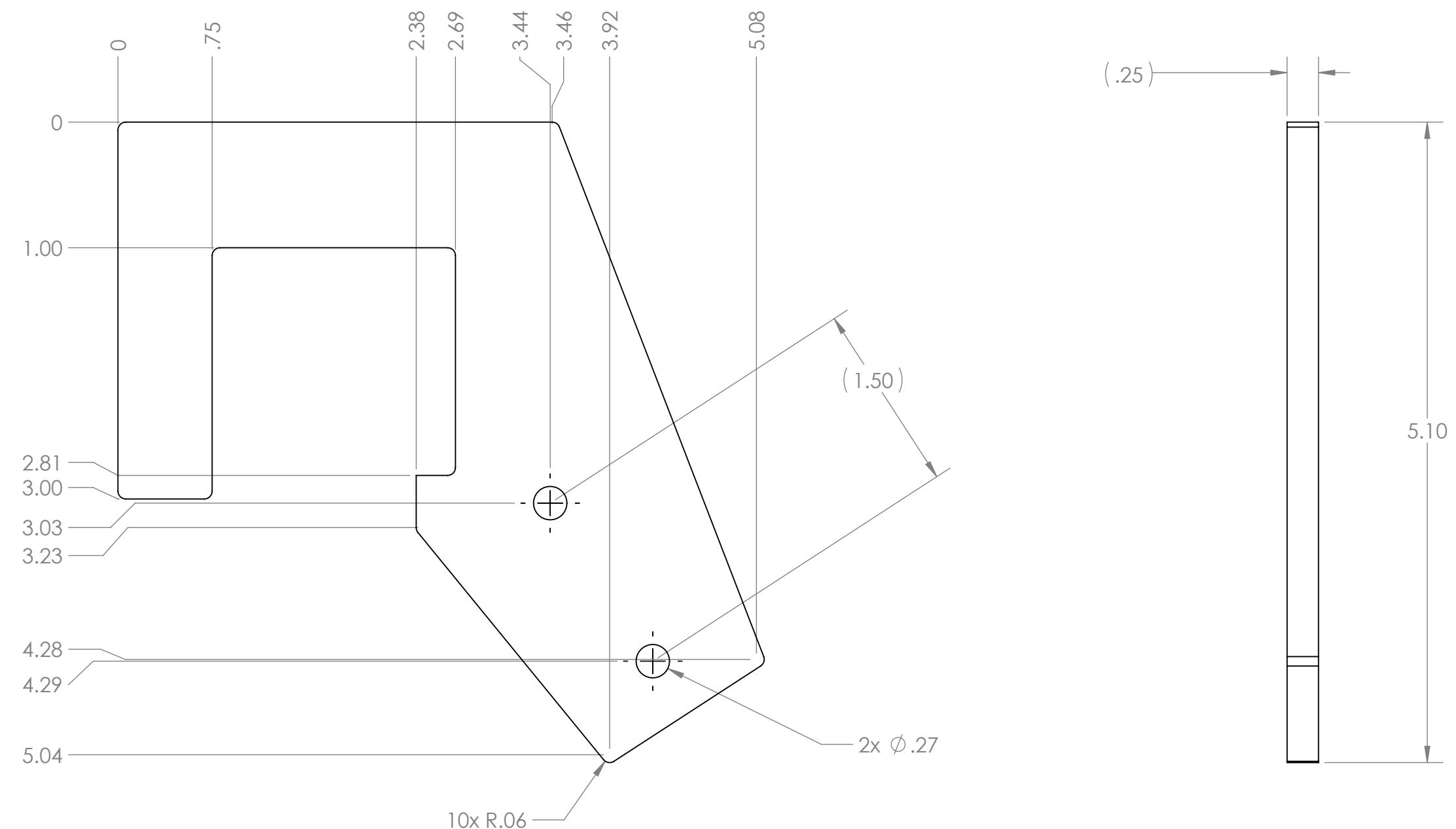
3

2

1

B

B

**Notes:**

1. Material: 1/4" thick, clear polycarbonate.
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL: ±1/16				
ANGULAR: MACH ±1° BEND ±1°				
TWO PLACE DECIMAL: ±.01				
THREE PLACE DECIMAL: ±.001				
INTERPRET GEOMETRIC TOLERANCING PER:				
MATERIAL				
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:1		WEIGHT:	SHEET 1 OF 1	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner  
TITLE: Rocket Outrigger Gusset  
SIZE DWG. NO. REV  
**B GE-19119**  
SCALE: 1:1 WEIGHT: SHEET 1 OF 1

4

3

2

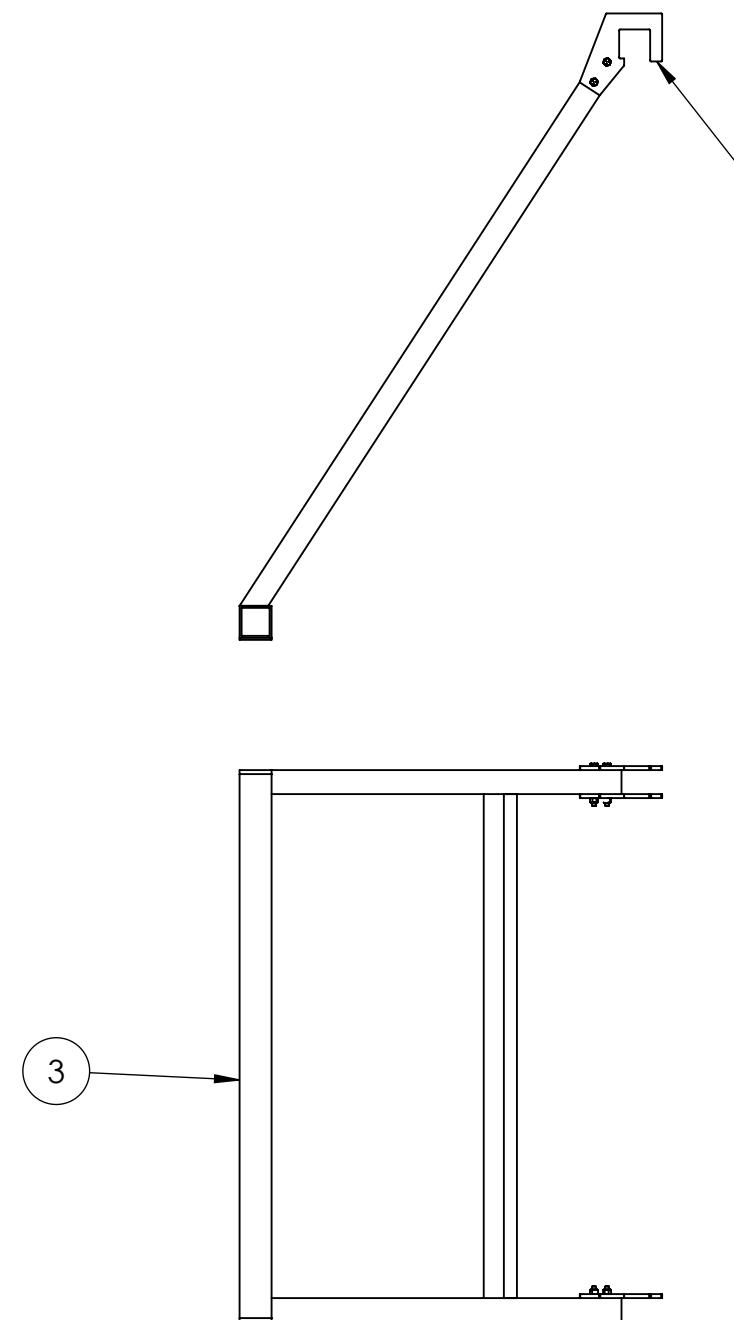
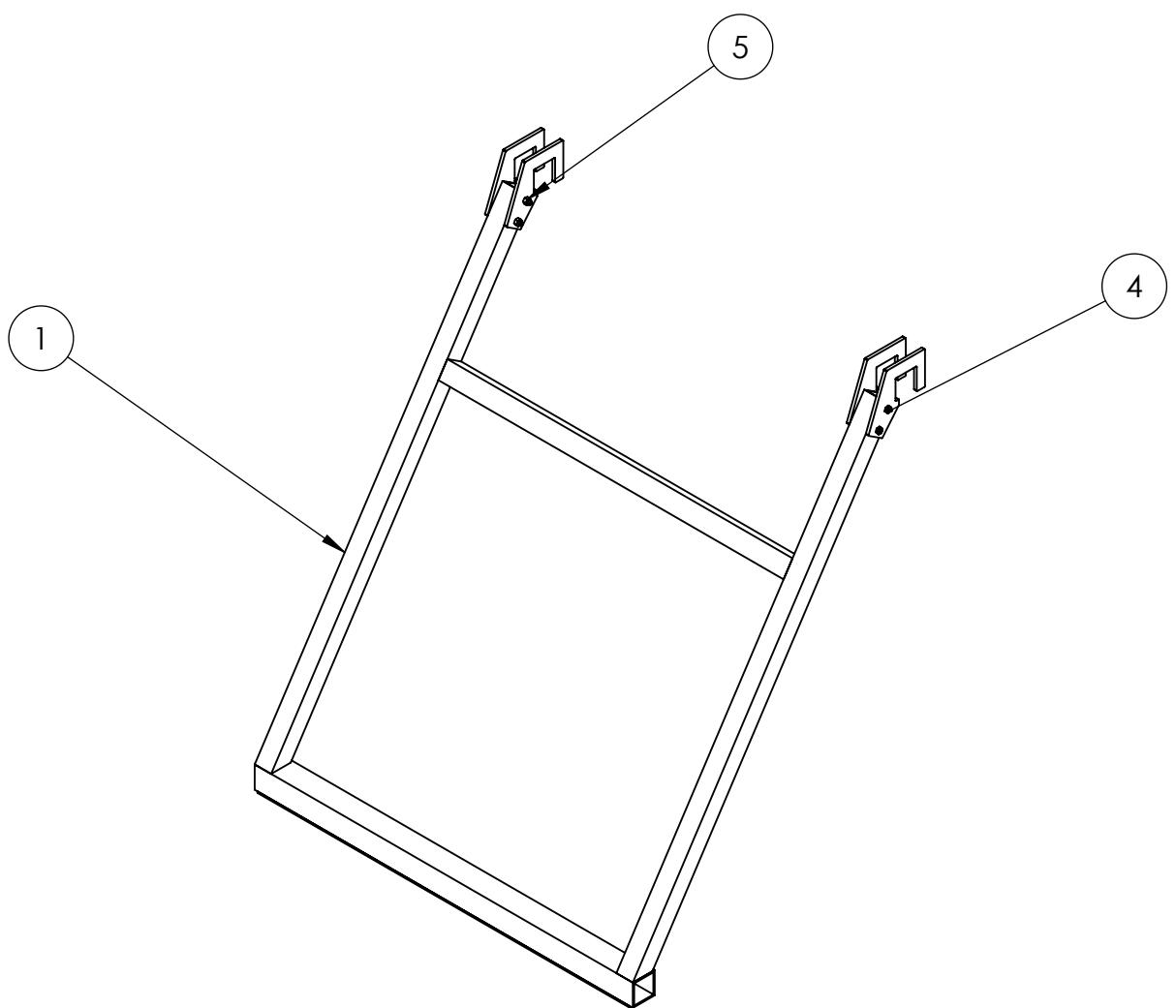
1

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2

1



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19118	Rocket Outrigger	1
2	GE-19119	Rocket Outrigger Gusset	4
3	Hook_2_34	Hook_2_34	1
4	hex_.25_20_2.5_partial	Steel Hex Head Screw, 1/4"-20 x 2-1/2" long, partially threaded	4
5	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$			
		THREE PLACE DECIMAL $\pm .001$			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
		FINISH			
	NEXT ASSY	USED ON			
		APPLICATION	DO NOT SCALE DRAWING		
SIZE	DWG. NO.			REV	
<b>B</b>	<b>GE-19120</b>				
SCALE: 1:12	WEIGHT:			SHEET 1 OF 1	

**FIRST ROBOTICS COMPETITION**  
SOLIDWORKS  
Modeling Solutions Partner

**Rocket Outrigger Assembly**

4

3

2

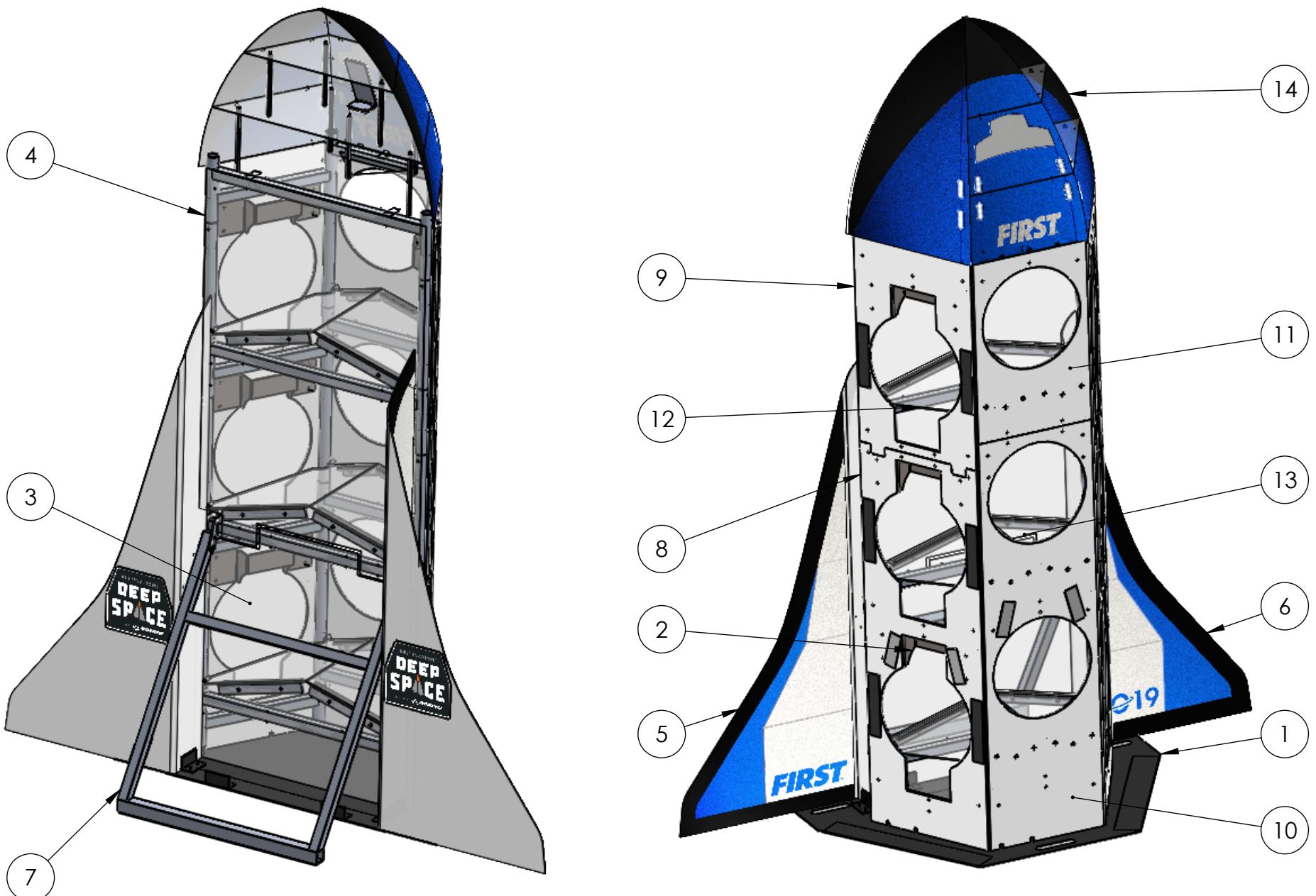
1

B

B

Notes:  
 1. This assembly exists in Red and Blue configurations, only blue is shown here.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19025	Rocket Frame Assembly	1
2	GE-19026	Keyhole Insert	6
3	GE-19113	Rocket Back Bottom Assembly	1
4	GE-19114	Rocket Back Top Assembly	1
5	GE-19116	Rocket Fin Left	1
6	GE-19117	Rocket Fin Right	1
7	GE-19120	Rocket Outrigger Assembly	1
8	GE-19126	Rocket Panel Bottom Assembly	2
9	GE-19127	Rocket Panel Top Assembly	2
10	GE-19128	Rocket Cargo Bottom Assembly	1
11	GE-19129	Rocket Cargo Top Assembly	1
12	GE-19180	Rocket Ramp Left	3
13	GE-19181	Rocket Ramp Right	3
14	GE-19202	Nose Cone Assembly	1



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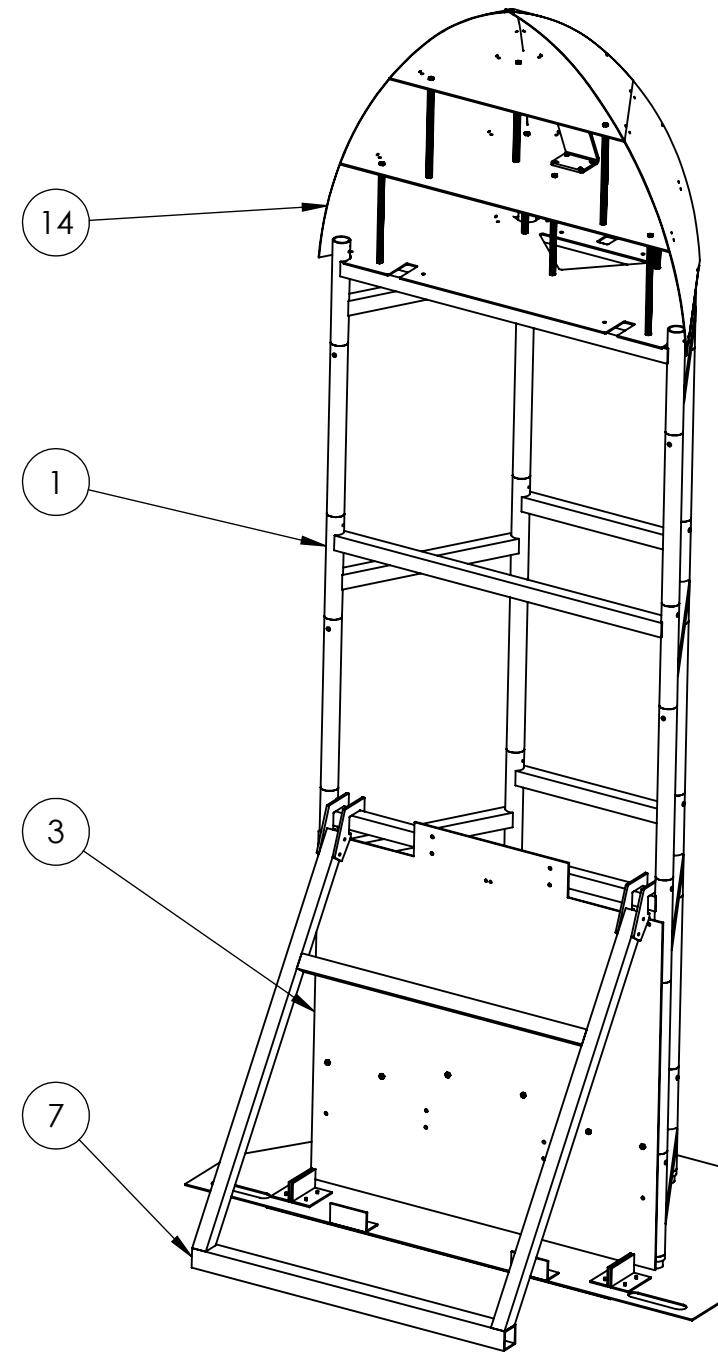
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL: ±1/16	ENG APPR.		
		ANGULAR: MACH ±1° BEND ±1°	MFG APPR.		
		TWO PLACE DECIMAL ±.01	Q.A.		
		THREE PLACE DECIMAL ±.001	COMMENTS:		
			MATERIAL		
			FINISH		
			APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.		REV		
B	GE-19121				
SCALE: 1:20	WEIGHT:		SHEET 1 OF 4		

4

3

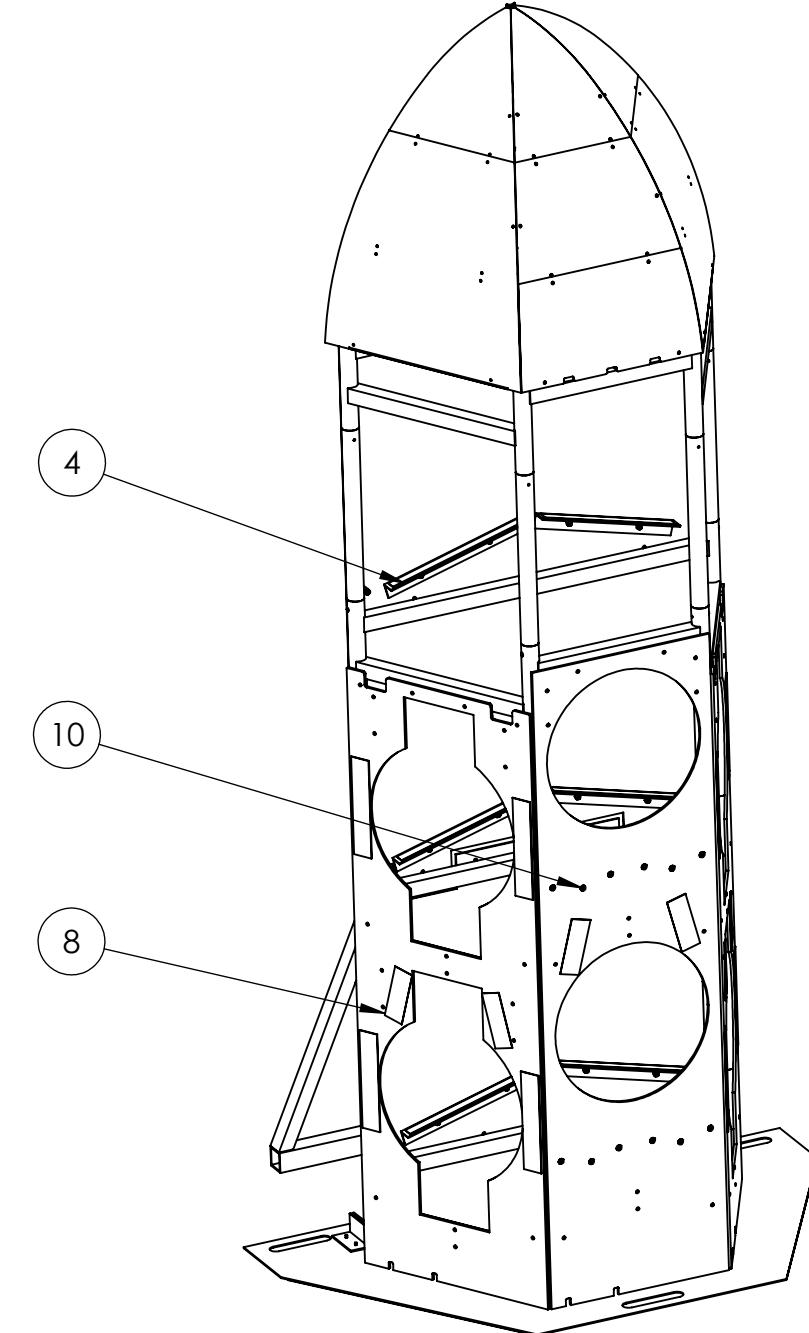
2

1



B

B



#### Notes:

1. Attach item 14 to item 1 using 120-lb cable ties.
2. Attach item 3 to item 1 using 120-lb cable ties, making sure not to use the holes along the side edges.
3. Place item 7 over the crossbar of item 1 as shown.

#### Notes:

1. Attach item 14 to item 1 using 120-lb cable ties.
2. Attach item 3 to item 1 using 120-lb cable ties, making sure not to use the holes along the side edges.
3. Place item 7 over the crossbar of item 1 as shown.

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
SIZE	DWG. NO.				REV
<b>B</b>	<b>GE-19121</b>				
SCALE: 1:18	WEIGHT:				SHEET 2 OF 4

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

# Rocket Assembly

4

3

2

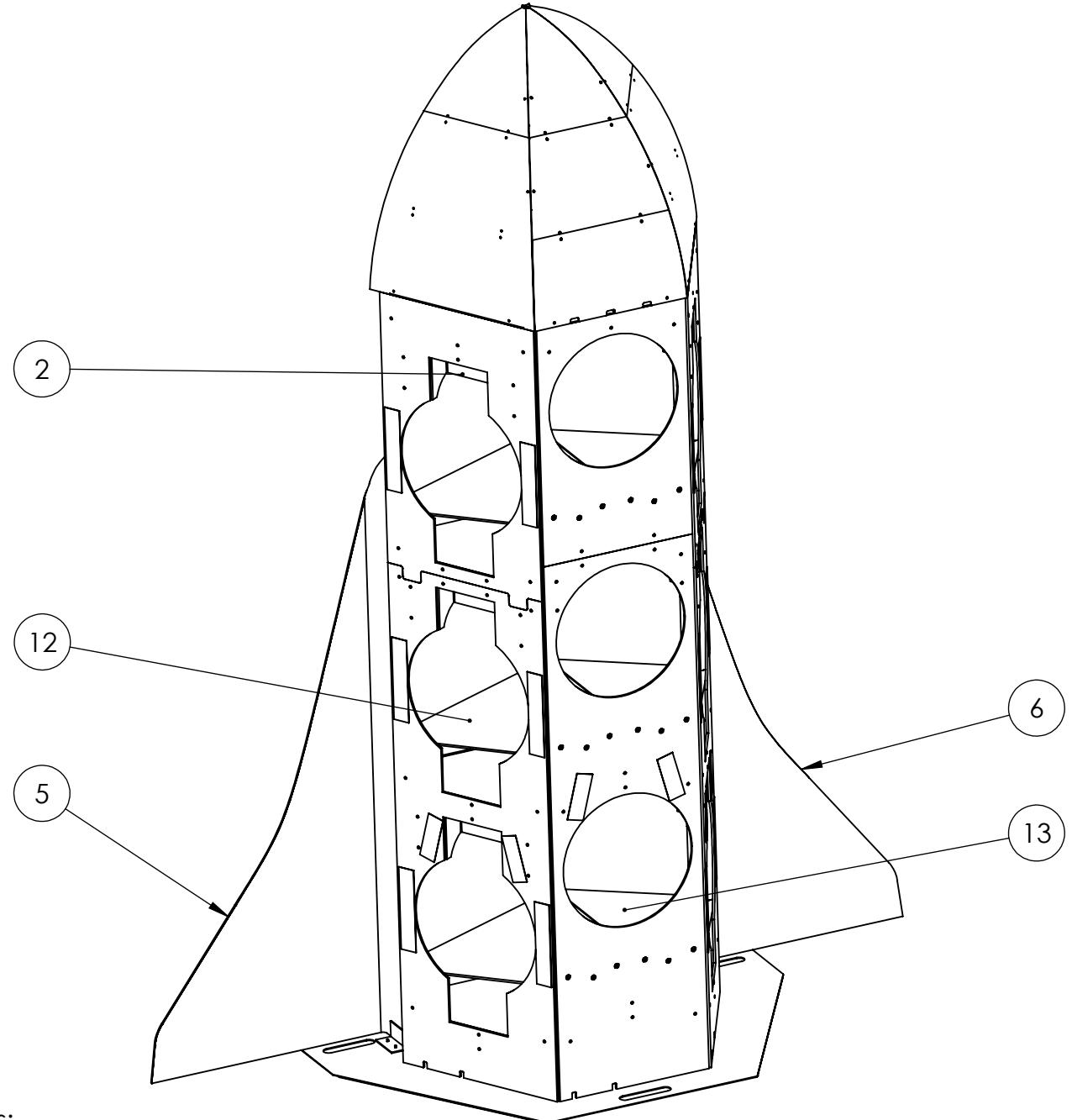
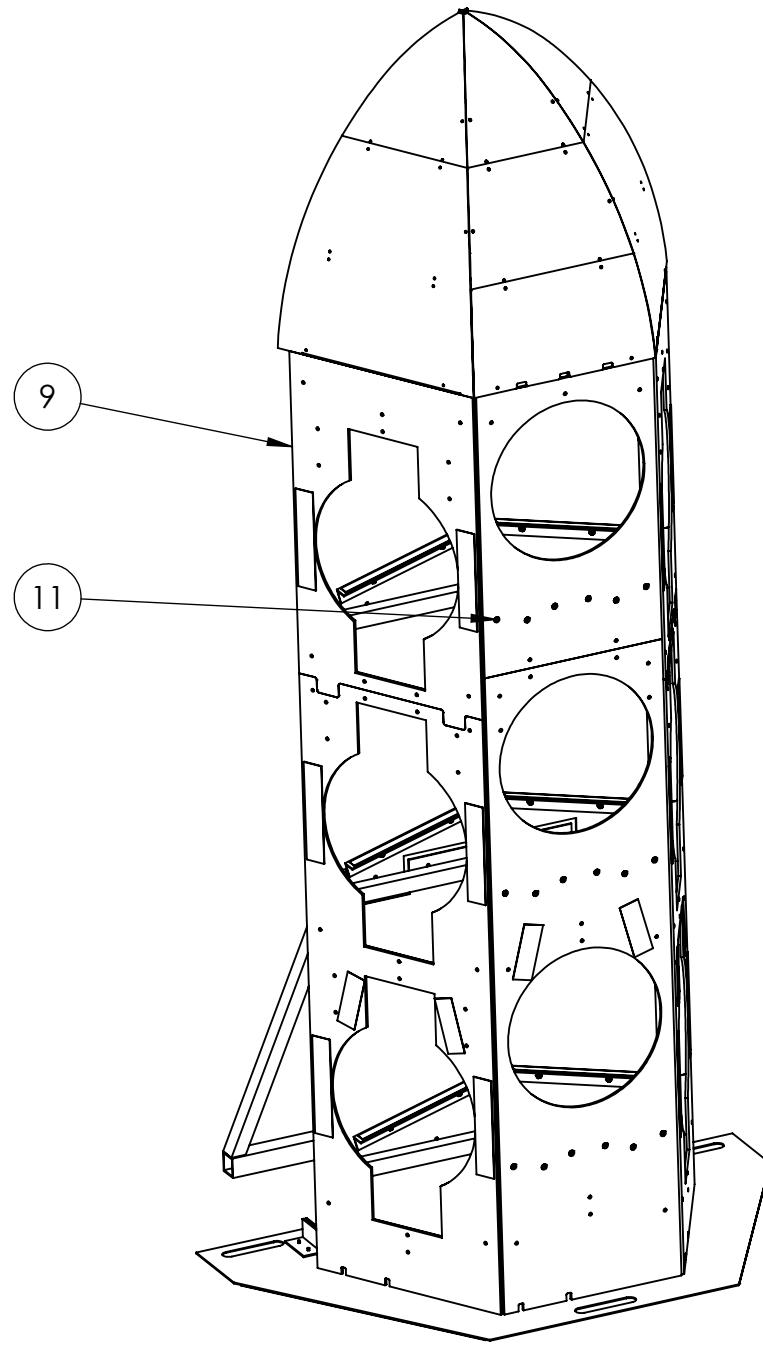
1

4

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1



## Notes:

1. Attach item 9 and 11 to the assembly using 120-lb cable ties.
2. Ensure all cable tie holes have been used to connect plastic side faces to frame and each other.

## Notes:

1. Attach item 2 (qty. 6) to the assembly using 120-lb cable ties.
2. Place items 12 (qty. 3) and 13 (qty. 3) into the assembly, affixing using the hook and loop fastener. Make sure they sit under the spacers attached to the back of Items 8 and 9.
3. Place items 5 and 6 into the notches on the assembly, and attach to item 7 using 120-lb cable ties.

	UNLESS OTHERWISE SPECIFIED:	NAME	DATE
	DIMENSIONS ARE IN INCHES		
	TOLERANCES:		
	FRACTIONAL: $\pm\frac{1}{16}$		
	ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		
	TWO PLACE DECIMAL $\pm .01$		
	THREE PLACE DECIMAL $\pm .001$		
	INTERPRET GEOMETRIC TOLERANCING PER:		
	MATERIAL		
NEXT ASSY	USED ON	FINISH	
APPLICATION	DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Assembly**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19121</b>	
SCALE: 1:18	WEIGHT:	SHEET 3 OF 4

4

3

2

1

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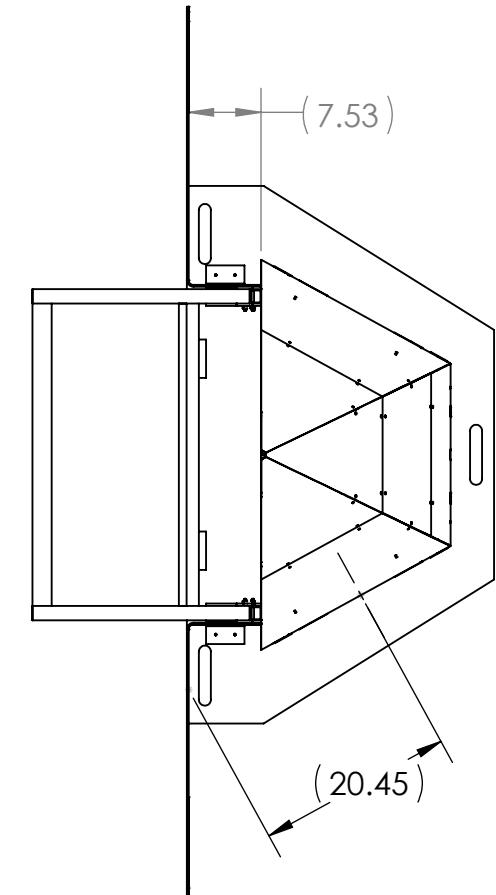
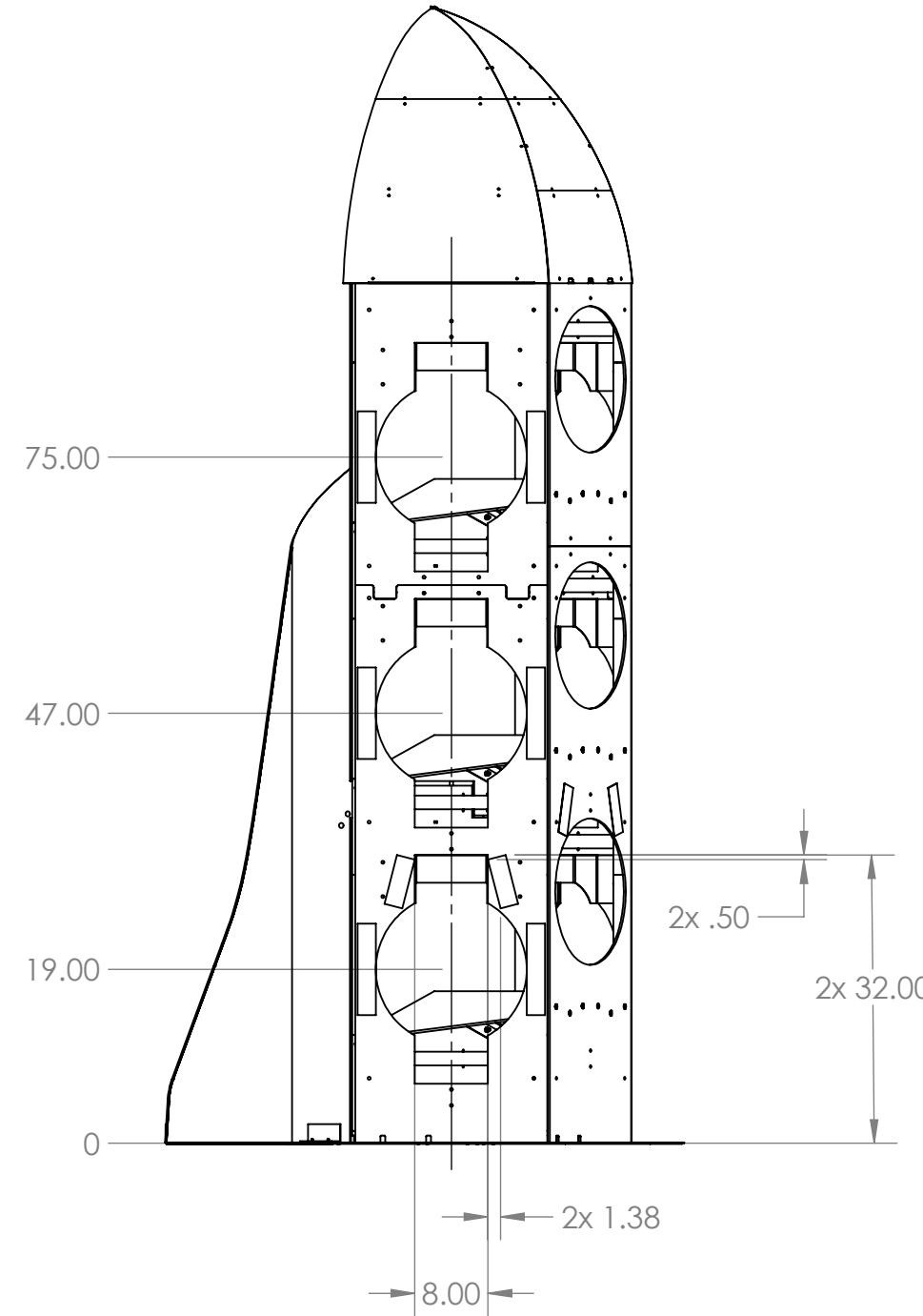
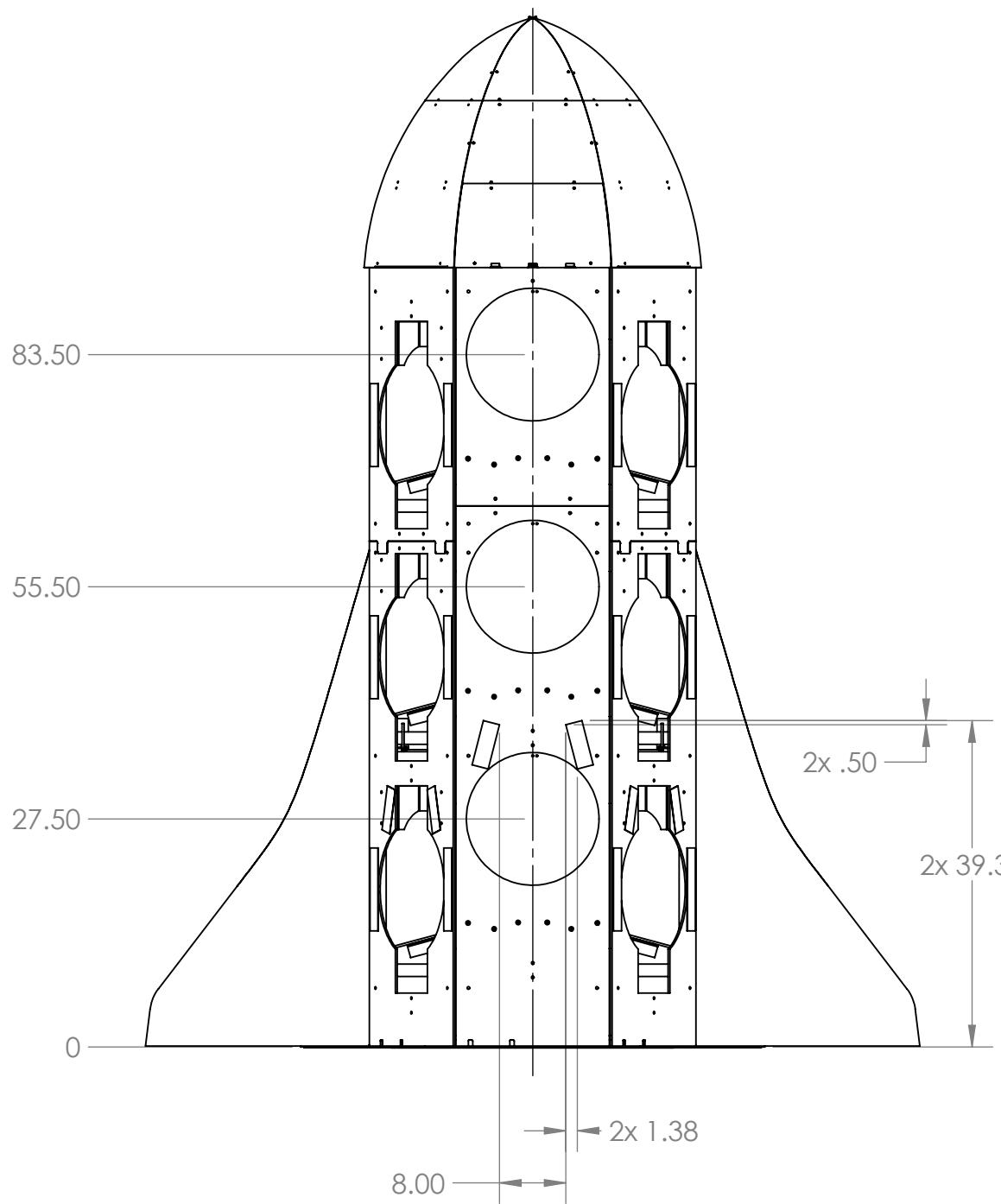
4

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1

B



A

B

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Assembly**

**SIZE DWG. NO. REV**  
**B GE-19121**

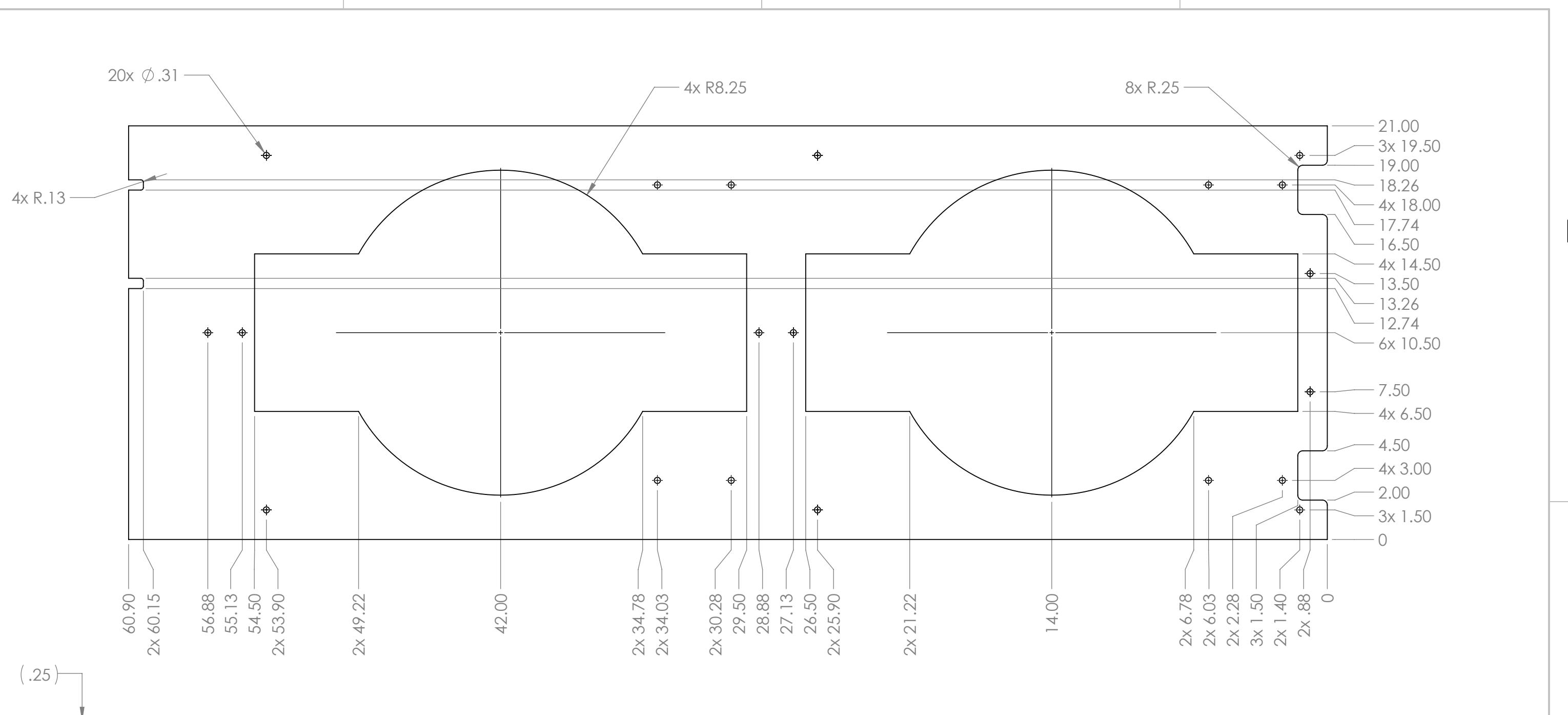
SCALE: 1:20 WEIGHT: SHEET 4 OF 4

4

3

2

1



## Notes:

1. Material: 1/4" thick, clear polycarbonate
  2. Finish: Apply screen print to one side.
  3. Remove all burrs and sharp edges.
  4. Tag or label with part number.

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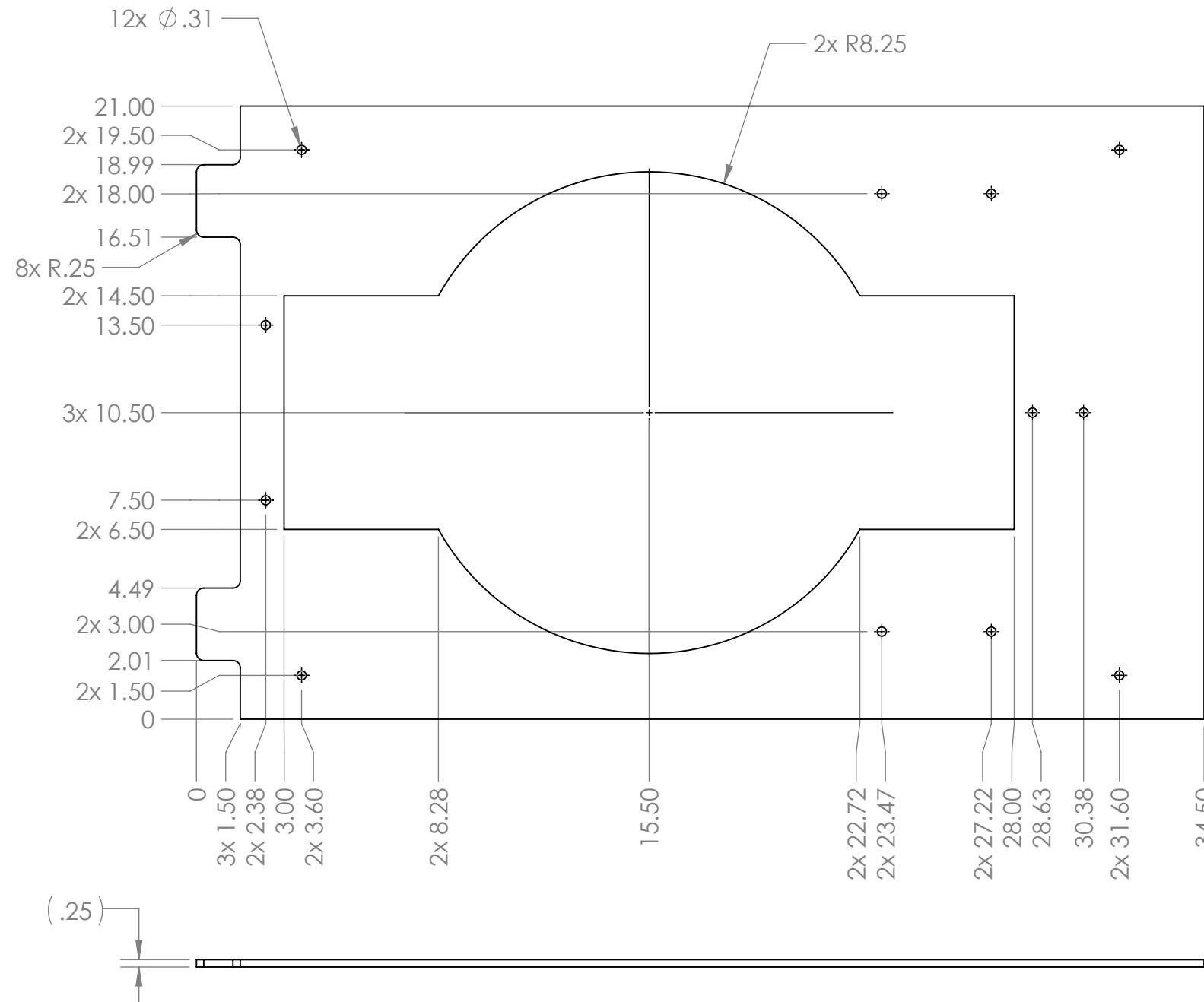
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST</b> <b>ROBOTICS</b> <b>COMPETITION</b>	<b>TITLE:</b>  <h1>Rocket Panel Plastic Bottom</h1>	
		DIMENSIONS ARE IN INCHES	DRAWN					<b>DS SOLIDWORKS</b> <small>Modeling Solutions Partner</small>
		TOLERANCES:	CHECKED					
		FRACTIONAL $\pm 1/16$	ENG APPR.					
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.					
		TWO PLACE DECIMAL $\pm .01$	Q.A.					
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:					
		INTERPRET GEOMETRIC TOLERANCING PER:						
		MATERIAL						
NEXT ASSY	USED ON	FINISH						
APPLICATION		DO NOT SCALE DRAWING						
			SCALE: 1:5	WEIGHT:	SHEET 1 OF 1	REV		

4

3

2

1

**Notes:**

1. Material: 1/4" thick, clear polycarbonate.
2. Finish: Apply screen print to one side.
3. Remove all burrs and sharp edges.
4. Tag or label with part number.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Panel Plastic Top**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19123</b>	
SCALE: 1:5	WEIGHT:	SHEET 1 OF 1

4

3

2

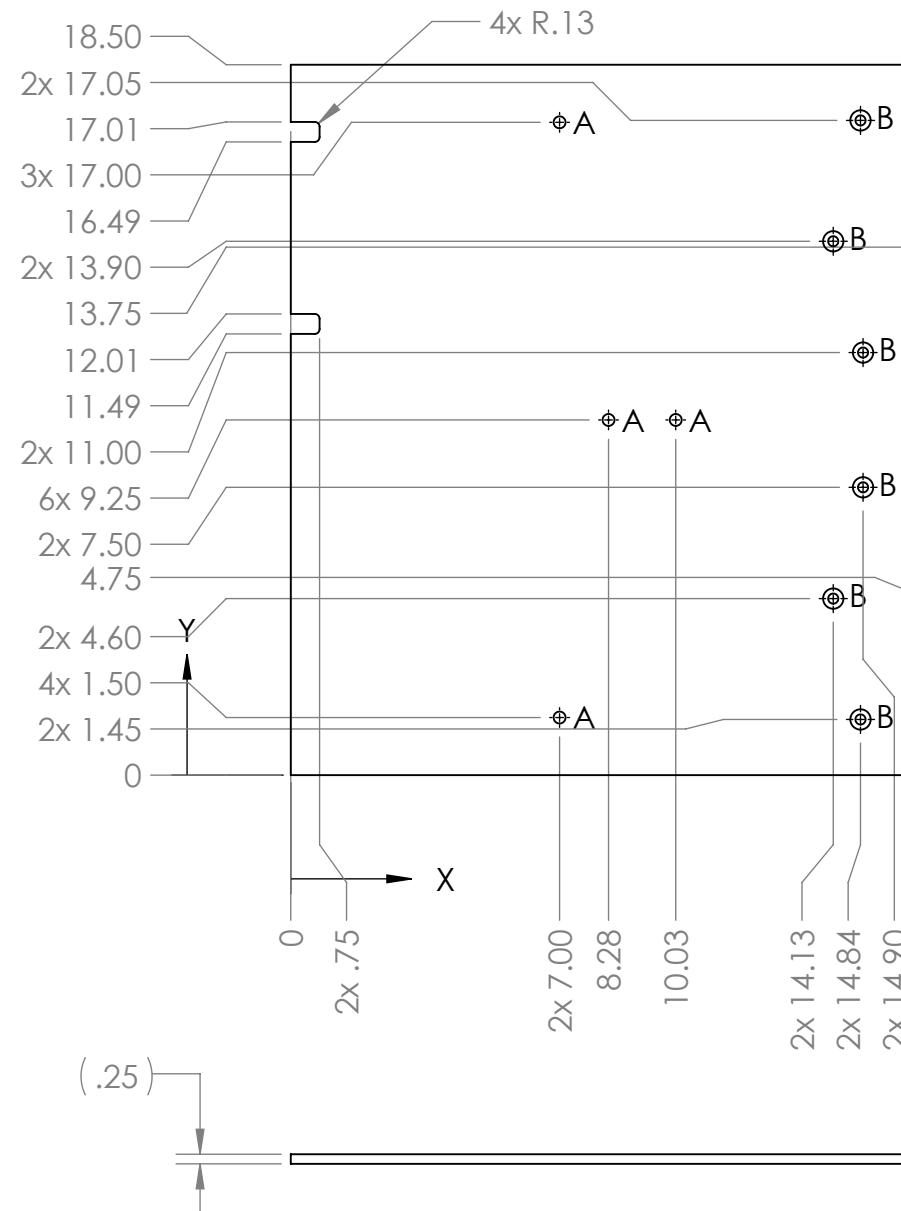
1

TAG	SIZE	QUANTITY
A	$\phi$ .31 THRU ALL	14
B	$\phi$ .27 THRU ALL $\checkmark$ $\phi$ .53 X 82°	12
C	$\phi$ 16.00 THRU	2

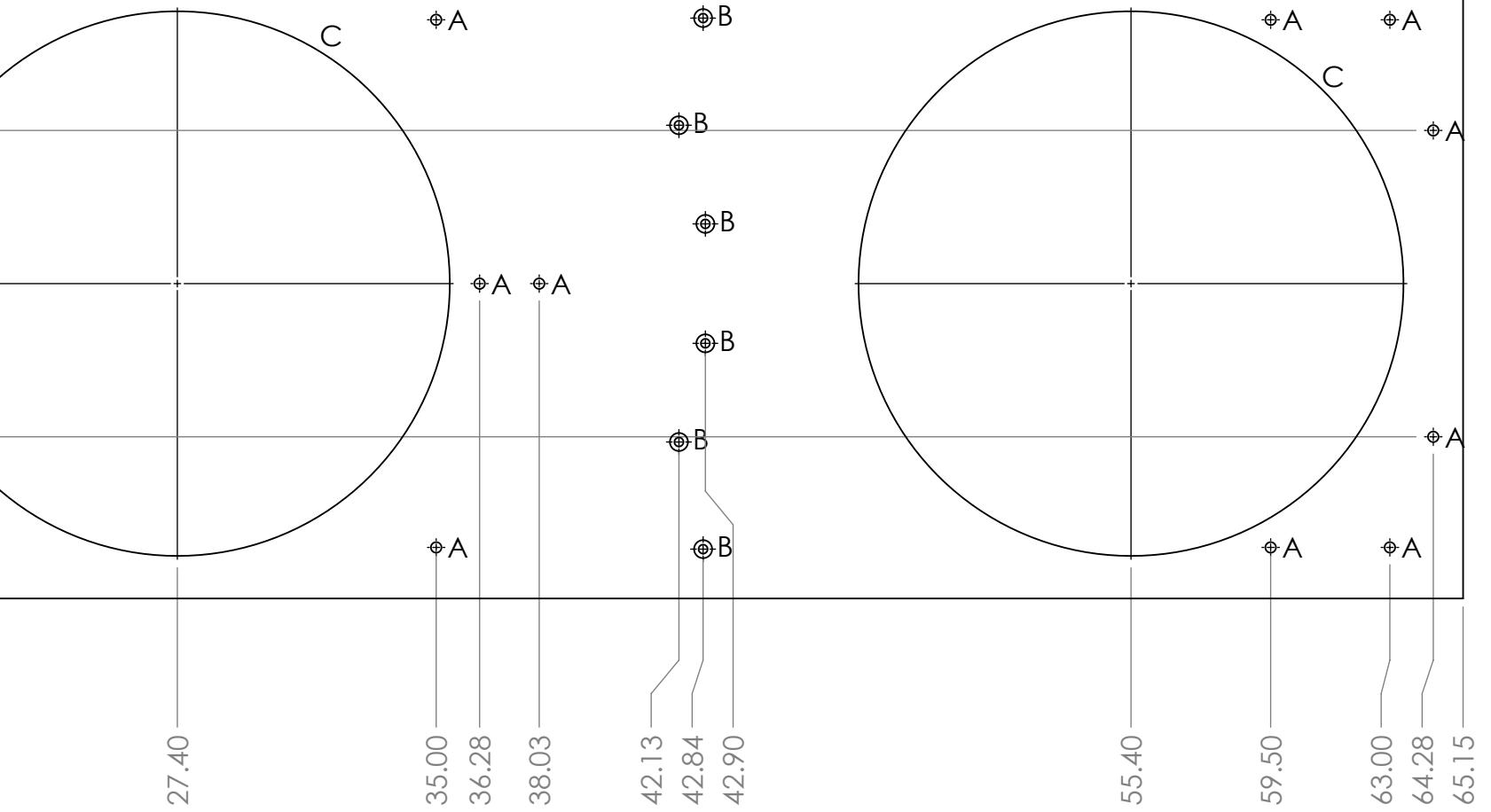
## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A3	A	Added note about screen print	10/30/2018	JRF

B



- Notes:
- Material: 1/4" thick, clear polycarbonate.
  - Finish: Apply screen print to back side (side without countersinks).
  - Remove all burrs and sharp edges.
  - Tag or label with part number.



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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Rocket Cargo Plastic Bottom**

**SIZE DWG. NO. REV**  
**B GE-19124 A**

**SCALE: 1:5 WEIGHT: SHEET 1 OF 1**

4

3

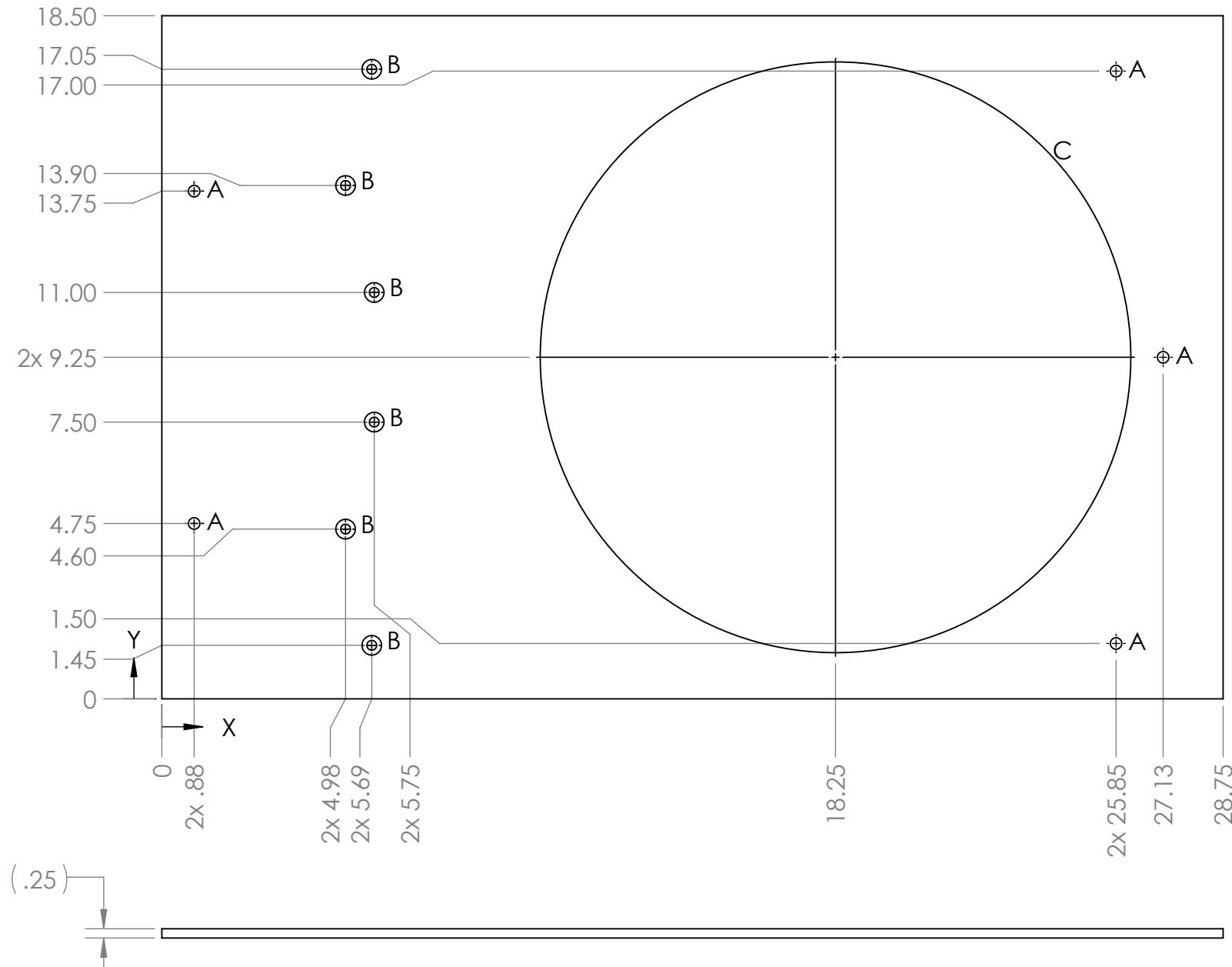
2

1

TAG	SIZE	QUANTITY
A	$\phi$ .31 THRU ALL	5
B	$\phi$ .27 THRU ALL $\checkmark \phi$ .53 X 82°	6
C	$\phi$ 16.00 THRU	1

REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A3	A	Added note about screen print	10/30/2018	JRF



## Notes:

- Material: 1/4" thick, clear polycarbonate
- Finish: Apply screen print to back side (side without countersinks)
- Remove all burrs and sharp edges
- Tag or label with part number

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		INTERPRET GEOMETRIC TOLERANCING PER:		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19125</b>	<b>A</b>		
SCALE: 1:4		WEIGHT:	SHEET 1 OF 1	

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Rocket Cargo  
Plastic Top**

4

3

2

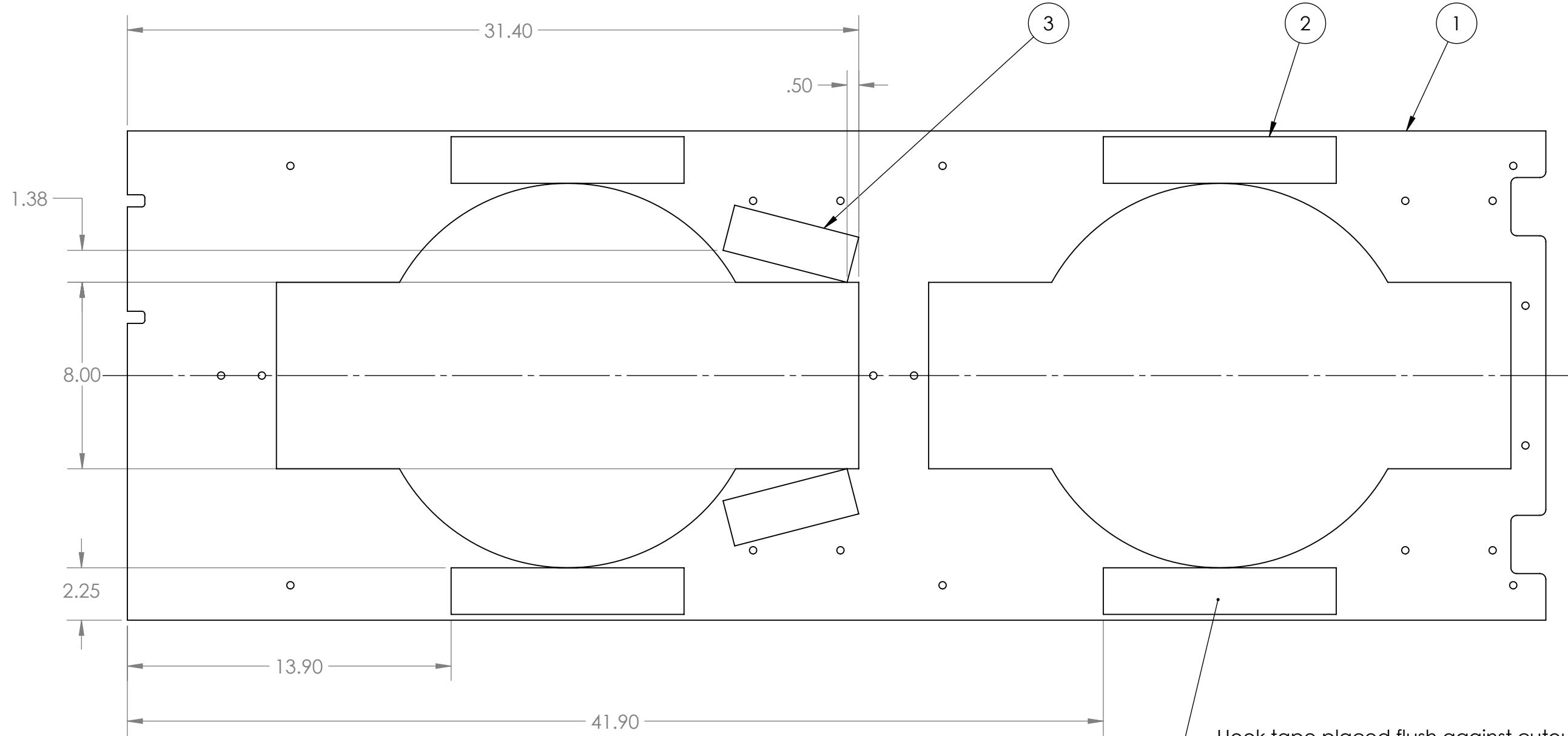
1

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1



Hook tape placed flush against cutout, centered.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19122	Rocket Panel Plastic Bottom	1
2	Hook_2_10	2" x 10" Hook, Adhesive Backed	4
3	VisionTape	2" x 5.5" Retroreflective tape	2

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:	
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
		APPLICATION	DO NOT SCALE DRAWING		

**FIRST** ROBOTICS COMPETITION **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Rocket Panel Bottom Assembly

SIZE DWG. NO. REV

**B** GE-19126

SCALE: 1:5 WEIGHT: SHEET 1 OF 1

4

3

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4

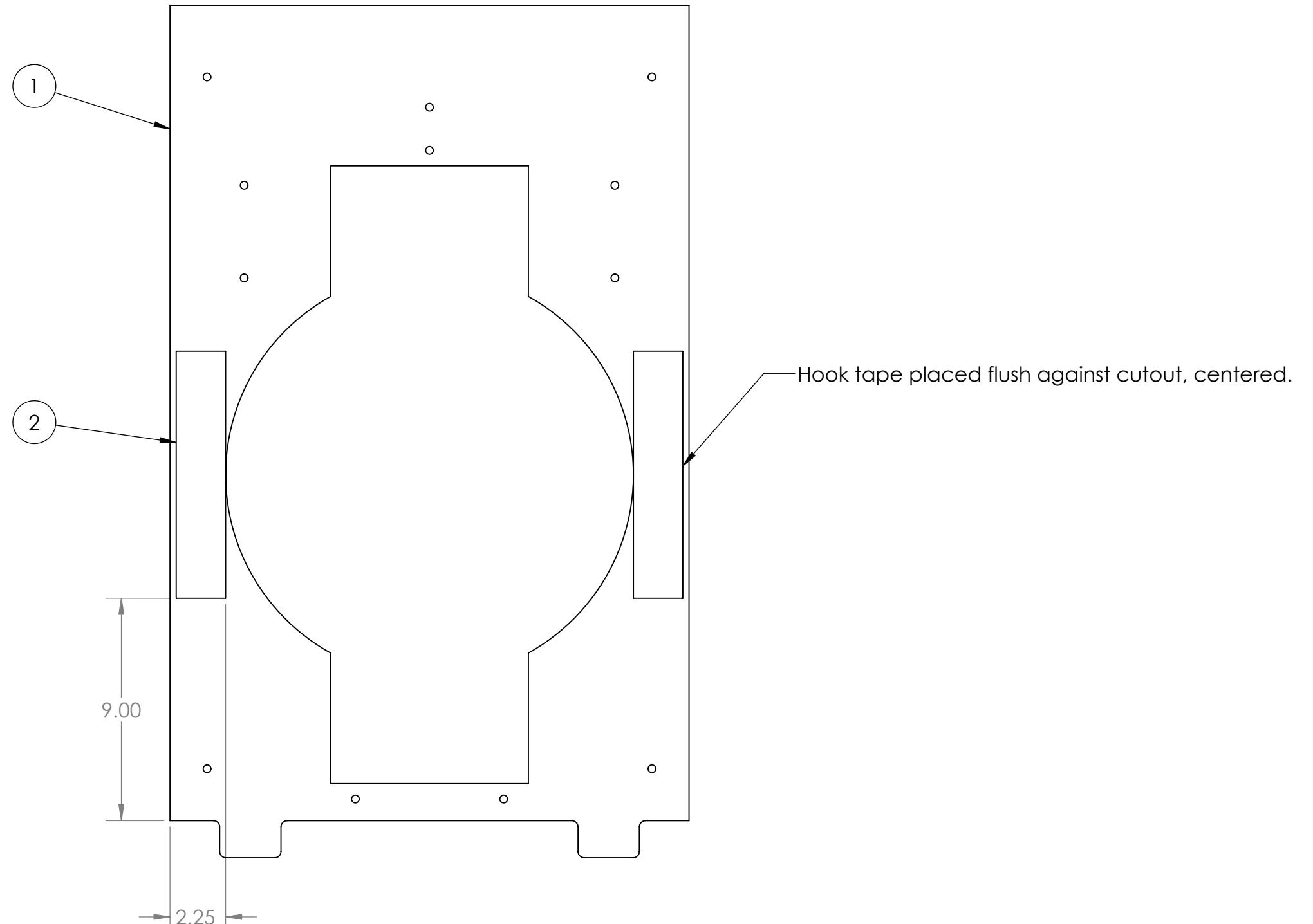
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19123	Rocket Panel Plastic Top	1
2	Hook_2_10	2" x 10" Hook, Adhesive Backed	2

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Rocket Panel Top Assembly

**SIZE** DWG. NO. REV  
**B** GE-19127

SCALE: 1:5 WEIGHT: SHEET 1 OF 1

4

3

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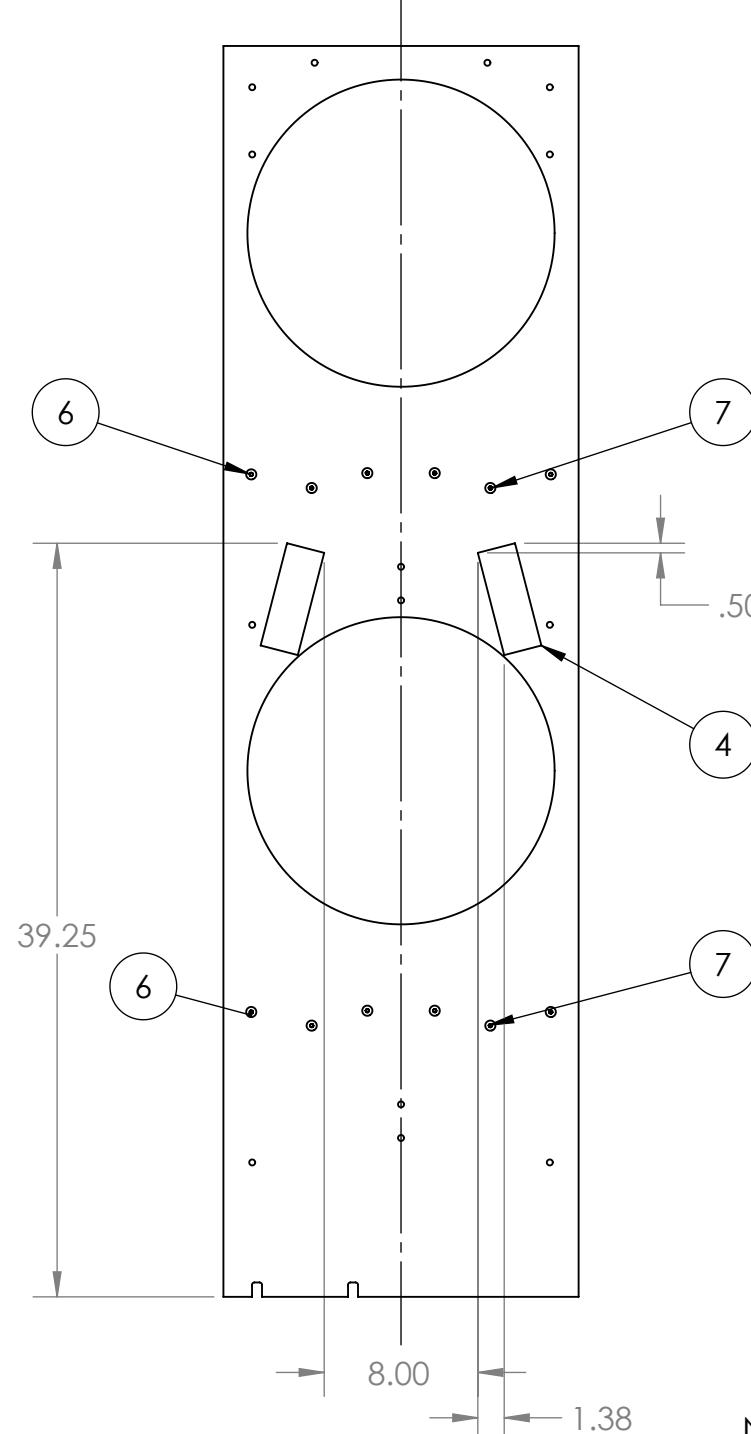
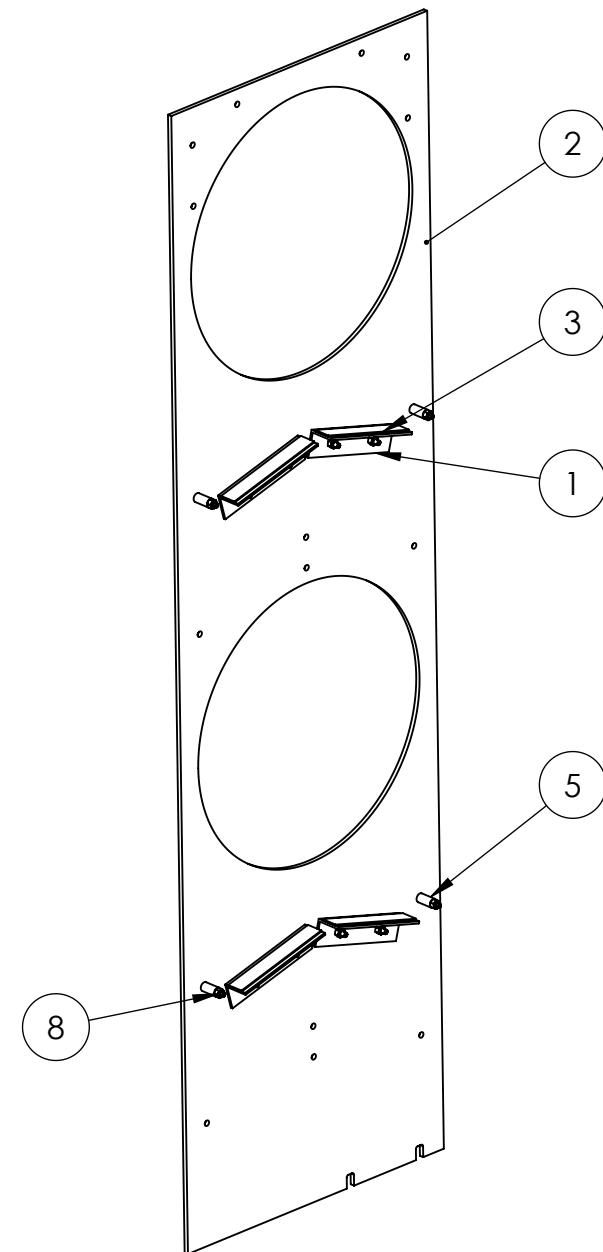
3

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1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19029	Rocket Ramp Support Front	4
2	GE-19124	Rocket Cargo Plastic Bottom	1
3	Hook_1_6	1" x 6" Hook, Adhesive Backed	4
4	VisionTape	2" x 5.5" Retroreflective tape	2
5	spacer_.257_1_.5	Spacer, .257" ID, 1/2" OD, 1" thk	4
6	flat_hex_.25_20_1.75	Steel Hex Flat Head Screw, 1/4"-20 x 1.75" long, partially threaded	4
7	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	8
8	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	12

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

Notes:  
1. Item 3 attaches to the top of item 1, centered.

TITLE: FIRST ROBOTICS COMPETITION SOLIDWORKS Modeling Solutions Partner

SIZE DWG. NO. REV  
**B** GE-19128

SCALE: 1:10 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

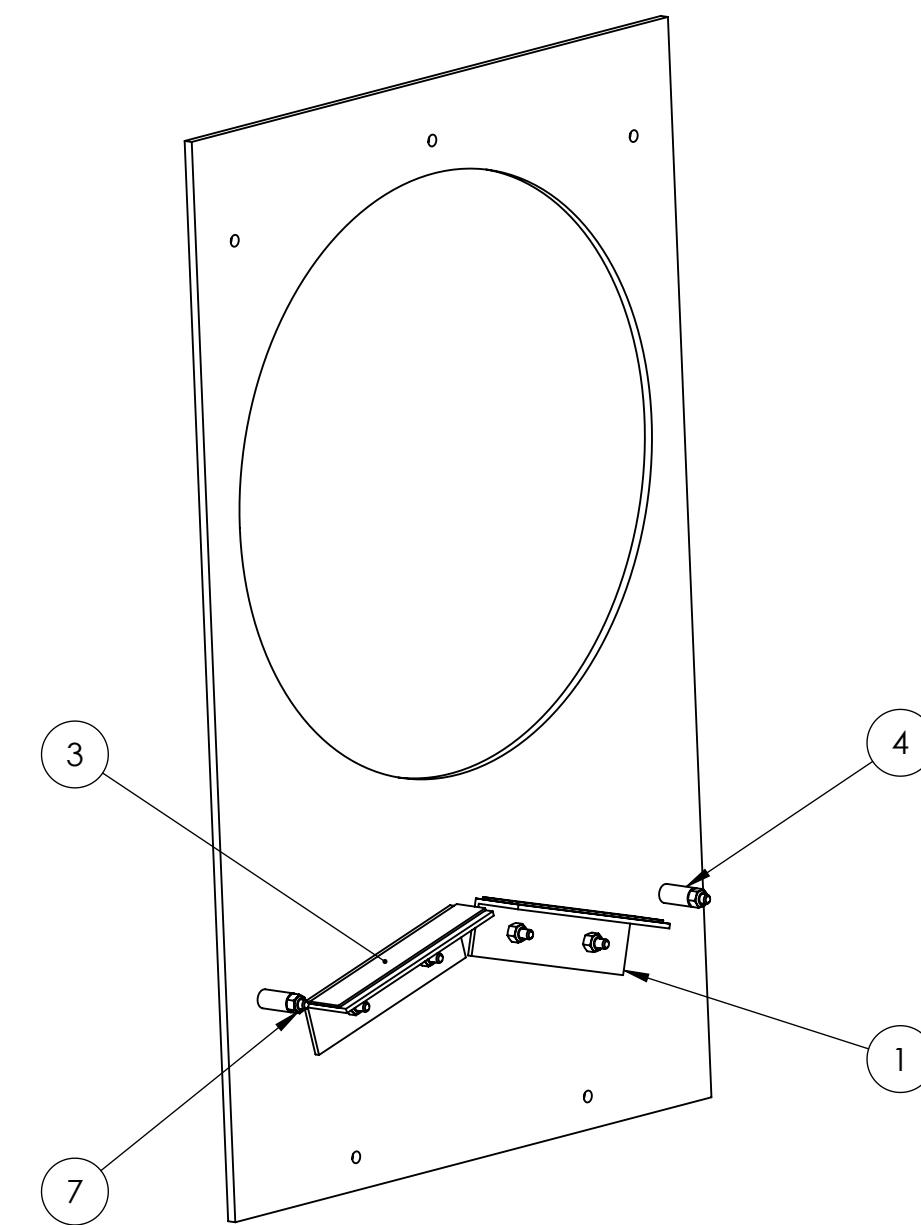
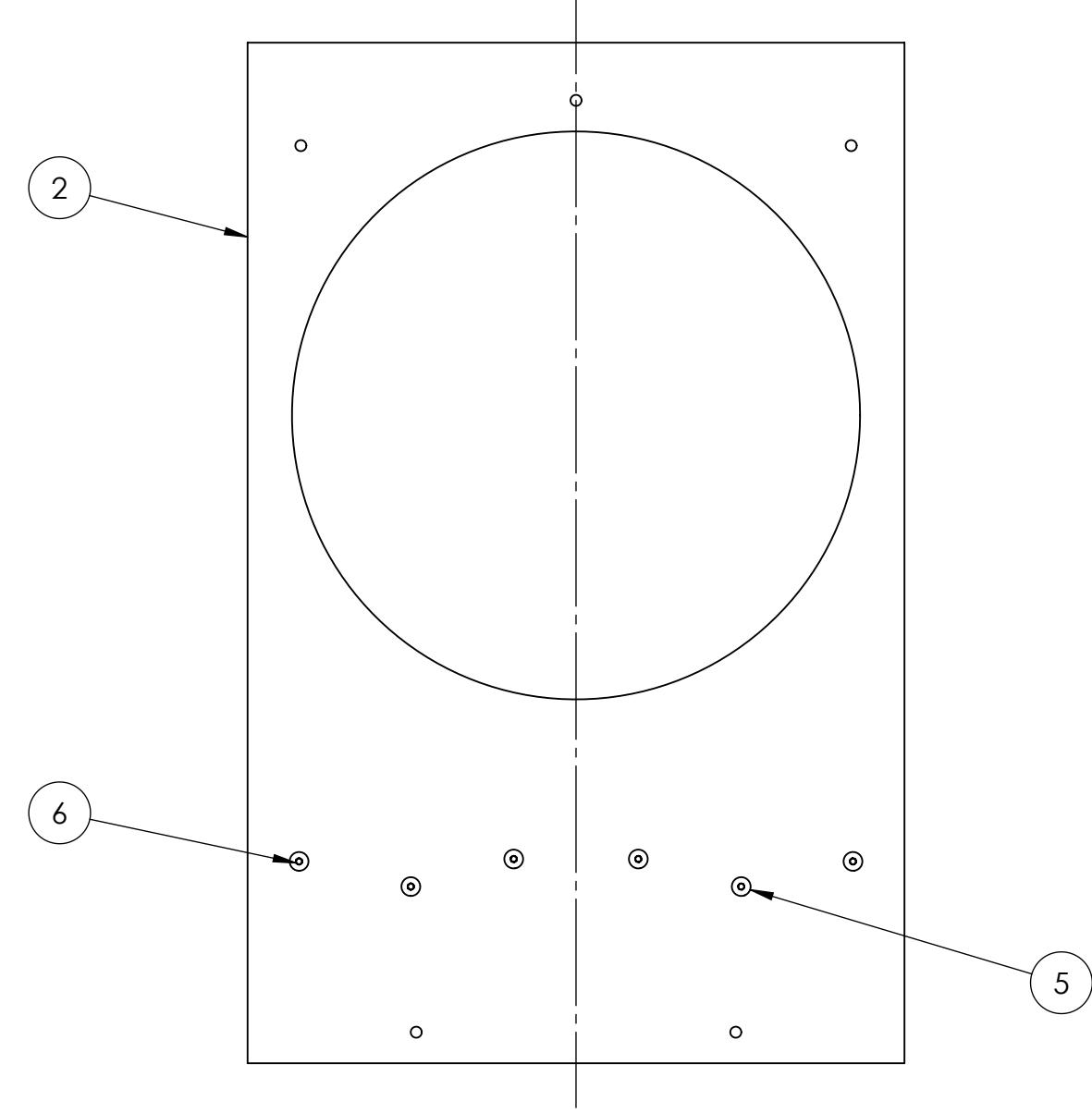
3

2

1

B

B



## Notes:

1. Item 3 attaches to the top of item 1, centered.

A

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19029	Rocket Ramp Support Front	2
2	GE-19125	Rocket Cargo Plastic Top	1
3	Hook_1_6	1" x 6" Hook, Adhesive Backed	2
4	spacer_.257_1_.5	Spacer, .257" ID, 1/2" OD, 1" thk	2
5	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	4
6	flat_hex_.25_20_1.75	Steel Hex Flat Head Screw, 1/4"-20 x 1.75" long, partially threaded	2
7	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	6

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	
SCALE: 1:5 WEIGHT: SHEET 1 OF 1				

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Rocket Cargo  
Top Assembly**

SIZE DWG. NO. REV  
**B GE-19129**

SCALE: 1:5 WEIGHT: SHEET 1 OF 1

4

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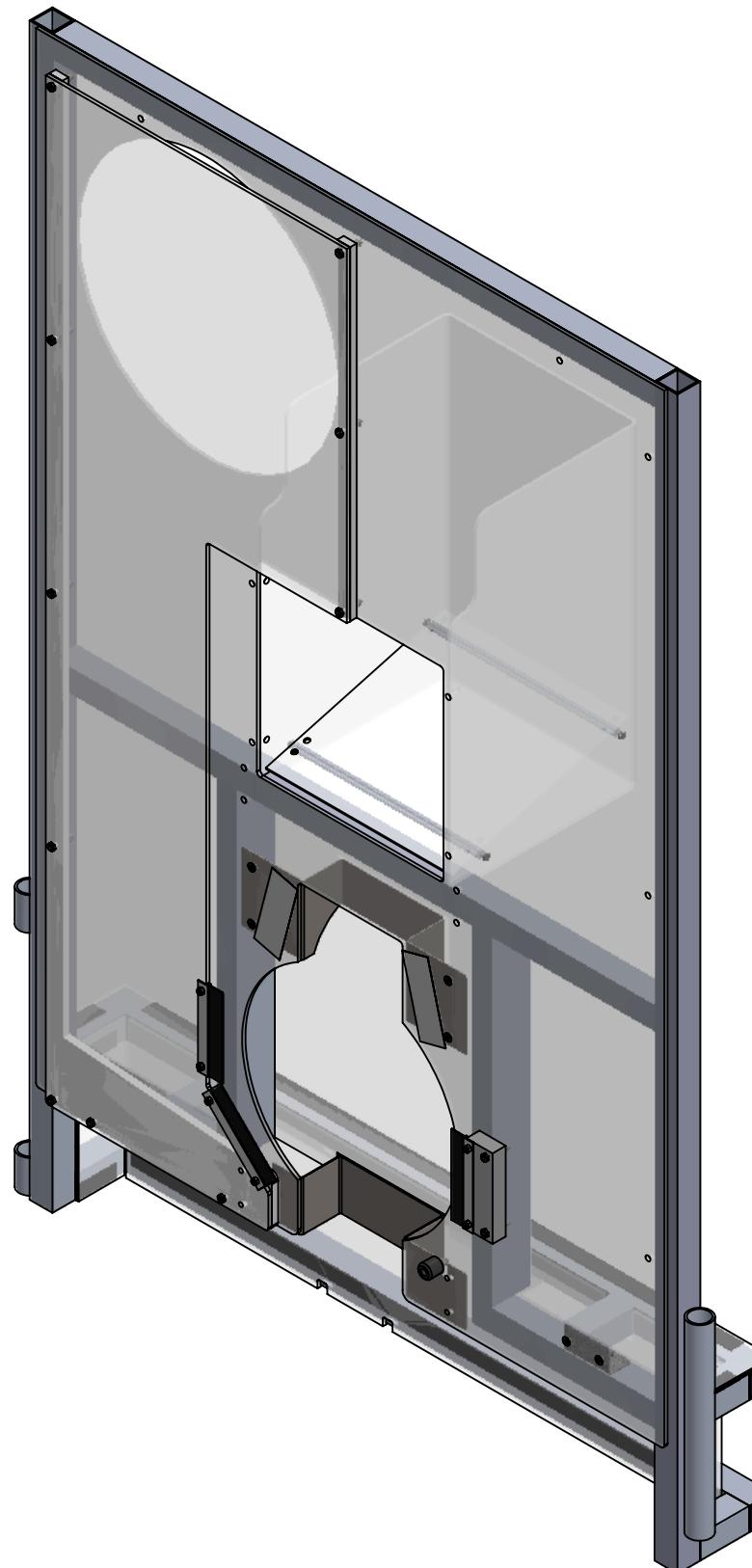
3

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B

B



ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19026	Keyhole Insert	1
2	GE-19098	Keyhole Insert Bottom	1
3	GE-19137	Plastic Assembly, Loading Station, Right	1
4	GE-19141	Loading Station Frame, Right	1
5	GE-19143	Chute Assembly	1
6	GE-19147	Keyhole Backing	1
7	GE-19148	Bumper Back	1
8	GE-19149	Bumper Top	1
9	GE-19154	Bumper Side	2
10	Hook_1_28	1" x 28" Hook Fastener, Adhesive Backed	1
11	Hook_1_3	1" x 3" Hook Fastener, Adhesive Backed	6
12	Hook_1_45	1" X 45" Hook Fastener, Adhesive Backed	2
13	Loop_1_28	1" x 28" Loop Fastener, Adhesive Backed	1
14	Loop_1_3	1" x 3" Loop Fastener, Adhesive Backed	6
15	Loop_1_45	1" x 45" Loop Fastener, Adhesive Backed	2
16	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	4
17	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	4
18	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST</b> <b>ROBOTICS</b> <b>COMPETITION</b>
		DIMENSIONS ARE IN INCHES	DRAWN			
		TOLERANCES:	CHECKED			
		FRACTIONAL $\pm 1/16$	ENG APPR.			
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.			
		TWO PLACE DECIMAL $\pm .01$	Q.A.			
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:			
		INTERPRET GEOMETRIC				
		TOLERANCING PER:				
		MATERIAL				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
<span style="float: right;">TITLE:  <b>Feeder Station Assembly</b></span>						
		SIZE	DWG. NO.		REV	
		<b>B</b>	<b>GE-19130</b>			
		SCALE: 1:10	WEIGHT:	SHEET 1 OF 4		

# Feeder Station Assembly

SIZE <b>B</b>	DWG. NO. <b>GE-19130</b>	REV
------------------	-----------------------------	-----

SCALE: 1:10 WEIGHT: SHEET 1 OF 4

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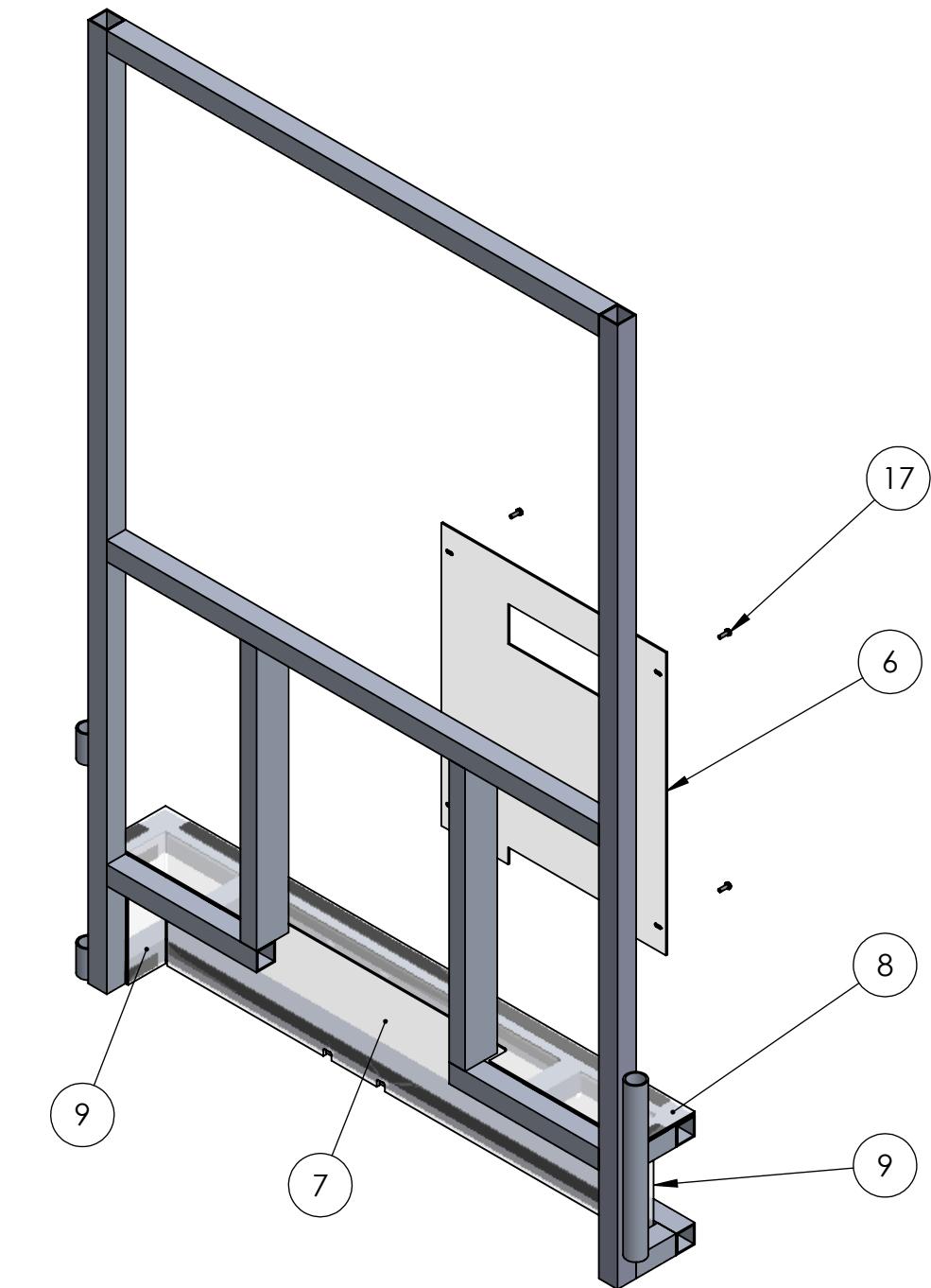
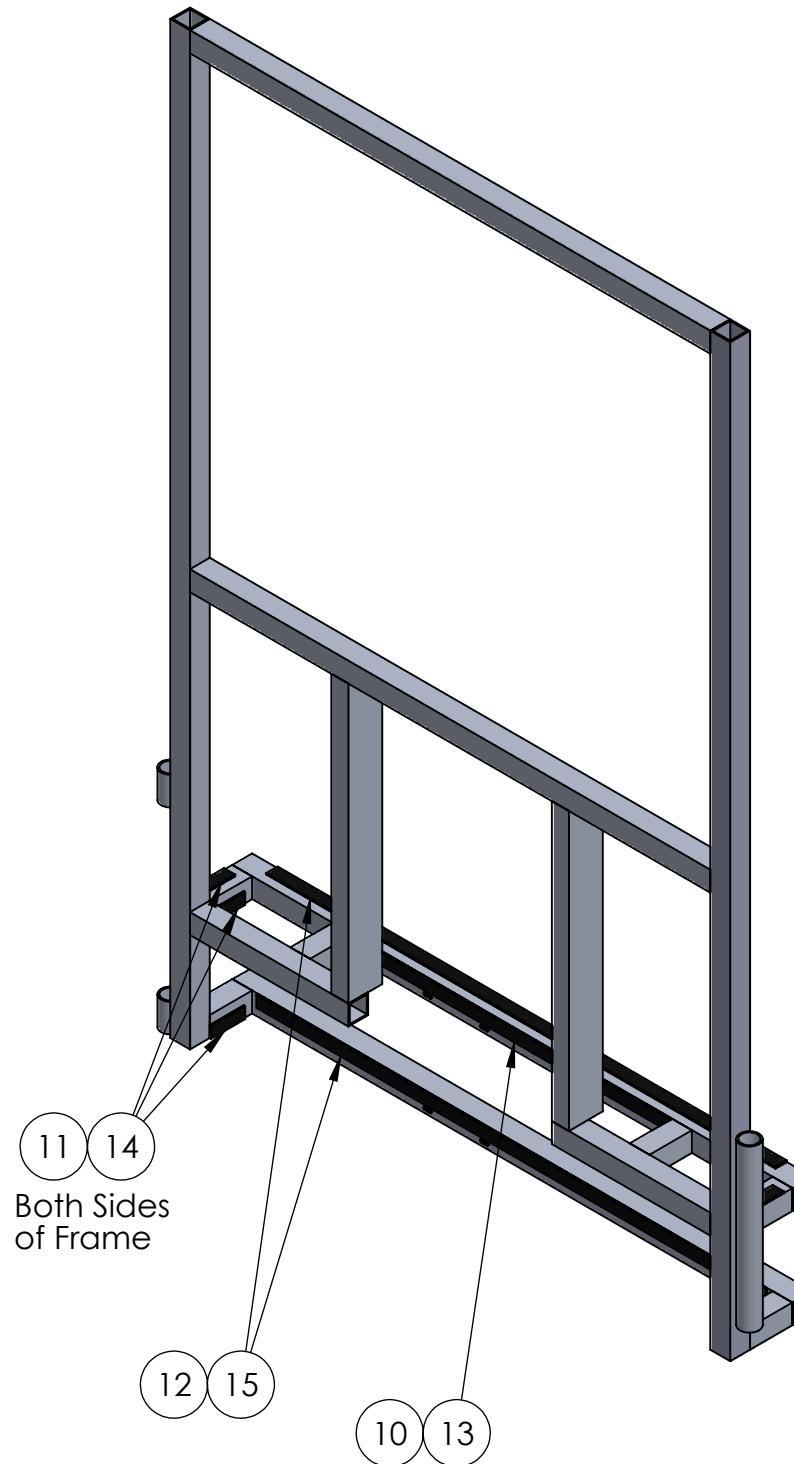
3

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**Notes:**

1. Apply the hook fastener to the aluminum frame.
2. Attach the loop fastener to the hook.
3. Peel the protective backing off the loop.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SCALE: 1:12	WEIGHT:			SHEET 2 OF 4
B	GE-19130			REV

**FIRST ROBOTICS COMPETITION**  
**SOLIDWORKS**  
Modeling Solutions Partner

**Feeder Station Assembly**

4

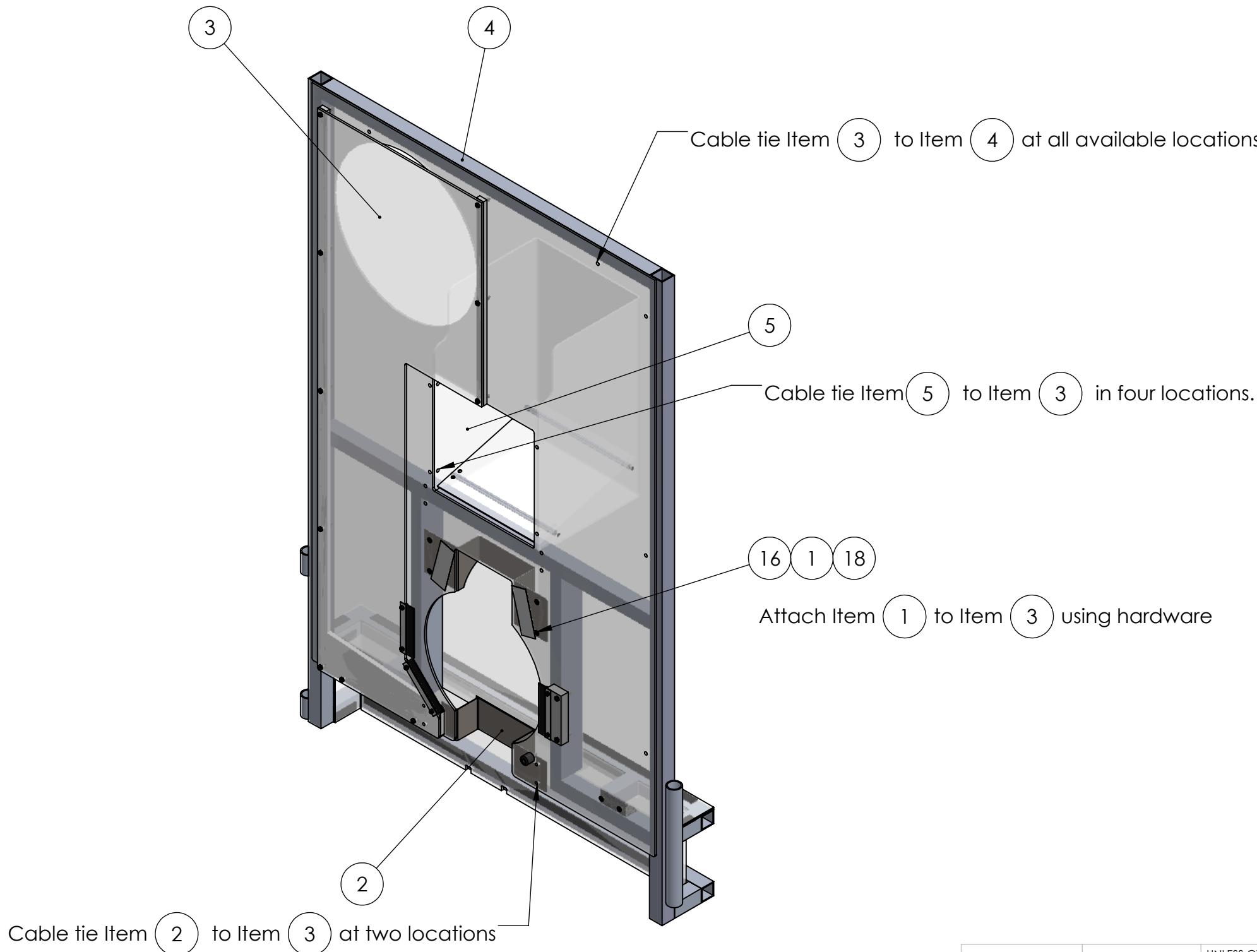
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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Feeder Station Assembly**

**B** **GE-19130**

SIZE DWG. NO. REV  
SCALE: 1:12 WEIGHT: SHEET 3 OF 4

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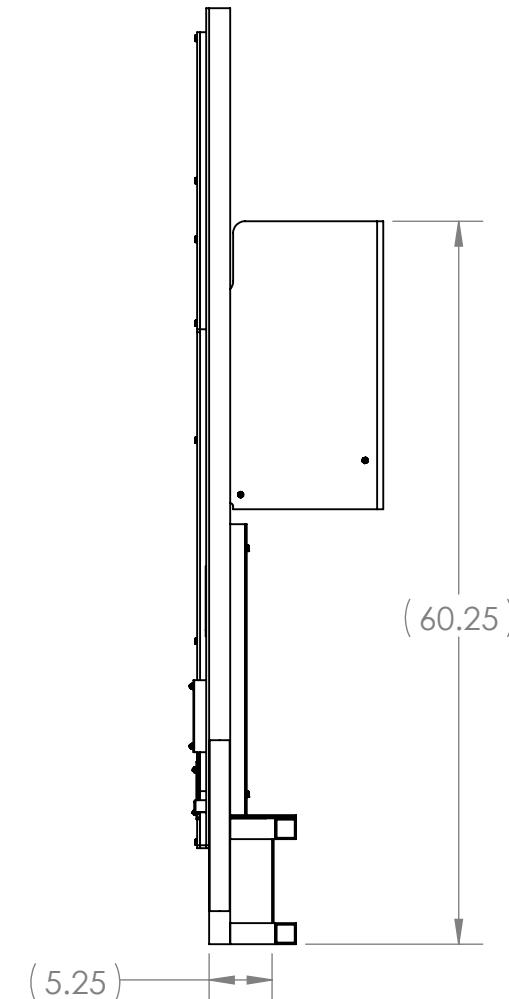
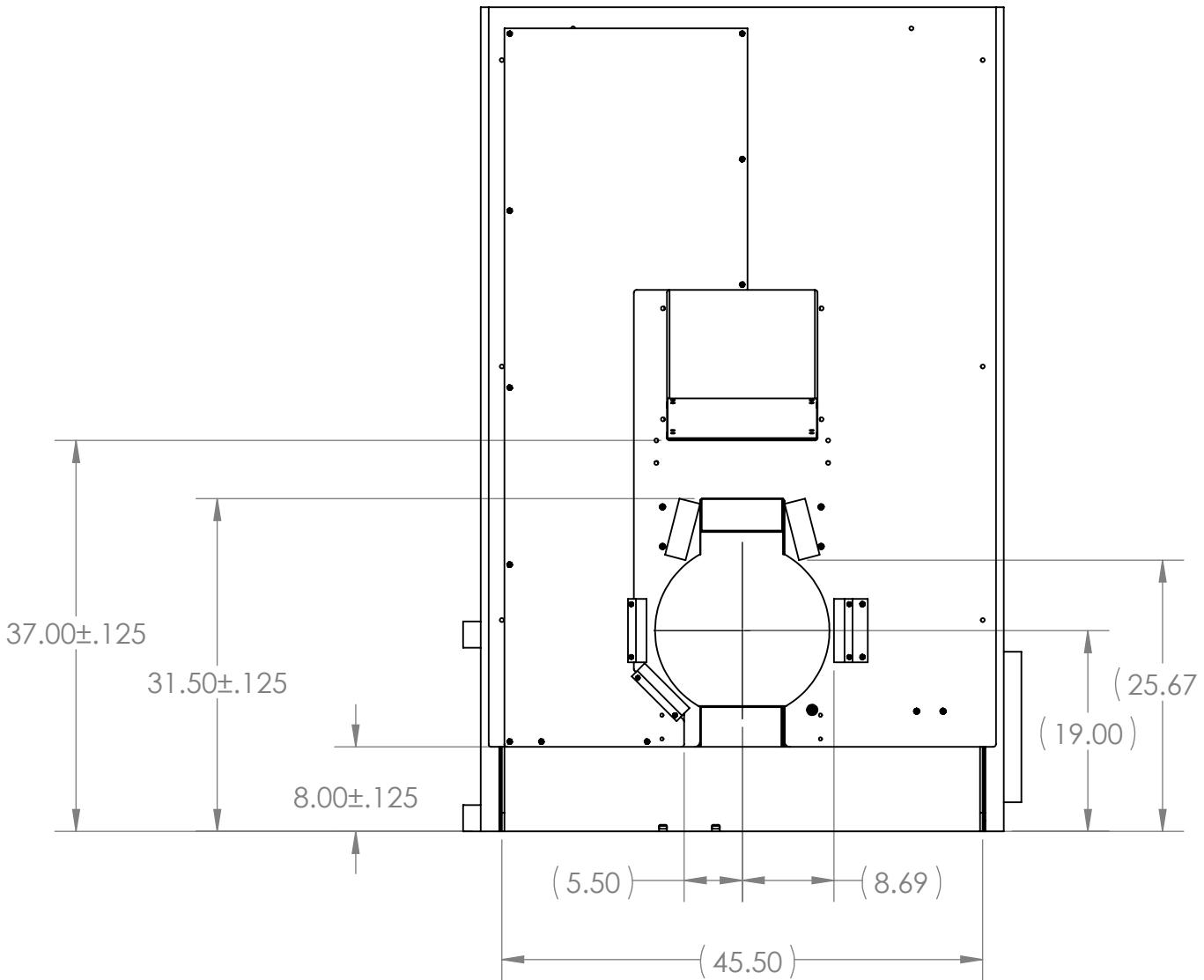
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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
TITLE: <b>Feeder Station Assembly</b>					
SIZE <b>B</b>	DWG. NO. <b>GE-19130</b>	REV			
SCALE: 1:16	WEIGHT:	SHEET 4 OF 4			

4

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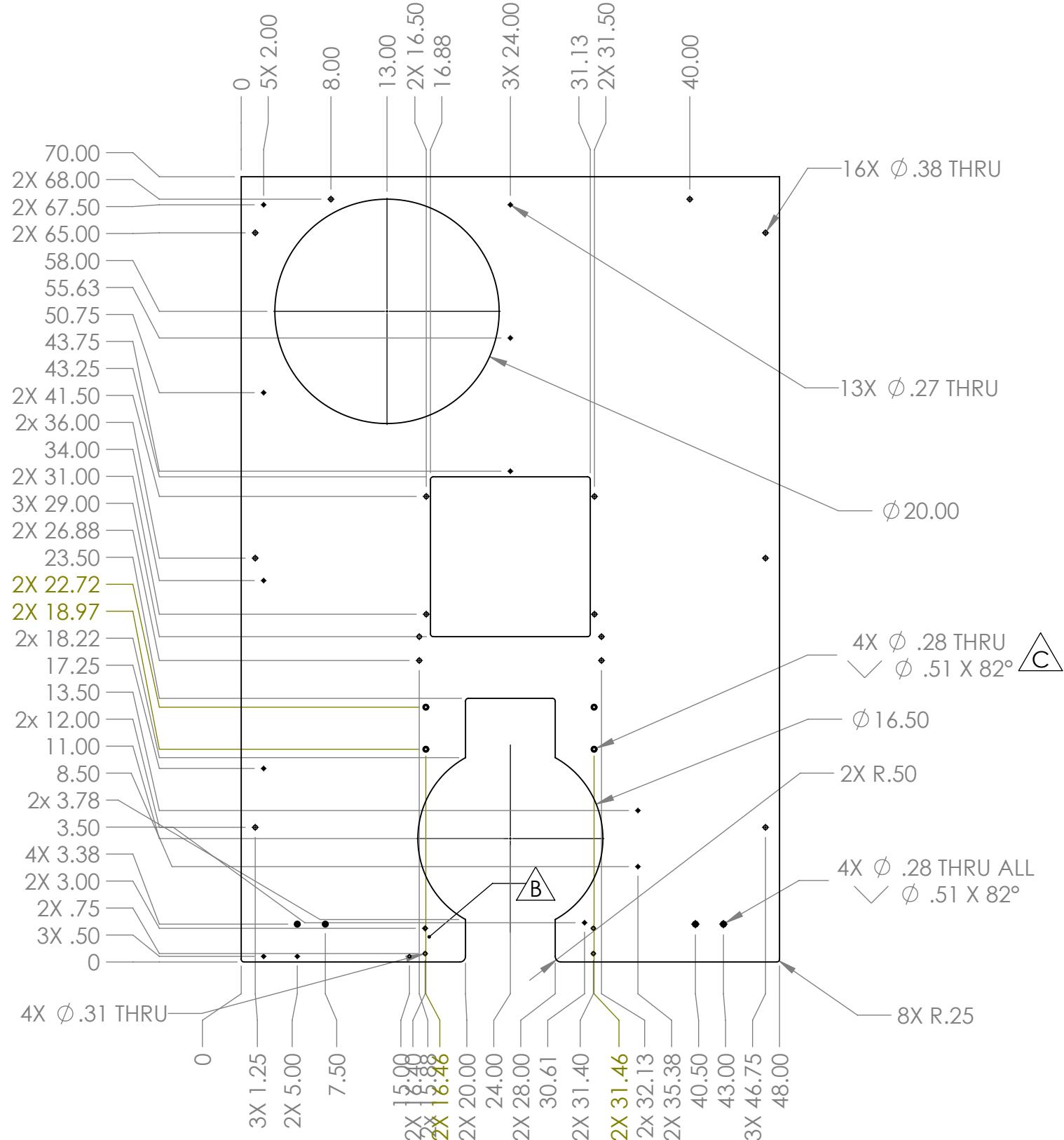
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
A1	A	Corrected part name.	10/10/2018	CPO
A3	B	Added 8X .31 Holes	10/17/2018	MXS
B3	C	Ø .31 Holes changed to C'Sink (4 places)	11/15/2018	DAF
B2	D	Corrected Table Error	11/15/2018	DAF

- Notes:
1. Material: 1/4" Clear Polycarbonate.
  2. Remove all burrs and sharp edges.
  3. Label or tag with part number.

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19131</b>	<b>E</b>		
SCALE: 1:12	WEIGHT:	SHEET 1 OF 1		



**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:

# Loading Station Panel, Right

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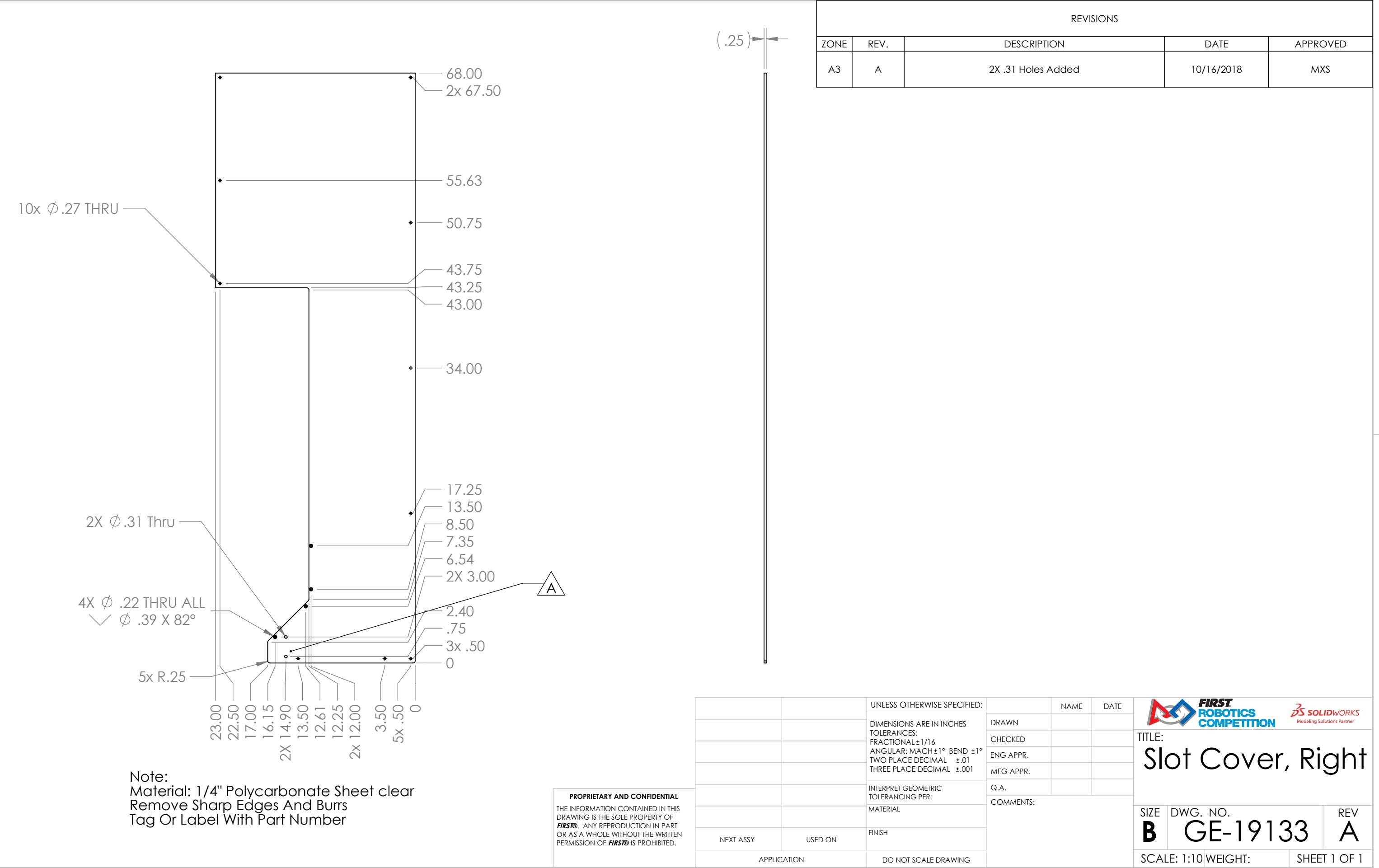
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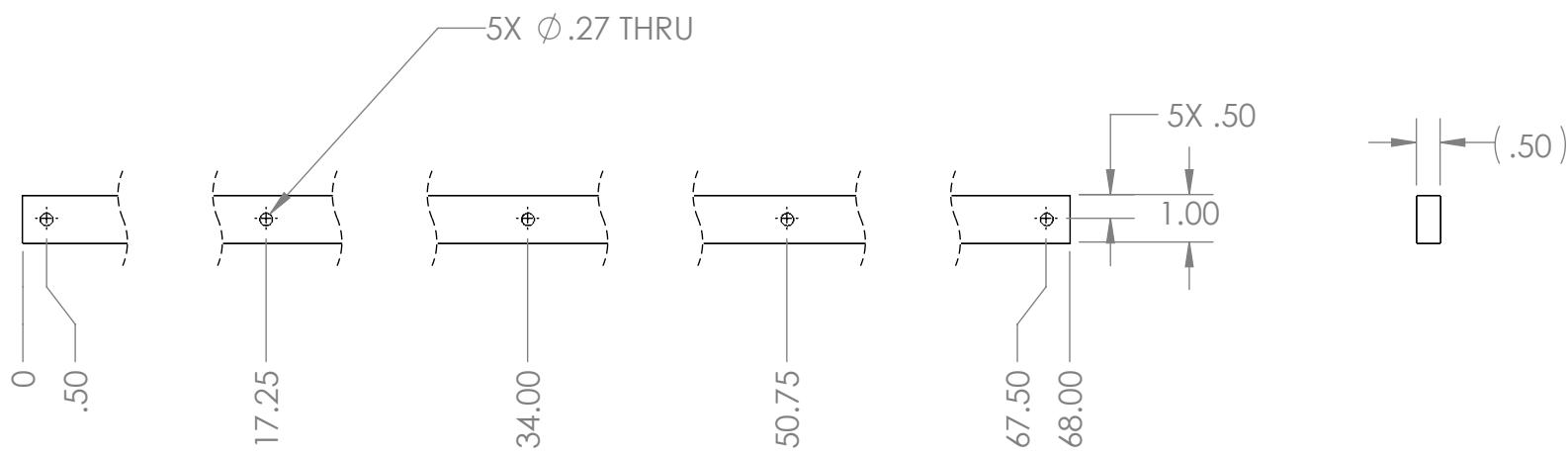
1

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**Notes:**

1. Material: 1/2" HDPE, White
2. Surface: Smooth texture
3. Remove all burrs and sharp edges.
4. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN		
		INTERPRET GEOMETRIC TOLERANCING PER:	CHECKED		
		MATERIAL	ENG APPR.		
			MFG APPR.		
			Q.A.		
		COMMENTS:			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			



TITLE:

# Slot Guide, Large

SIZE	DWG. NO.	REV
A	GE-19134	
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

2

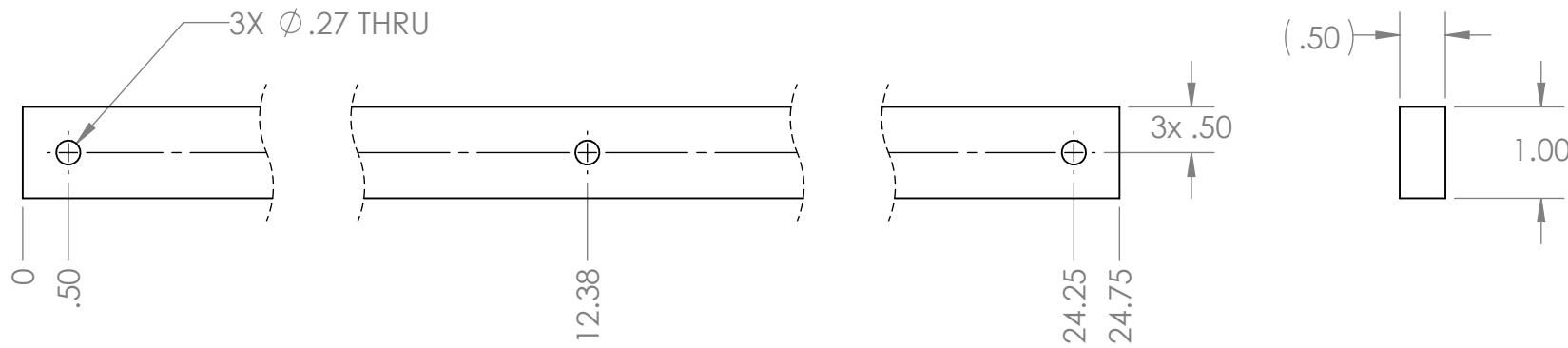
1

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## Notes:

1. 1/2" HDPE, White
2. Surface: Smooth Texture
3. Remove all burrs and sharp edges.
4. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm$ 1/16 ANGULAR: MACH $\pm$ 1° BEND $\pm$ 1° TWO PLACE DECIMAL $\pm$ .01 THREE PLACE DECIMAL $\pm$ .001				
		INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL		CHECKED		
				ENG APPR.		
				MFG APPR.		
				Q.A.		
		COMMENTS:				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				



**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:  
**Slot Guide, Small**

SIZE	DWG. NO.	REV
<b>A</b>	<b>GE-19135</b>	
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1

2

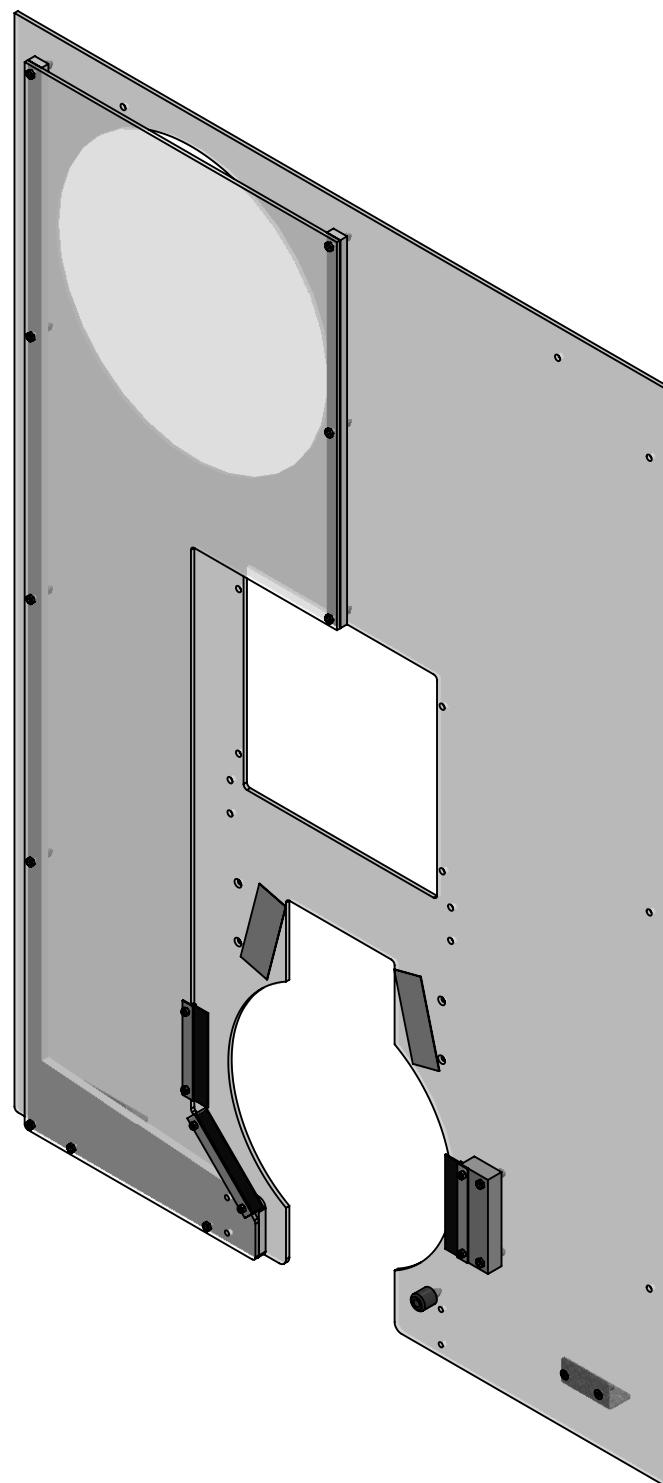
1

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19131	Loading Station Panel, Right	1
2	GE-19133	Slot Cover, Right	1
3	GE-19134	Slot Guide, Large	1
4	GE-19135	Slot Guide, Small	1
5	GE-19138	Slot Guide, Angled	1
6	GE-19139	Slot Stop	1
7	GE-19140	Bumper, Rubber	1
8	GE-19142	Angle, Support	2
9	GE-19190	6" brush	3
10	VisionTape	2" x 5.5" Retroreflective tape	2
11	button_hex_.25_20_1.25	Button Head, Hex, 1/4-20 x 1.25	1
12	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	4
13	flat_hex_10_32_1.375	Flat Head, Hex, 10-32 x 1.375"	2
14	flat_hex_10_32_.625	Flat Head, Hex, 10-32 x .625"	4
15	hex_.25_20_1.5	Steel Hex Head Screw, 1/4"-20 x 1-1/2" long, fully threaded	12
16	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	17
17	nylock_10_32	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size	6

	UNLESS OTHERWISE SPECIFIED:	NAME	DATE
	DIMENSIONS ARE IN INCHES	DRAWN	
	TOLERANCES: FRACTIONAL $\pm 1/16$	CHECKED	
	ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	ENG APPR.	
	TWO PLACE DECIMAL $\pm .01$	MFG APPR.	
	THREE PLACE DECIMAL $\pm .001$	Q.A.	
	INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:	
	MATERIAL		
NEXT ASSY	USED ON	FINISH	
APPLICATION		DO NOT SCALE DRAWING	
SCALE: 1:10	WEIGHT:	SHEET 1 OF 2	

**FIRST** ROBOTICS COMPETITION **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Plastic Assembly,  
Loading Station, Right

**SIZE** DWG. NO. **B** GE-19137 **REV**

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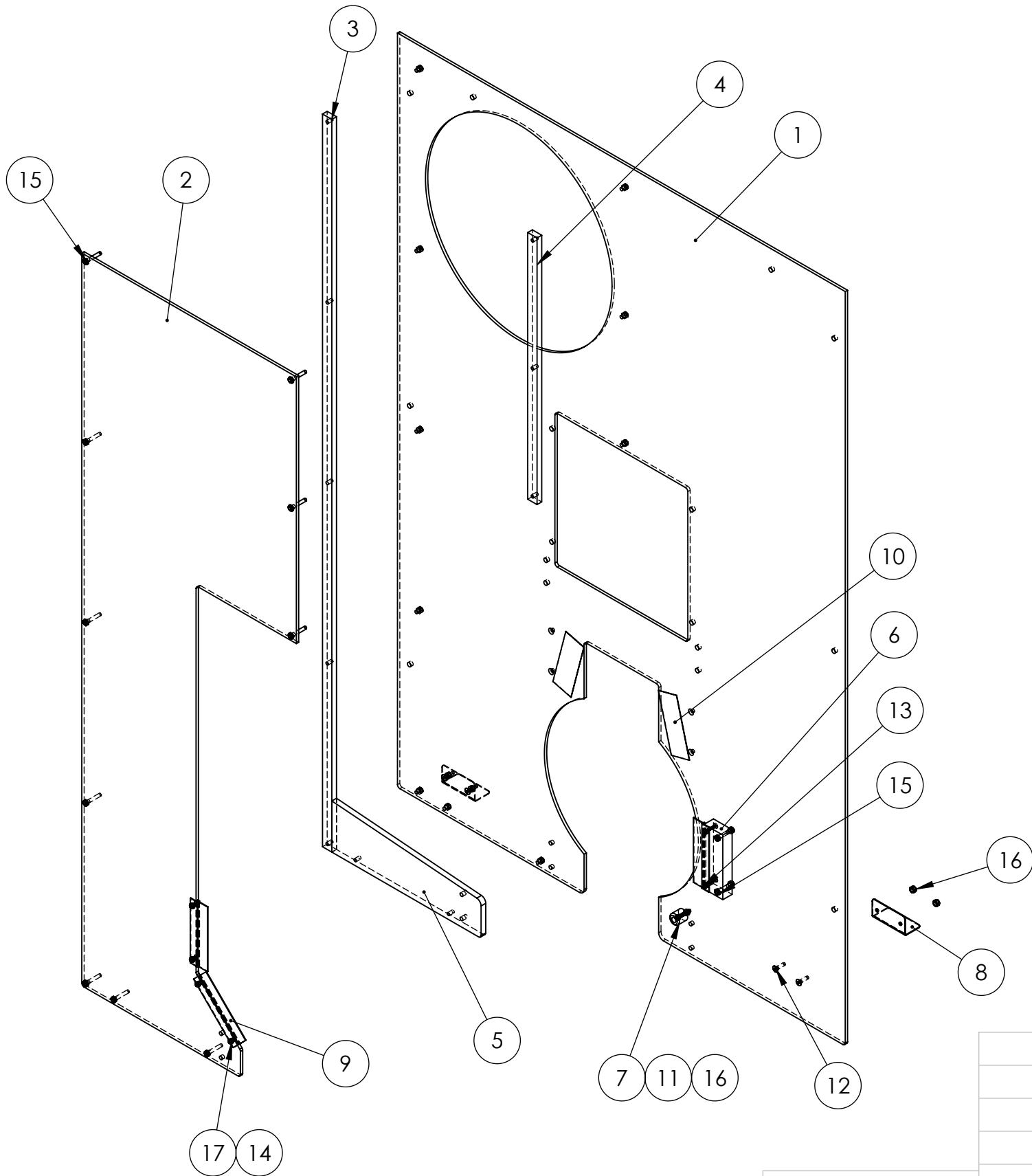
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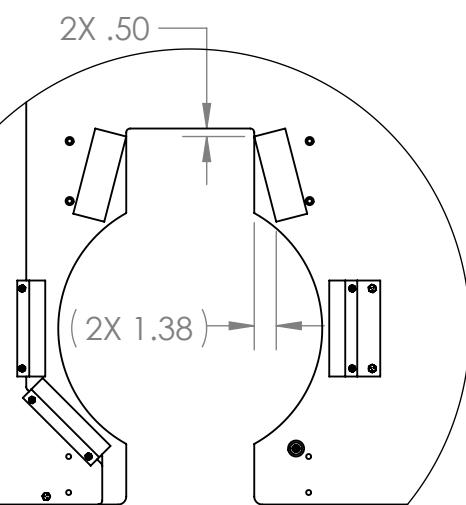
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B



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DETAIL A  
SCALE 1 : 12

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	MATERIAL		
APPLICATION		FINISH		
		DO NOT SCALE DRAWING		

**FIRST** ROBOTICS COMPETITION **SOLIDWORKS**  
Modeling Solutions Partner

TITLE: Plastic Assembly,  
Loading Station, Right

SIZE DWG. NO. REV  
**B GE-19137**

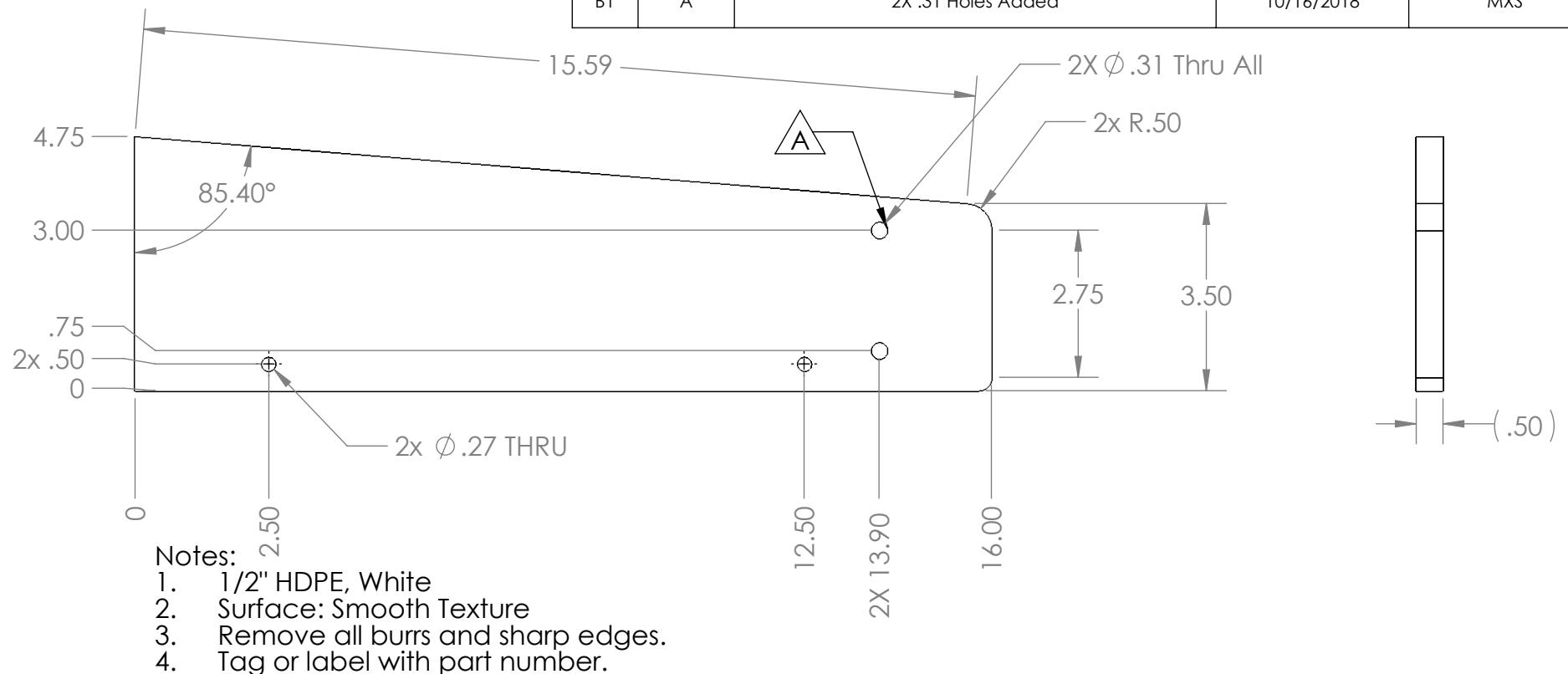
SCALE: 1:10 WEIGHT: SHEET 2 OF 2

2

1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B1	A	2X .31 Holes Added	10/16/2018	MXS



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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			



# Slot Guide, Angled

SIZE	DWG. NO.	REV
A	GE-19138	A
SCALE: 1:3	WEIGHT:	SHEET 1 OF 1

2

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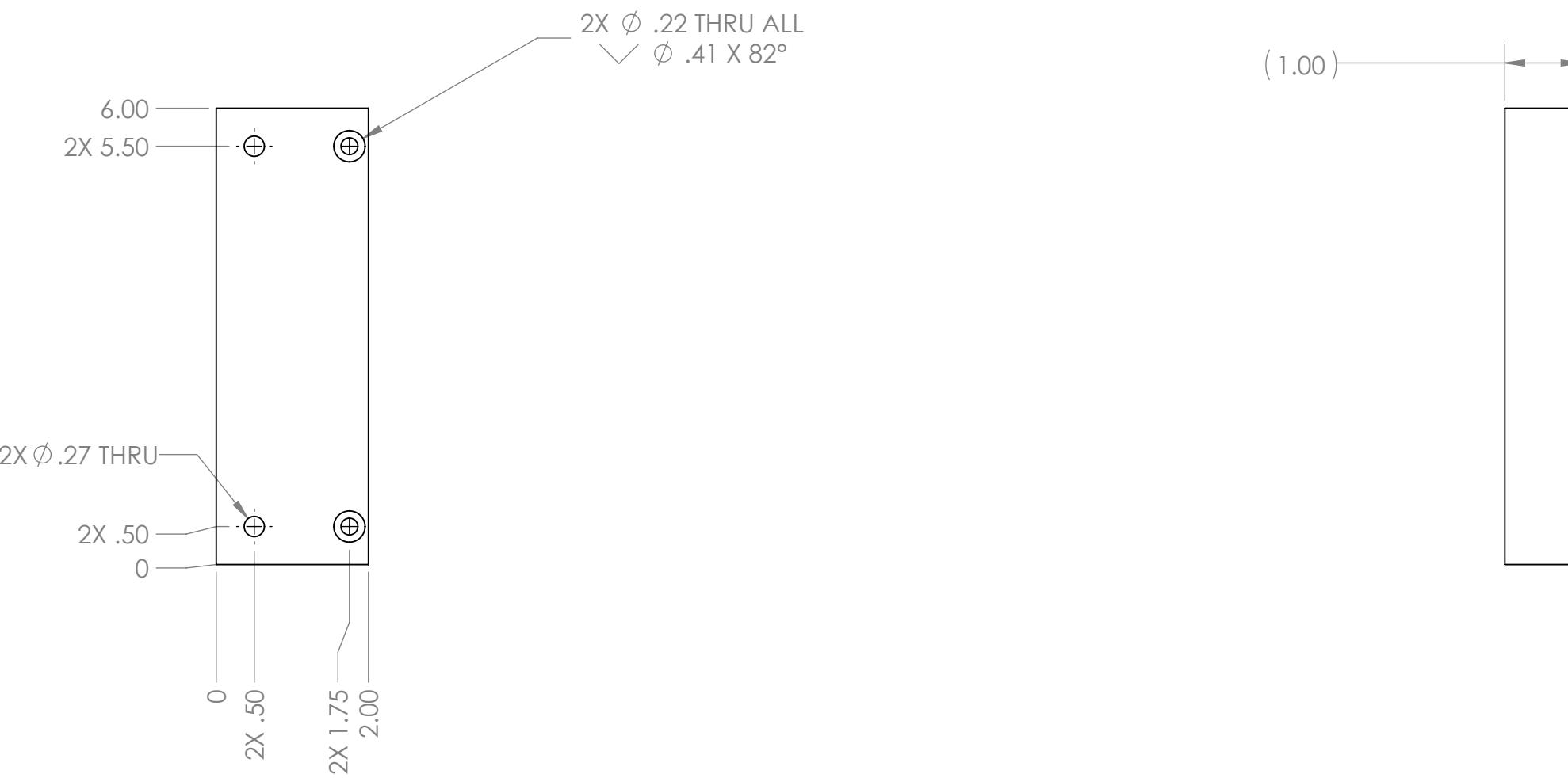
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B

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Note:  
 Material: 1" Thick HDPE Sheet White  
 Texture: Smooth  
 Remove Sharp Edges And Burrs  
 Tag Or Label With Part Number

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DRAWN		DIMENSIONS ARE IN INCHES		
CHECKED		TOLERANCES:		
ENG APPR.		FRACTIONAL $\pm 1/16$		
MFG APPR.		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		
Q.A.		TWO PLACE DECIMAL $\pm .01$		
COMMENTS:		THREE PLACE DECIMAL $\pm .001$		
MATERIAL				
NEXT ASSY	USED ON	INTERPRET GEOMETRIC TOLERANCING PER:		
		FINISH		
APPLICATION		DO NOT SCALE DRAWING		
SCALE: 1:2		WEIGHT:	SHEET 1 OF 1	
SIZE		DWG. NO.	REV	
<b>B</b>		<b>GE-19139</b>		

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**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
 Modeling Solutions Partner

**TITLE:**  
**Slot Stop**

4

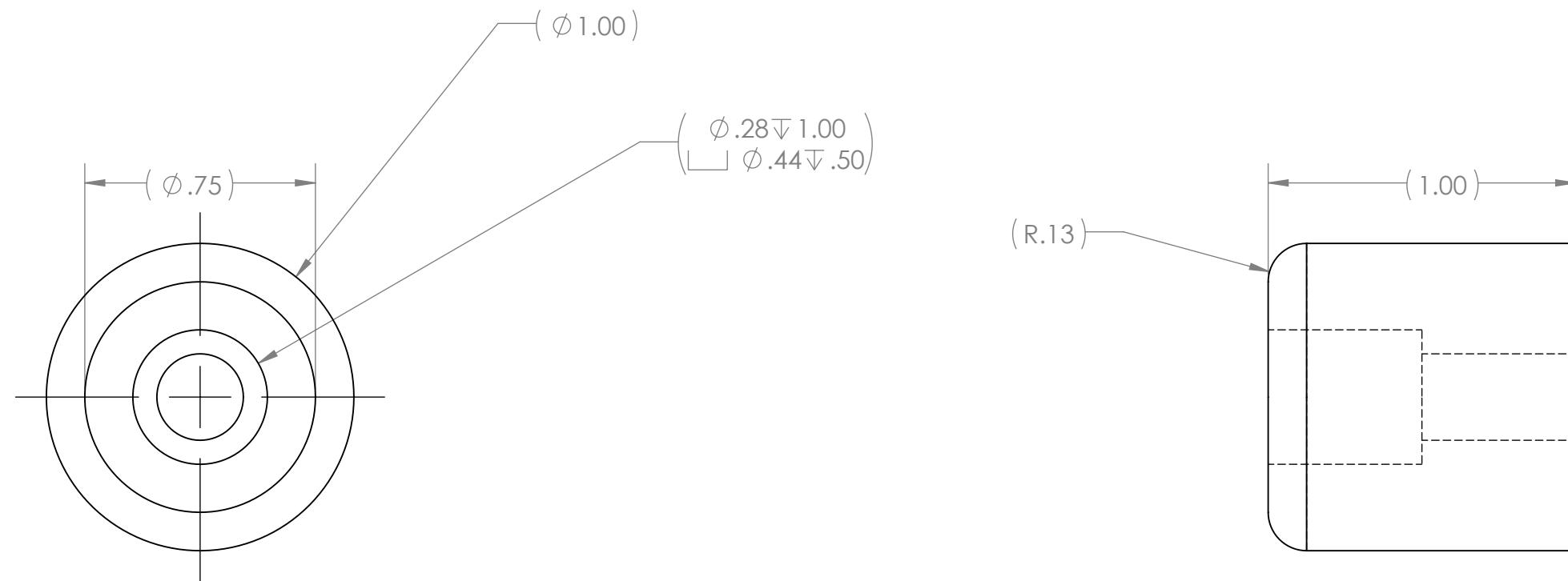
3

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B

B



Note:  
1" Rubber Bumper with Unthreaded Hole  
Source: McMaster-Carr  
Item #: 9540K953  
Equivalent substitutions allowed

Equivalent substitutions allowed

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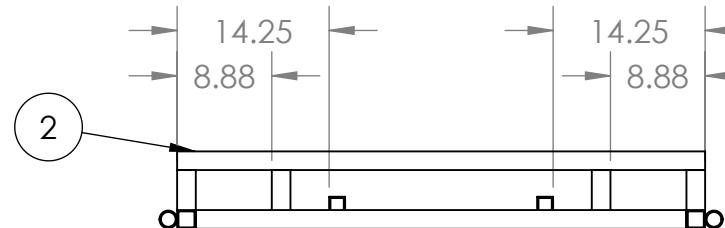
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b>  <b>SOLIDWORKS</b> <small>Modeling Solutions Partner</small>
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN			
			CHECKED			
			ENG APPR.			
			MFG APPR.			
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.			
		MATERIAL	COMMENTS:			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				
			SIZE	DWG. NO.	REV	
			<b>B</b>	<b>GE-19140</b>		
			SCALE: 2:1	WEIGHT:	SHEET 1 OF 1	

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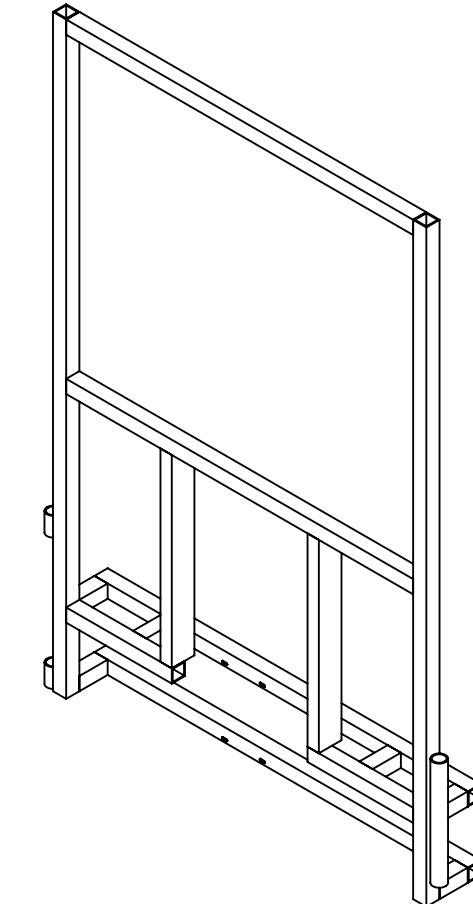
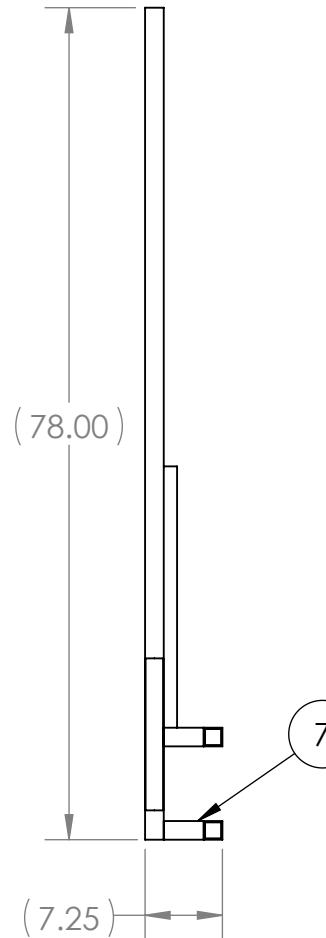
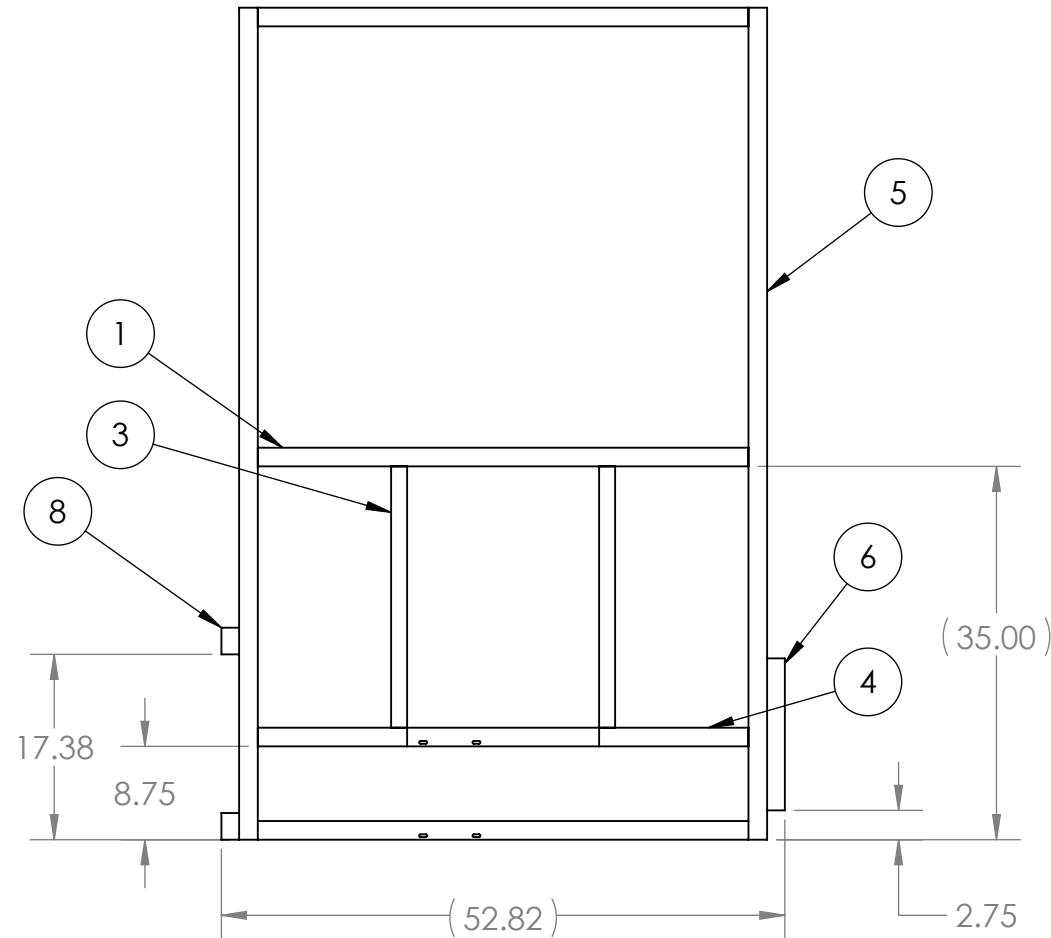
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	Initial Release	10/19/2018	DAF
A3	B	Corrected Item 3 Material Description	10/31/2018	DAF

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19141-01	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
2	GE-19141-02	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
3	GE-19141-03	1.5" x 3" x .125" Rectangular Tubing, 6061 Aluminum	2
4	GE-19141-04	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
5	GE-19141-05	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
6	GE-19141-06	1-1/4" Schedule 40 Pipe, 6061 Aluminum	1
7	GE-19141-07	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	6
8	GE-19141-08	1-1/4" Schedule 40 Pipe, 6061 Aluminum	2



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DIMENSIONS ARE IN INCHES	DRAWN	
TOLERANCES:	CHECKED	
FRACTIONAL $\pm 1/16$	ENG APPR.	
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.	
TWO PLACE DECIMAL $\pm .01$	Q.A.	
THREE PLACE DECIMAL $\pm .001$	COMMENTS:	
INTERPRET GEOMETRIC TOLERANCING PER:		
MATERIAL		
NEXT ASSY	USED ON	FINISH
APPLICATION		DO NOT SCALE DRAWING

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Title:** Loading Station Frame, Right

**Size:** DWG. NO. **B** **GE-19141** **Rev. B**  
**Scale:** 1:18 **Weight:** **Sheet 1 of 4**

4

3

2

1

4

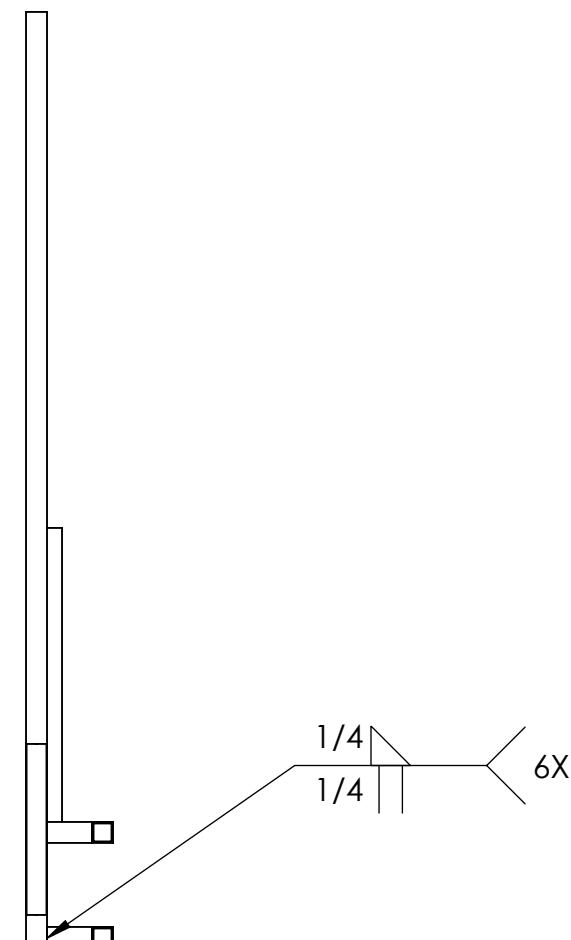
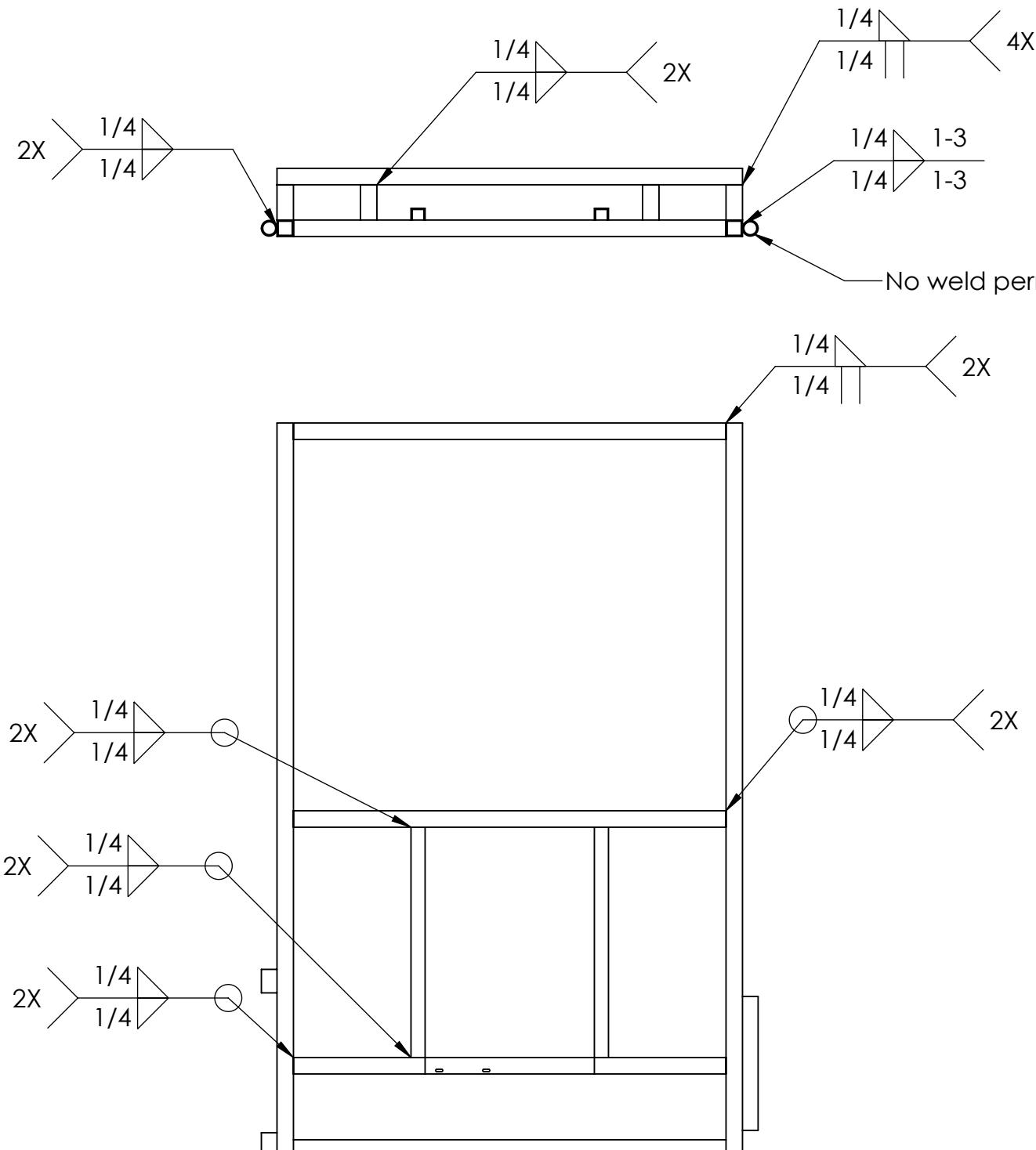
3

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B

B



A

A

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN		
TOLERANCES:		CHECKED		
FRACTIONAL $\pm 1/16$		ENG APPR.		
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		MFG APPR.		
TWO PLACE DECIMAL $\pm .01$		Q.A.		
THREE PLACE DECIMAL $\pm .001$		COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
		APPLICATION	DO NOT SCALE DRAWING	

**FIRST** ROBOTICS COMPETITION **SOLIDWORKS**  
Modeling Solutions Partner

**Title:** Loading Station Frame, Right

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19141</b>	<b>B</b>
SCALE: 1:16	WEIGHT:	SHEET 2 OF 4

4

3

2

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4

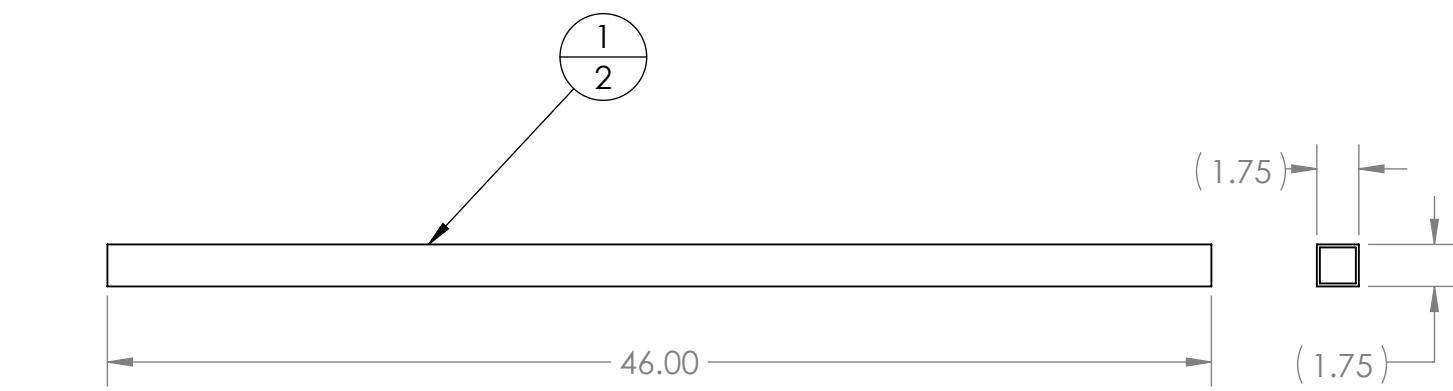
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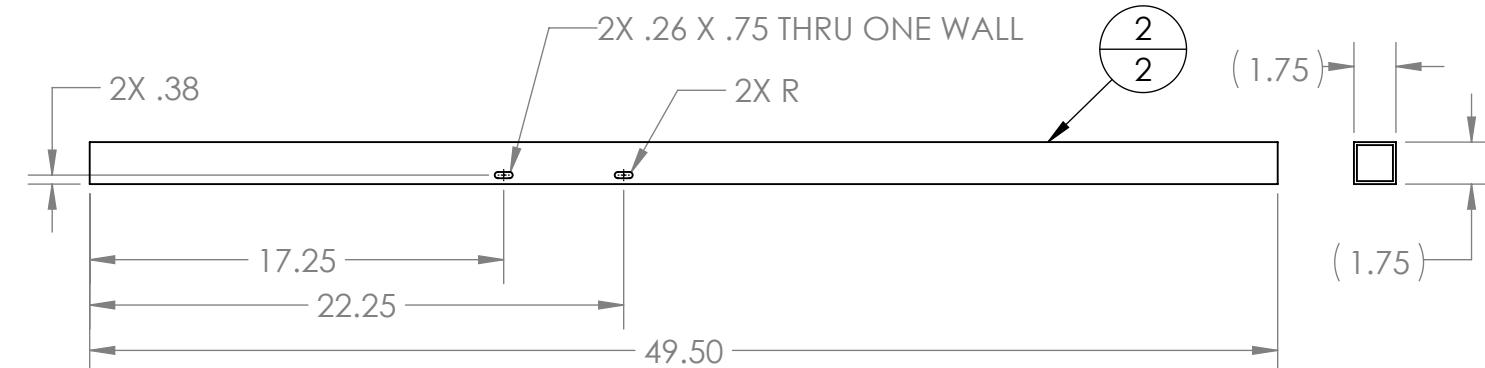
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B

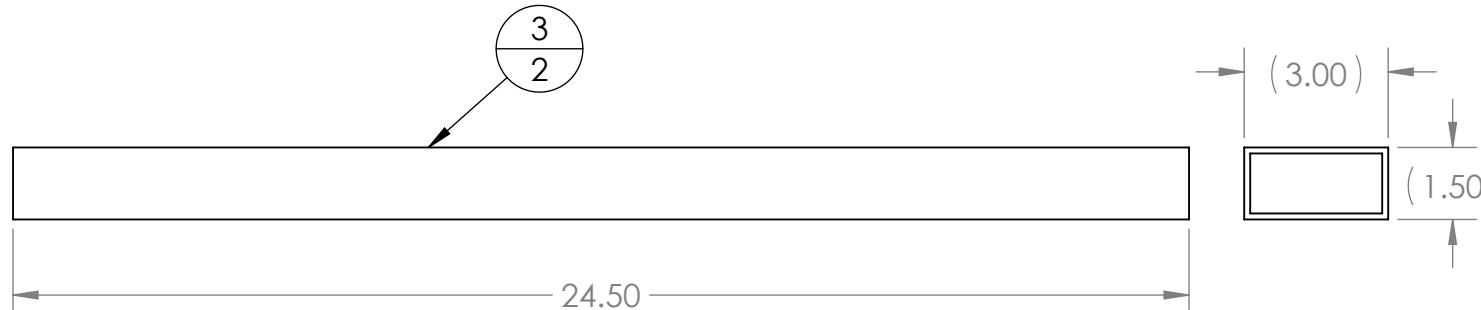
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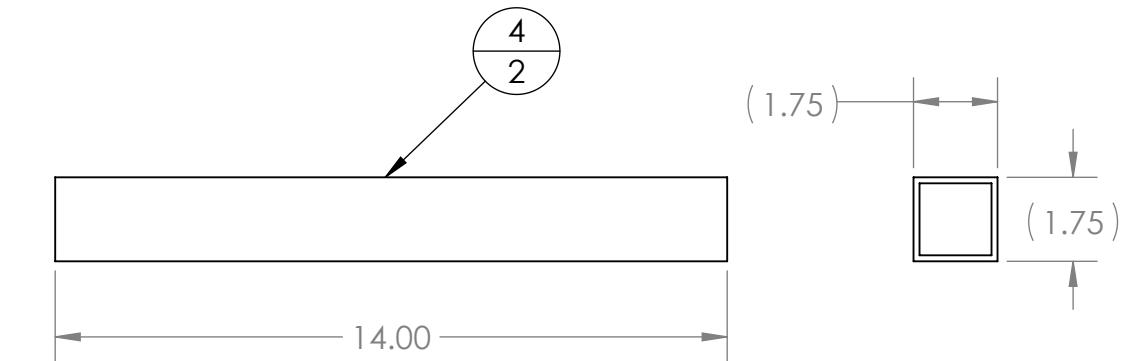
Scale: 1:8



Scale: 1:8



Scale: 1:4



Scale: 1:4

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Loading Station Frame, Right

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19141</b>	<b>B</b>
	<b>WEIGHT:</b>	<b>SHEET 3 OF 4</b>

4

3

2

1

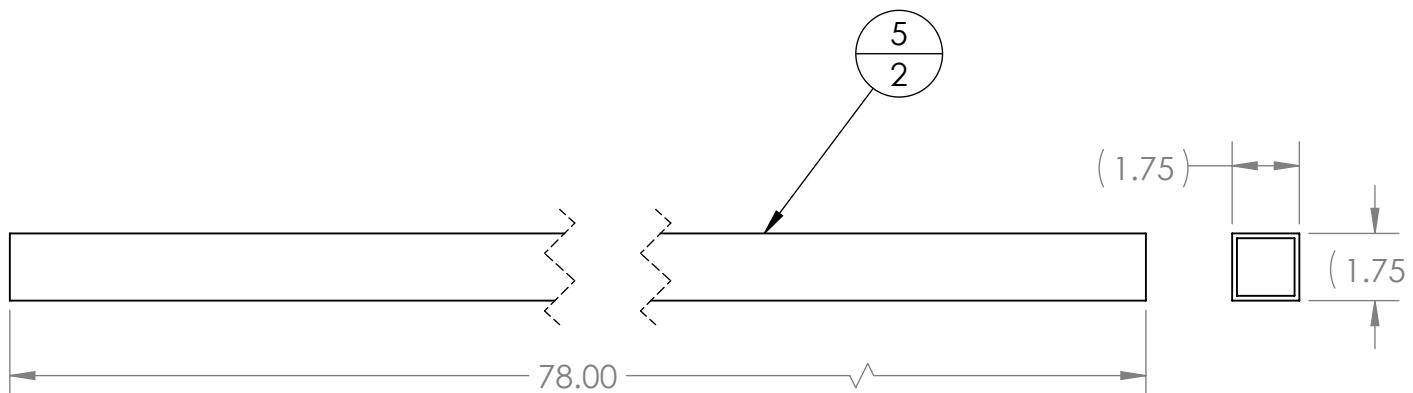
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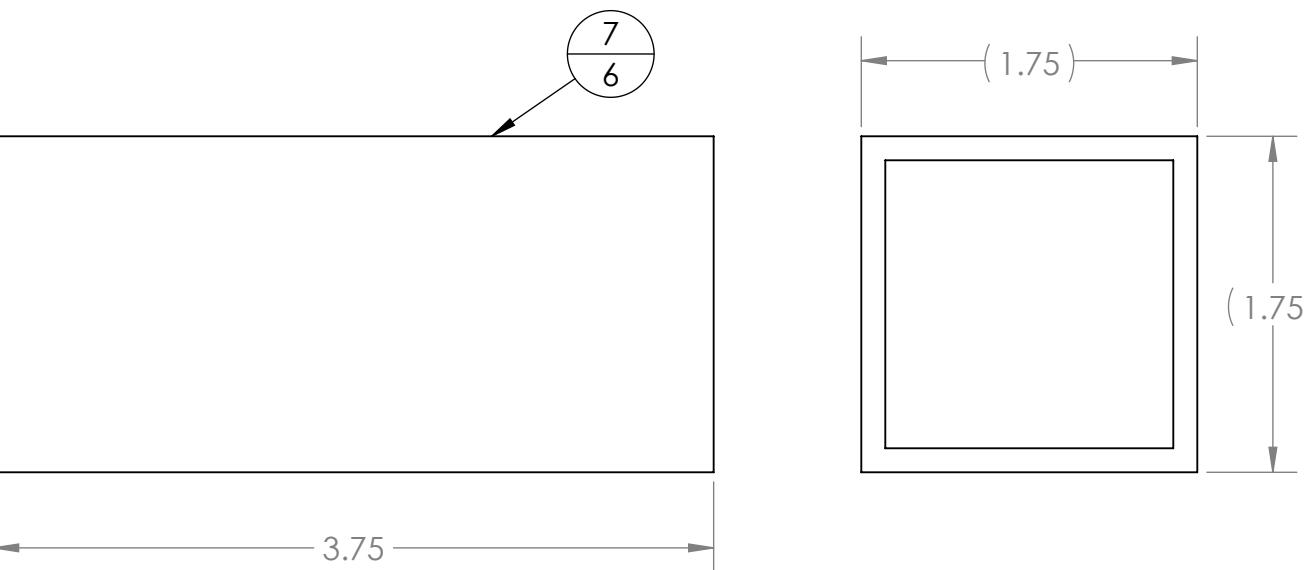
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1

B

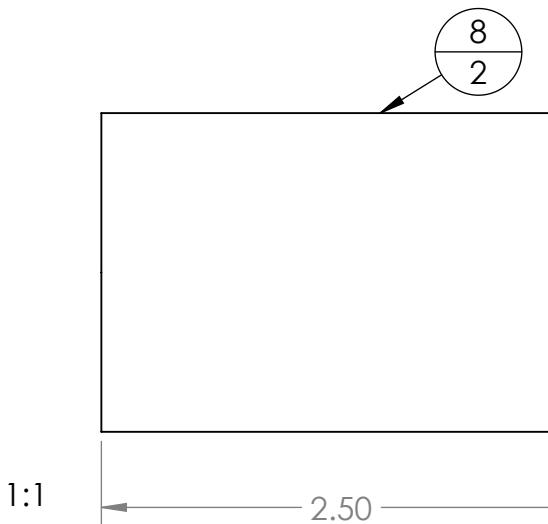


Scale: 1:1



Scale: 1:1

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Scale: 1:1

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES		TOLERANCES:			
FRACTIONAL $\pm 1/16$		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$			
Two place decimal $\pm .01$		Three place decimal $\pm .001$			
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**Title:** Loading Station Frame, Right

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19141</b>	<b>B</b>

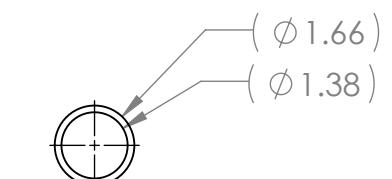
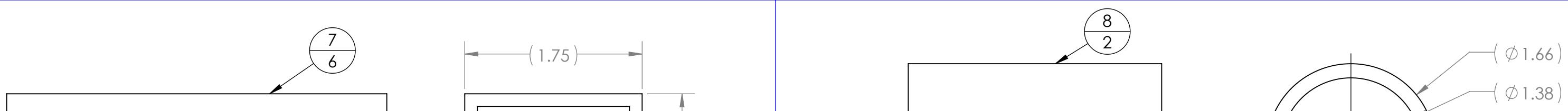
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4

3

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B

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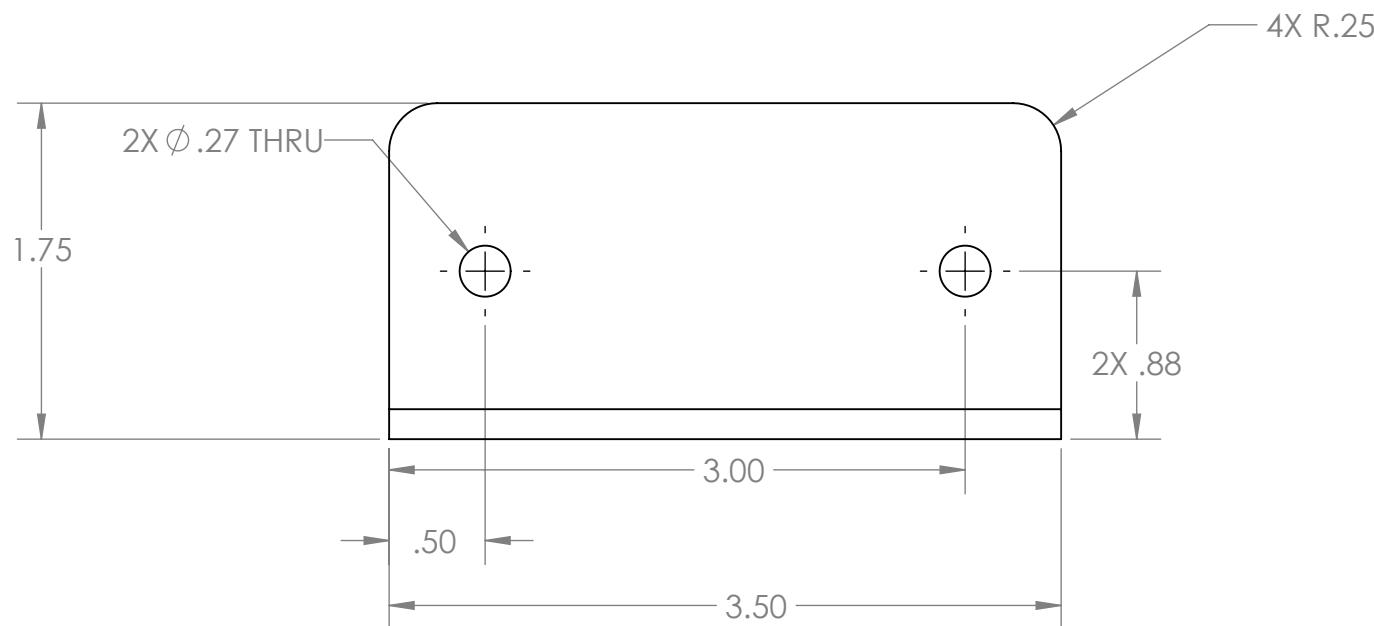
3

2

1

B

B



Note:  
Material: #14 Galvanized Steel, Plated or Similar  
Remove Sharp Edges And Burrs  
Tag or Label With Part Number

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL $\pm 1/16$				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$				
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:	
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**Angle, Support**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19142</b>	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1

4

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4

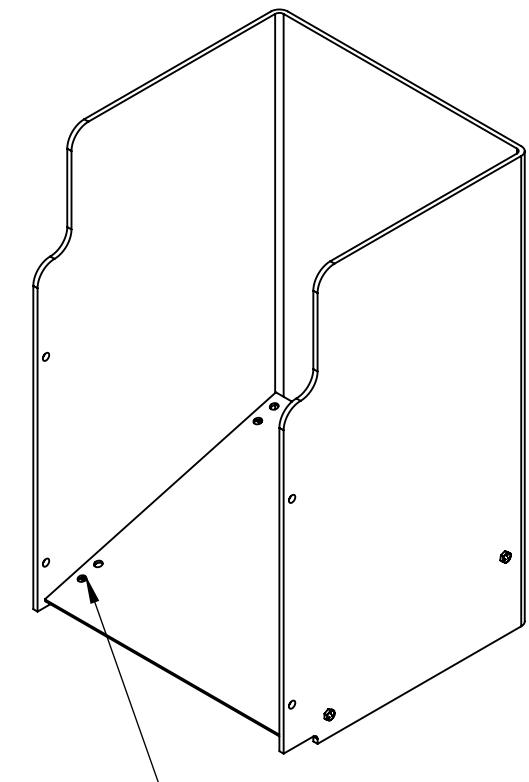
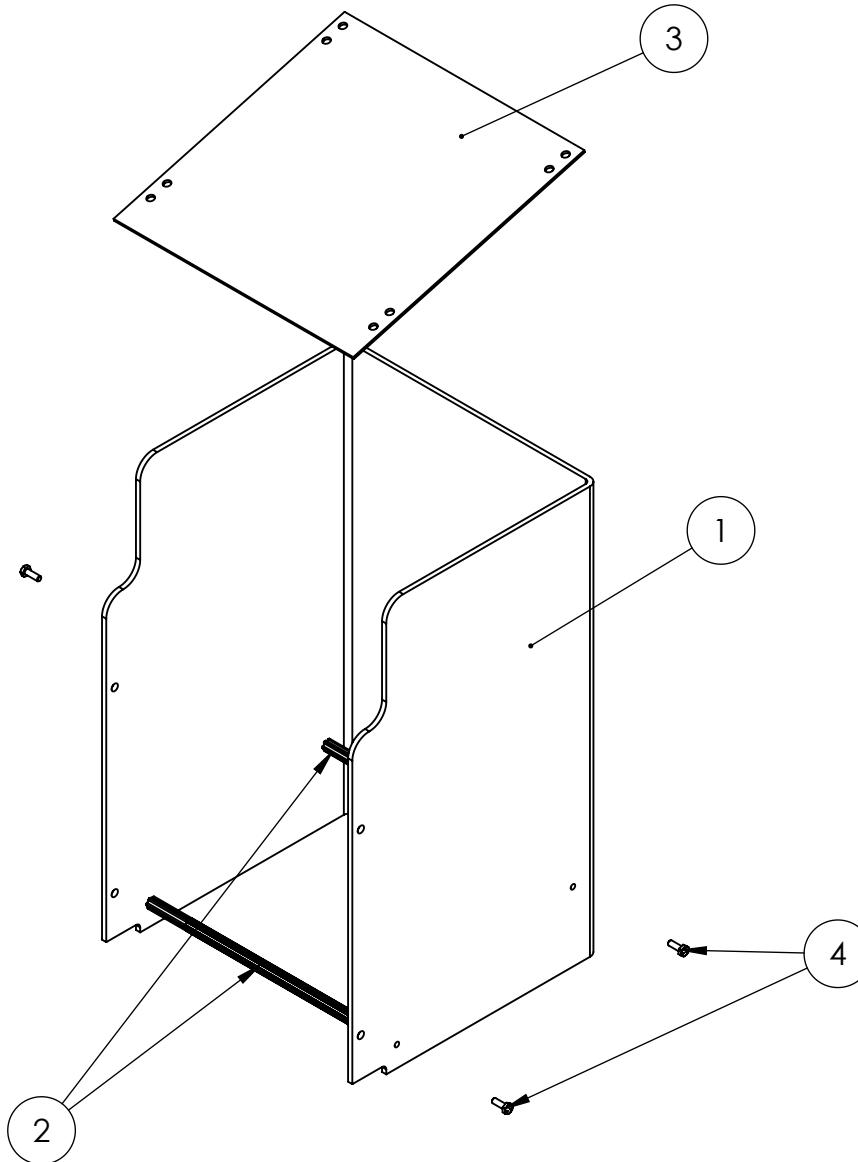
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19144	Chute	1
2	GE-19145	Churro	2
3	GE-19146	Bottom	1
4	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	4

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES:	CHECKED	
		FRACTIONAL $\pm 1/16$	ENG APPR.	
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.	
		TWO PLACE DECIMAL $\pm .01$	Q.A.	
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19143</b>			
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1		

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**FIRST ROBOTICS COMPETITION**  
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Modeling Solutions Partner

## Chute Assembly

4

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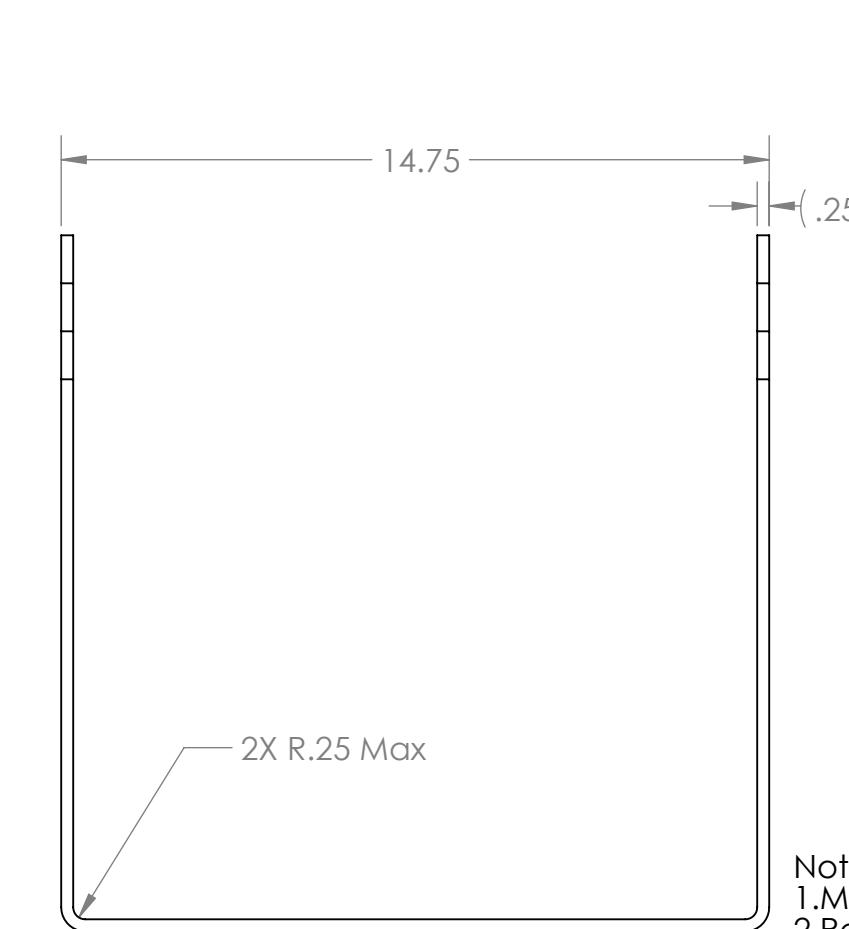
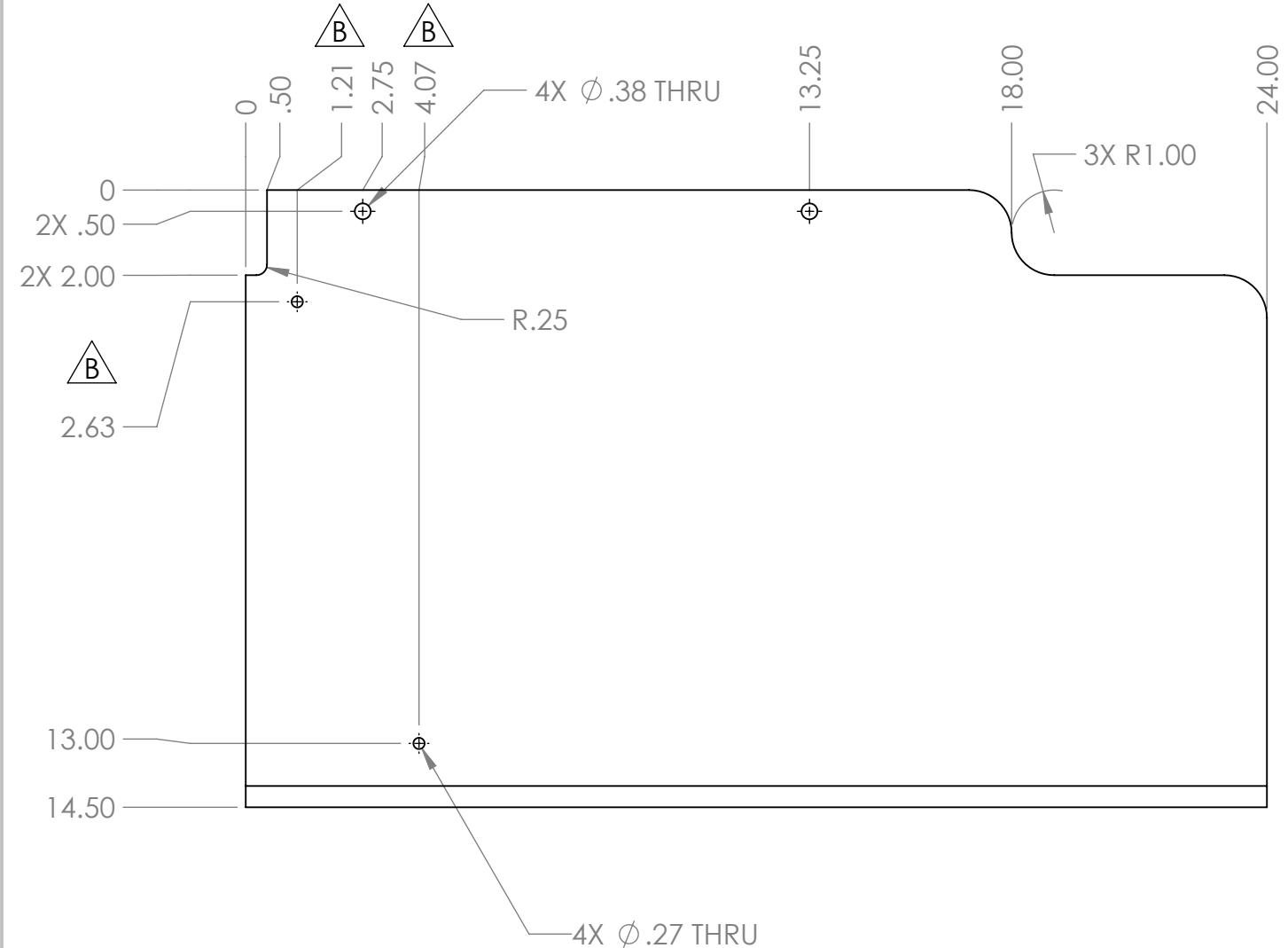
1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
	A	Cosmetic Changes to Model	11/01/2018	DAF
B4	B	1.21 was .56, 4.07 was 2.07, 2.63 was 2.25	11/21/2018	DAF

B

B



Note:  
 1. Material: 1/4" Thick Polycarbonate Sheet Clear  
 2. Remove Sharp Edges And Burrs  
 3. Tag Or Label With Part Number

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES		
		TOLERANCES:		
		FRACTIONAL $\pm 1/16$		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		
		TWO PLACE DECIMAL $\pm .01$		
		THREE PLACE DECIMAL $\pm .001$		
		INTERPRET GEOMETRIC		
		TOLERANCING PER:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
TITLE:		FIRST ROBOTICS COMPETITION		
SIZE		DWG. NO.	REV	
<b>B</b>		<b>GE-19144</b>	<b>B</b>	
SCALE: 1:4		WEIGHT:	SHEET 1 OF 1	

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4

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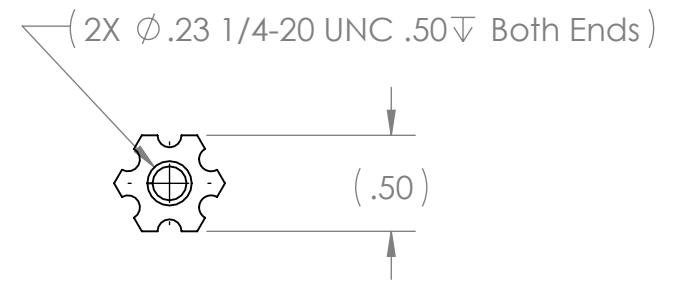
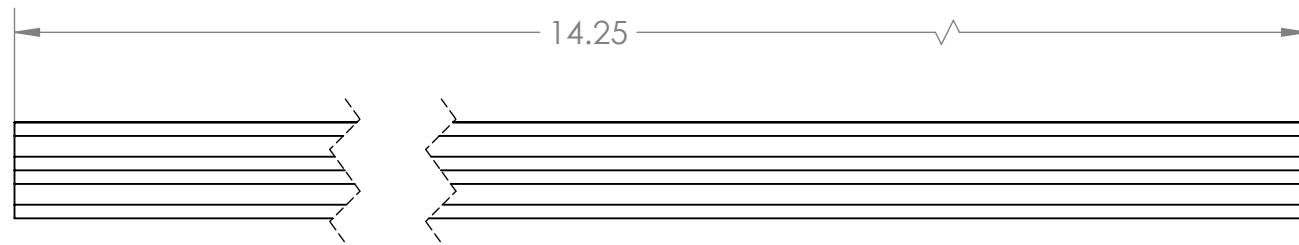
3

2

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B

B



## Note:

1. Make from Andymark Part AM-2241
2. Remove Sharp Edges And Burrs
3. Label Or Tag With Part Number

A

A

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
	APPLICATION	DO NOT SCALE DRAWING			
<b>B</b>	<b>GE-19145</b>				
SCALE: 1:1	WEIGHT:				SHEET 1 OF 1

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**Churro**

4

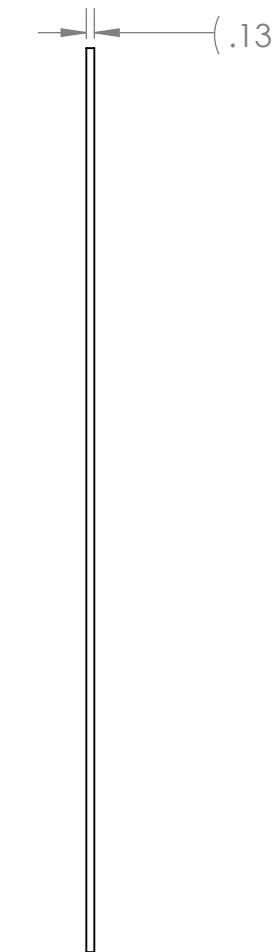
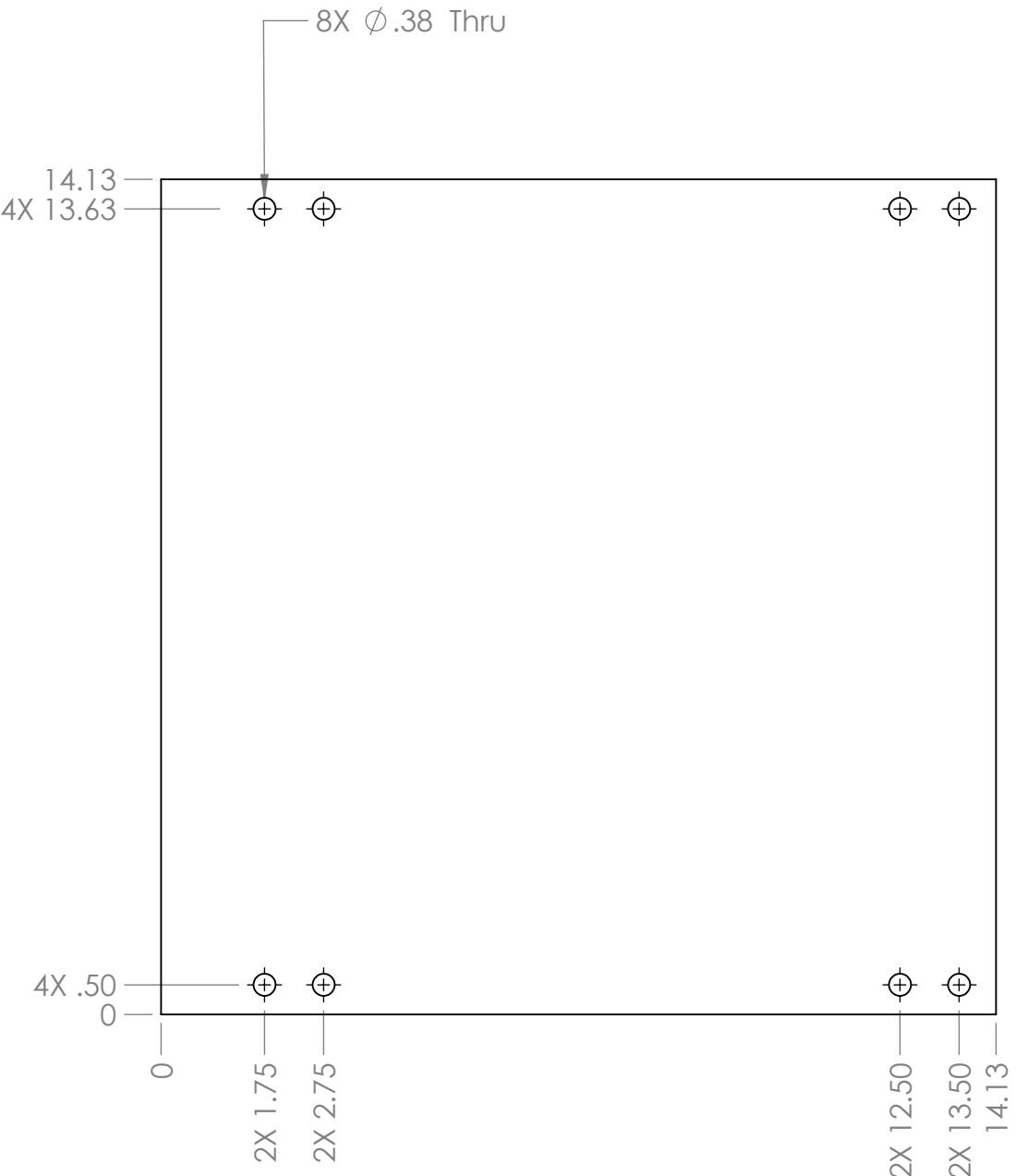
3

2

1

B

B



Note:  
 1. Material: 1/8" Thick Polycarbonate Sheet Clear  
 2. Remove Sharp Edges and Burrs  
 3. Tag or Label With Part Number

A

A

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		UNLESS OTHERWISE SPECIFIED:		TITLE:  Bottom	
		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL: ±1/16			
		ANGULAR: MACH ±1° BEND ±1°			
		TWO PLACE DECIMAL ±.01			
		THREE PLACE DECIMAL ±.001			
		INTERPRET GEOMETRIC TOLERANCING PER:		COMMENTS:	
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		MATERIAL			
		NEXT ASSY			
		USED ON			
		FINISH			
		APPLICATION			
		DO NOT SCALE DRAWING			
		SIZE DWG. NO. B GE-19146 REV			
		SCALE: 1:3 WEIGHT: SHEET 1 OF 1			



SOLIDWORKS  
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4

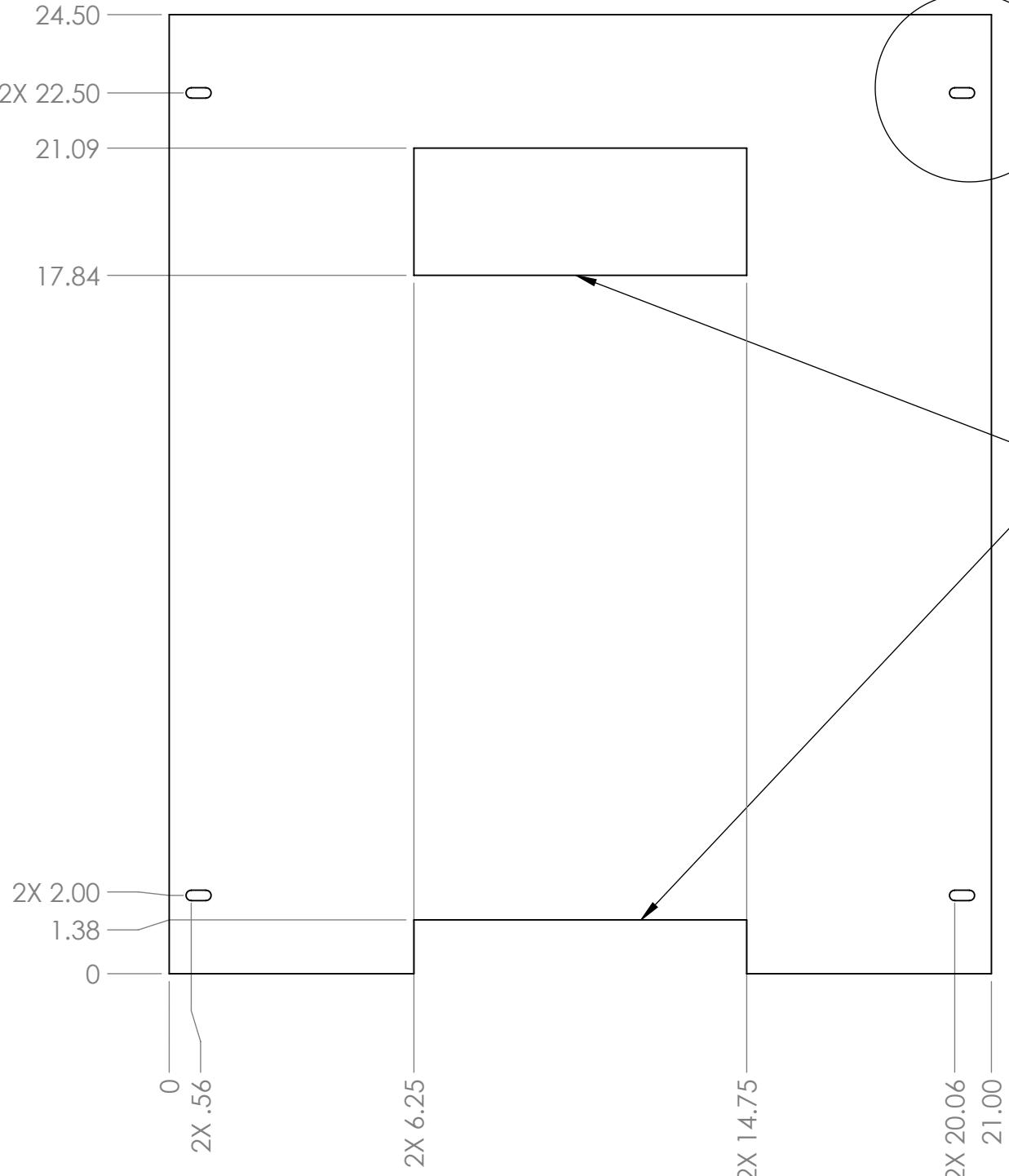
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B

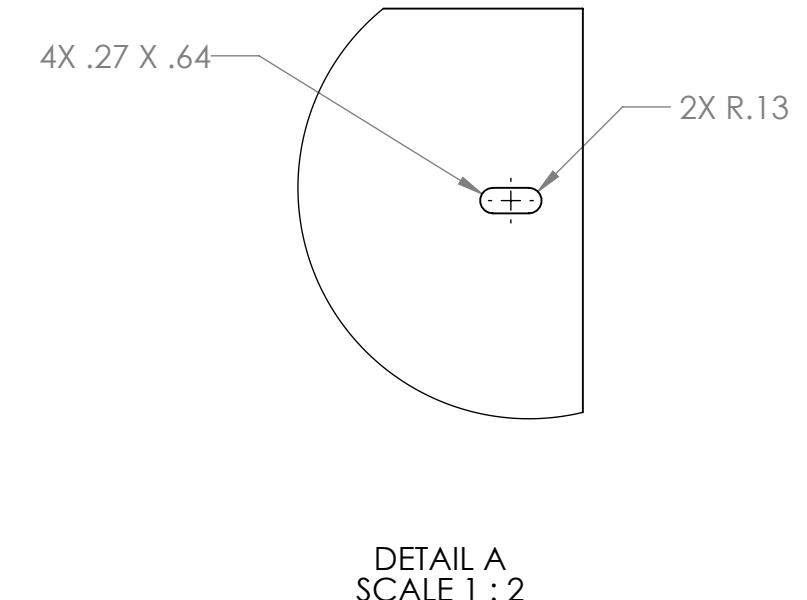
B



Note:  
Material: 1/8" Thick Polycarbonate Sheet Clear  
Remove Sharp Edges and Burrs  
Tag and Label With Part Number

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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
B3	A	Added Hole And Slot 2X 14.75 2X 14.75	10/19/2018	MXS



		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES		
		TOLERANCES:		
		FRACTIONAL: ±1/16		
		ANGULAR: MACH ±1° BEND ±1°		
		TWO PLACE DECIMAL ±.01		
		THREE PLACE DECIMAL ±.001		
		INTERPRET GEOMETRIC		
		TOLERANCING PER:		
		MATERIAL		
		Q.A.		
		COMMENTS:		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**TITLE:**  
**Keyhole Backing**

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19147</b>	<b>A</b>
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

4

3

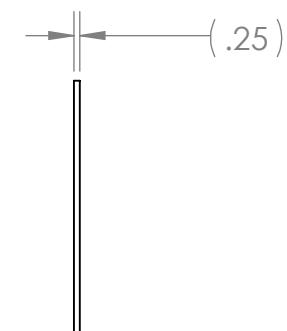
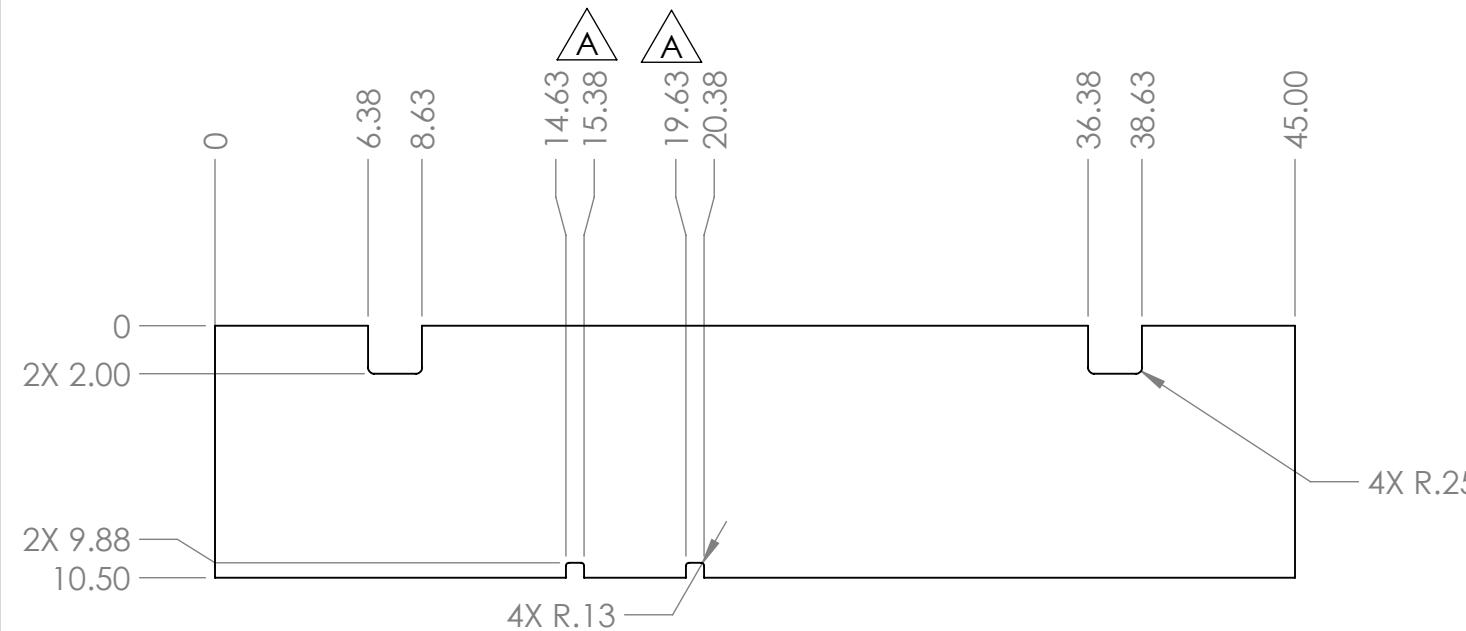
2

1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B-4	A	Added slots	12/27/2018	DAF

B



## Note:

Material: 1/4" Thick Polycarbonate Sheet Clear  
Remove Sharp Edges And Burrs  
Tag Or Label With Part Number

A

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19148</b>	<b>A</b>		
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1		

FIRST  
ROBOTICS  
COMPETITION

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TITLE:  
**Bumper Back**

4

3

2

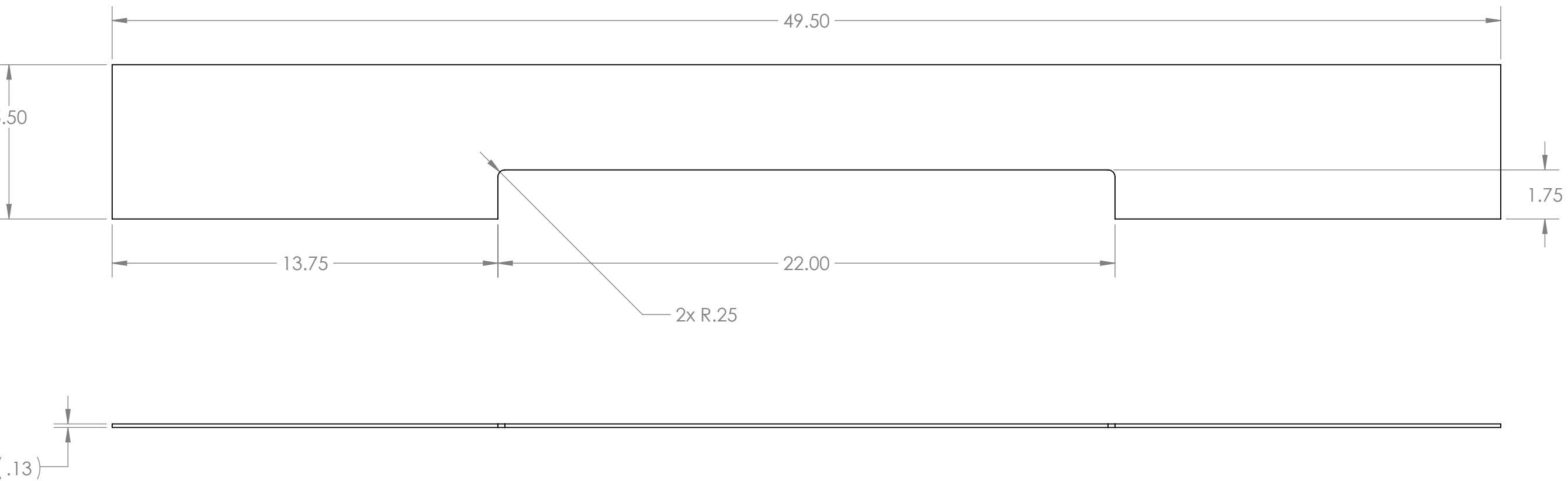
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**Notes:**

1. Material: 1/8" thick polycarbonate, clear
2. Remove all burrs and sharp edges
3. Tag or label with part number.

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	
<b>B</b>	<b>GE-19149</b>				
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1			



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**Bumper Top**

4

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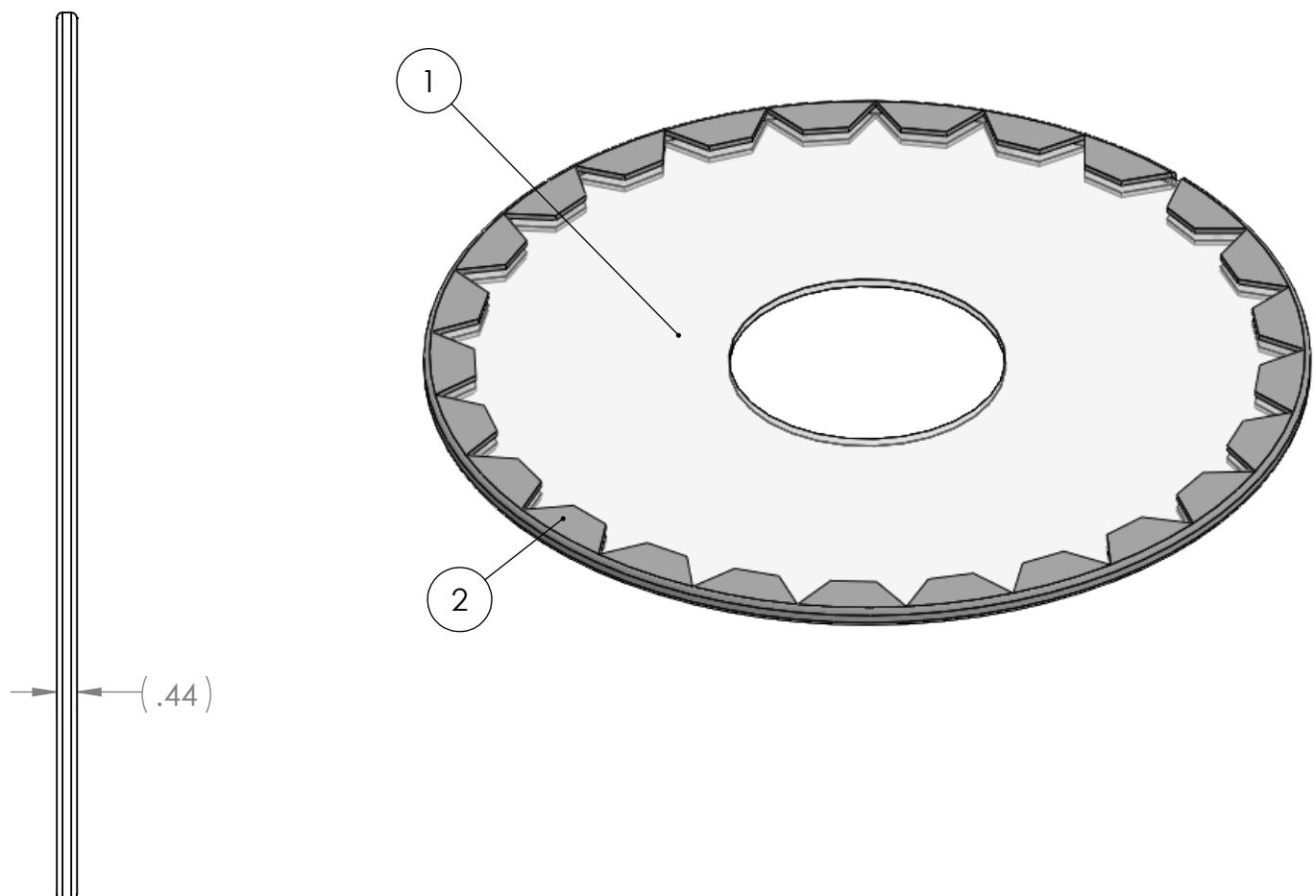
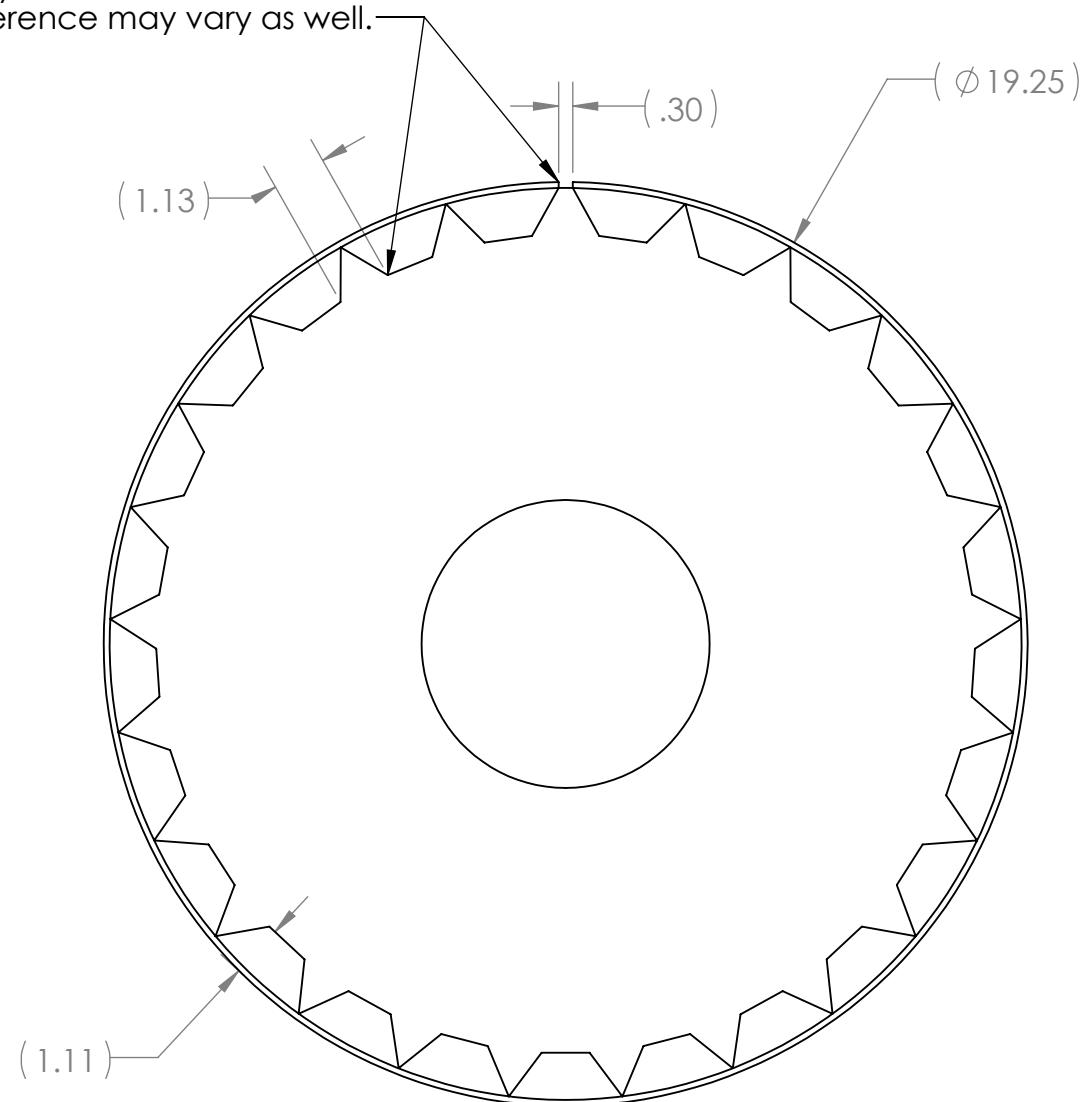
4

3

2

1

Gap sizes are approximate and may vary. Location on the circumference may vary as well.



Notes:  
1. Assembly available to teams from VEXpro as item # 217-6562

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19151	Panel, Polycarbonate	1
2	GE-19153	Loop, Panel	1

		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES		DRAWN	DAF
		TOLERANCES:		CHECKED	
		FRACTIONAL: ±1/16		ENG APPR.	
		ANGULAR: MACH ±1° BEND ±1°		MFG APPR.	
		TWO PLACE DECIMAL ±.01		Q.A.	
		THREE PLACE DECIMAL ±.001		COMMENTS:	
		INTERPRET GEOMETRIC			
		TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	
SIZE	DWG. NO.		REV		
<b>B</b>	<b>GE-19150</b>				
SCALE: 1:4	WEIGHT:		SHEET 1 OF 1		

 FIRST  
ROBOTICS  
COMPETITION

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**Panel Assembly**

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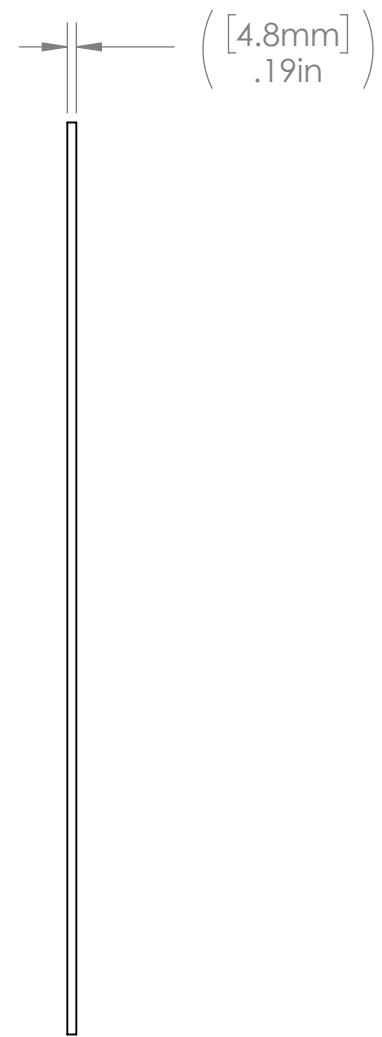
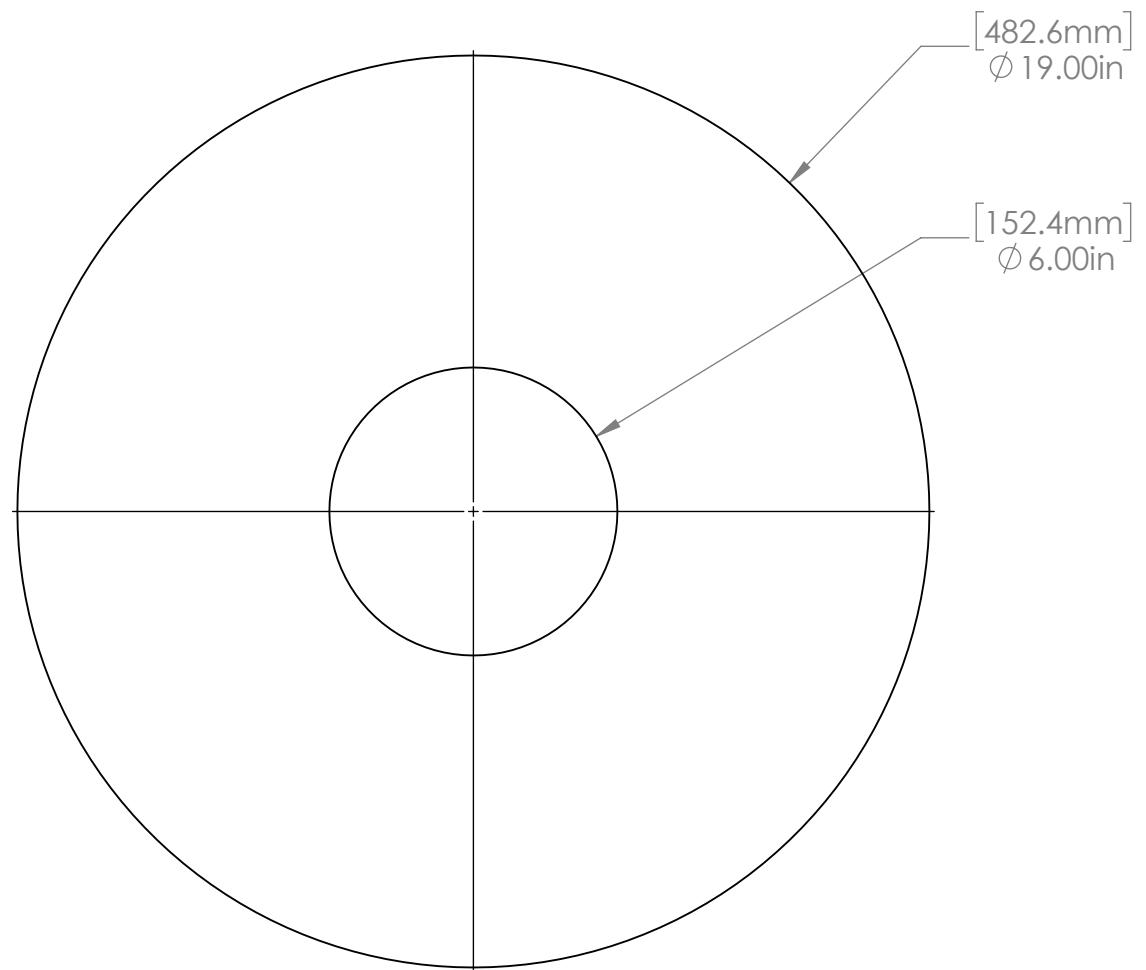
3

2

1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
A3	A	Note about screen printing added.	12/31/2018	CPO



## Note:

1. Material: 3/16 Polycarbonate, Clear
2. Remove all burrs and sharp edges.
3. Screen print applied to both faces.



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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001	NAME DRAWN DAF 8/20/18	DATE
		INTERPRET GEOMETRIC TOLERANCING PER:	CHECKED	
		MATERIAL	ENG APPR. MFG APPR.	
	NEXT ASSY	FINISH	Q.A.	COMMENTS:
	USED ON			
	APPLICATION	DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Panel,  
Polycarbonate**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19151</b>	<b>A</b>
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

4

3

2

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4

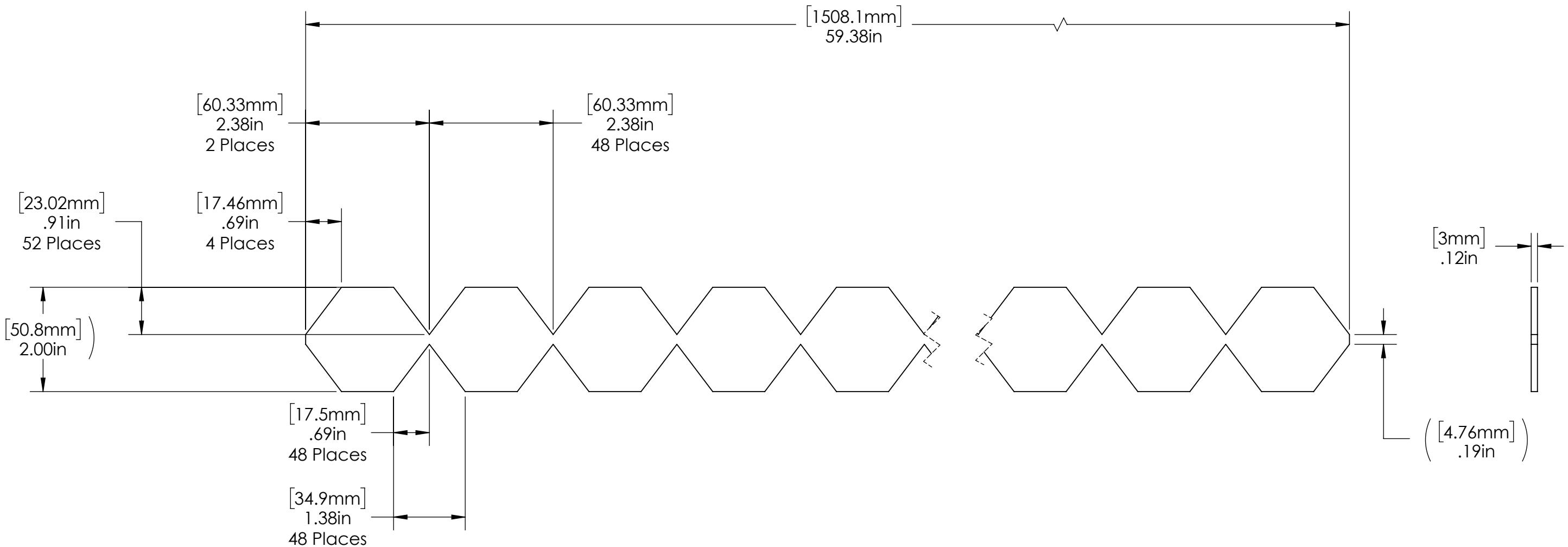
3

2

1

B

B



## Notes:

1. Material: 2" Loop Fastener, Adhesive Backed. 3M Product SJ3571.
2. Color: White
3. Adhesive: Acrylic Pressure Sensitive Adhesive

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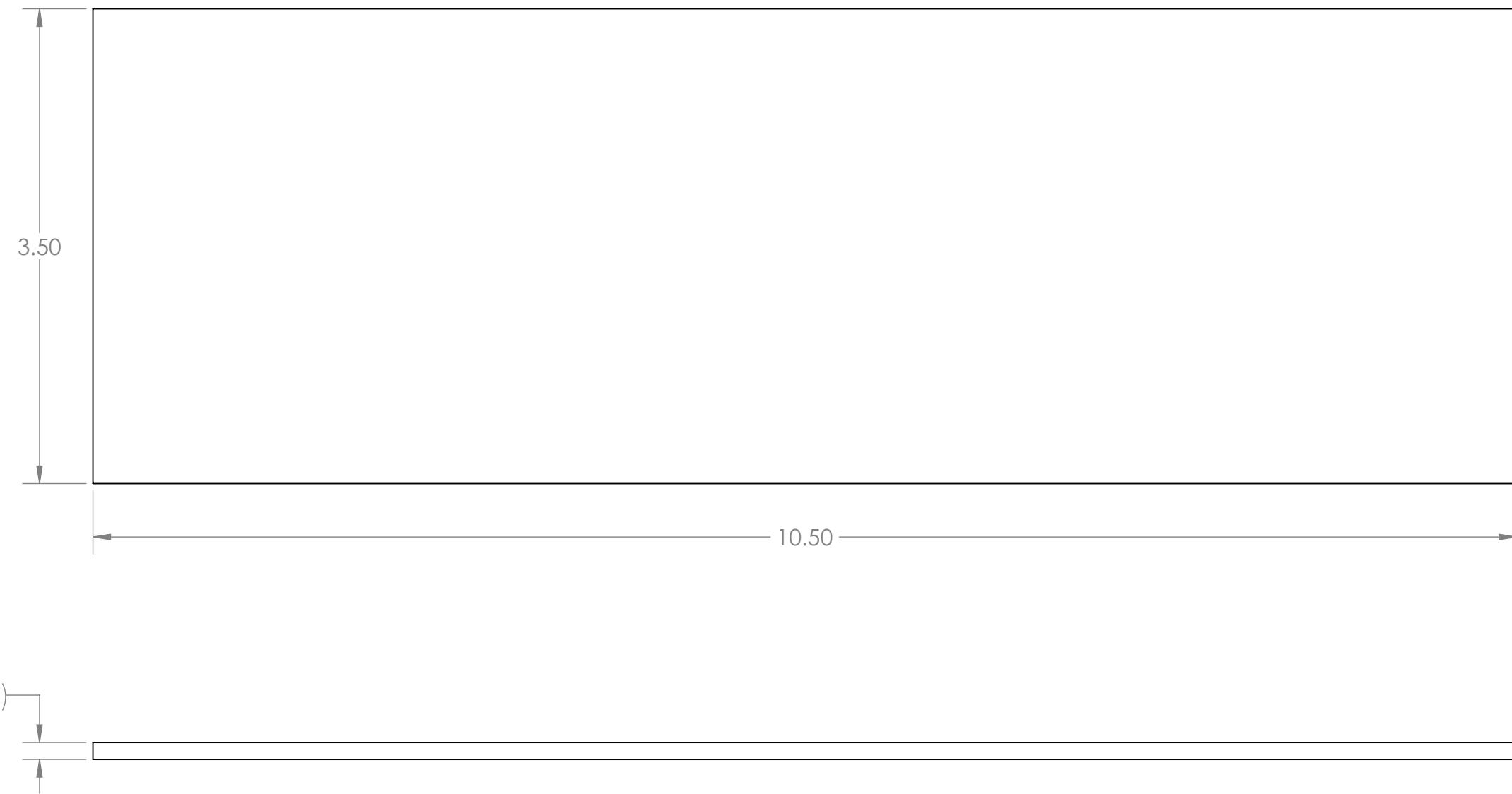
		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
SIZE	DWG. NO.			REV
<b>B</b>	<b>GE-19153</b>			<b>A</b>
SCALE: 1:2	WEIGHT:			SHEET 1 OF 1

4

3

2

1



## Notes:

1. Material: 1/8" thick polycarbonate, clear
2. Remove all burrs and sharp edges.
3. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Bumper Side**

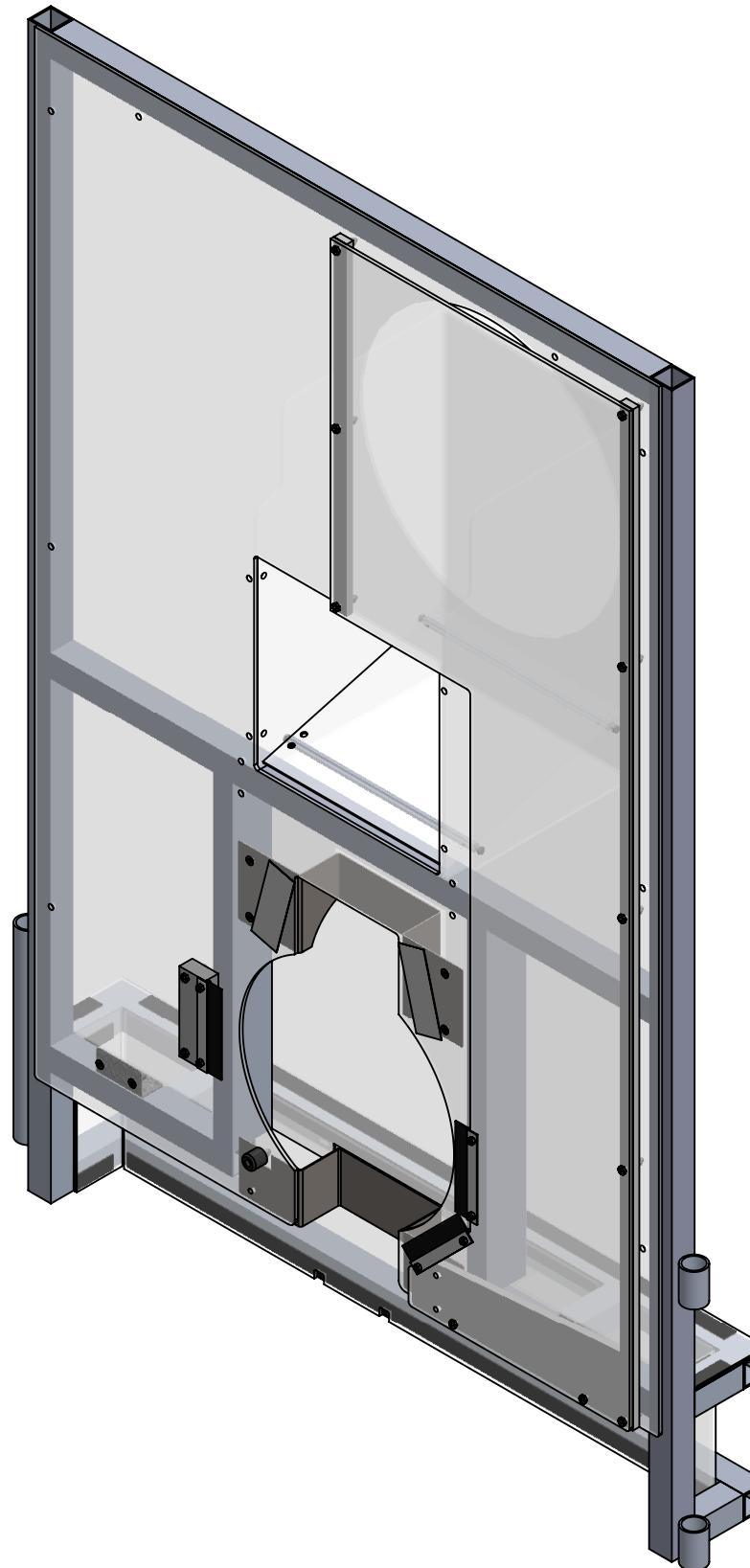
SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19154</b>	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1

4

3

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1



B

B

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19026	Keyhole Insert	1
2	GE-19098	Keyhole Insert Bottom	1
3	GE-19143	Chute Assembly	1
4	GE-19147	Keyhole Backing	1
5	GE-19148	Bumper Back	1
6	GE-19149	Bumper Top	1
7	GE-19154	Bumper Side	2
8	GE-19156	Plastic Assembly, Loading Station, Left	1
9	GE-19159	Feeder Station Frame	1
10	Hook_1_28	1" x 28" Hook Fastener, Adhesive Backed	1
11	Hook_1_3	1" x 3" Hook Fastener, Adhesive Backed	6
12	Hook_1_45	1" X 45" Hook Fastener, Adhesive Backed	2
13	Loop_1_28	1" x 28" Loop Fastener, Adhesive Backed	1
14	Loop_1_3	1" x 3" Loop Fastener, Adhesive Backed	6
15	Loop_1_45	1" x 45" Loop Fastener, Adhesive Backed	2
16	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	4
17	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	4
18	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4

	UNLESS OTHERWISE SPECIFIED:	NAME	DATE
	DIMENSIONS ARE IN INCHES	DRAWN	
	TOLERANCES:	CHECKED	
	FRACTIONAL $\pm 1/16$	ENG APPR.	
	ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.	
	TWO PLACE DECIMAL $\pm .01$	Q.A.	
	THREE PLACE DECIMAL $\pm .001$	COMMENTS:	
	INTERPRET GEOMETRIC TOLERANCING PER:		
	MATERIAL		
NEXT ASSY	USED ON	FINISH	
APPLICATION	DO NOT SCALE DRAWING		
SCALE: 1:10	WEIGHT:	SHEET 1 OF 4	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Loading Station Assembly, Left**

**SIZE** DWG. NO. REV  
**B** **GE-19155**

4

3

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4

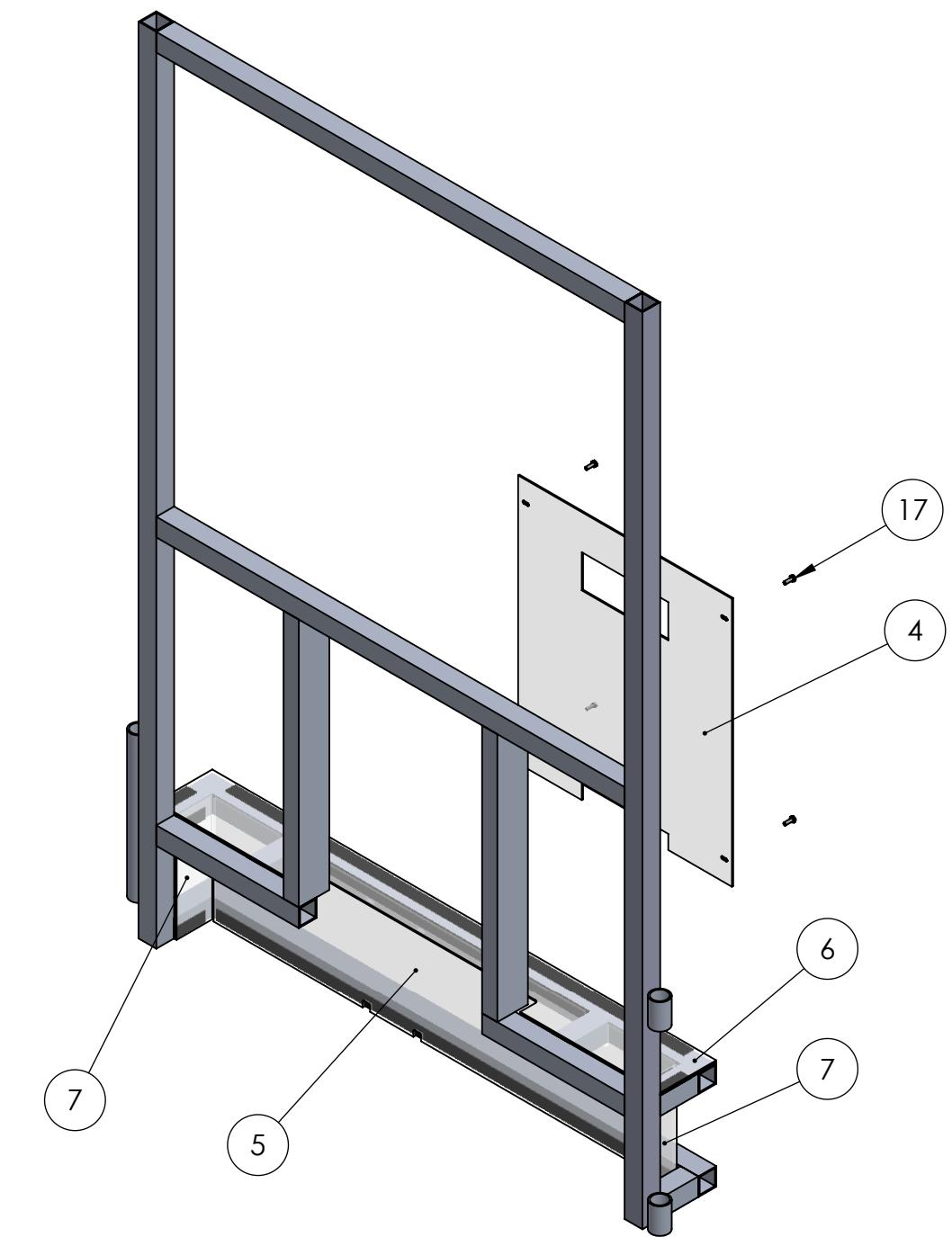
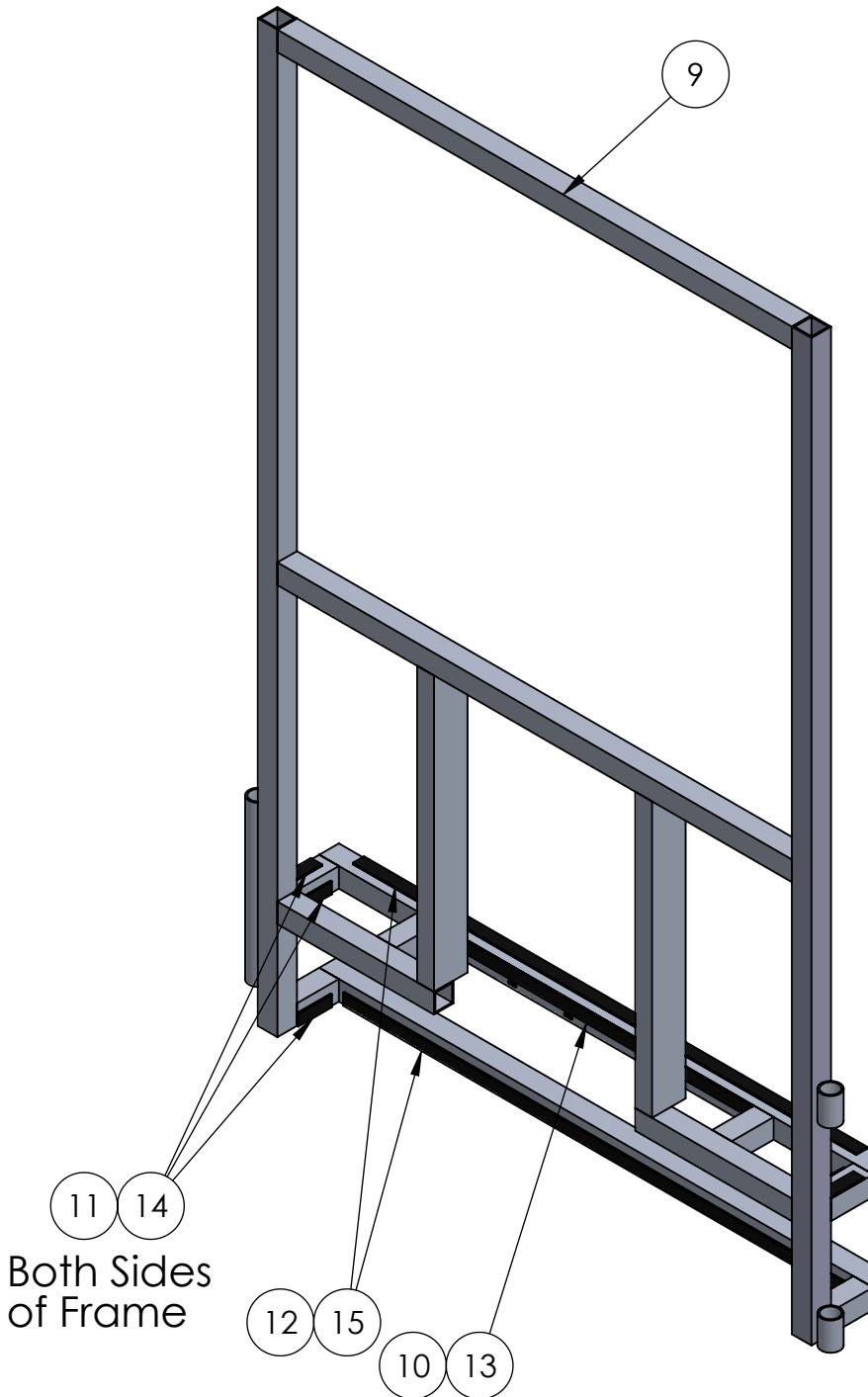
3

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B

B

Both Sides  
of Frame

## Notes:

1. Apply the hook fastener to the aluminum frame.
2. Attach the loop fastener to the hook.
3. Peel the protective backing off the loop.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL		
		FINISH		
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Loading Station Assembly, Left

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19155</b>	
SCALE: 1:12	WEIGHT:	SHEET 2 OF 4

4

3

2

1

4

3

2

1

Cable tie Item 3 to Item 8 at four places

Cable tie Item (8) to Item (9) at all available locations.

Attach **1** to Item **8** with hardware. 4 places

Cable tie Item **2** to Item **8** at two locations

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST</b> <b>ROBOTICS</b> <b>COMPETITION</b>	<b>TITLE:</b>  <h1>Loading Station Assembly, Left</h1>
		DIMENSIONS ARE IN INCHES	DRAWN				
		TOLERANCES:	CHECKED				
		FRACTIONAL $\pm 1/16$	ENG APPR.				
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.				
		TWO PLACE DECIMAL $\pm .01$	Q.A.				
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:				
		INTERPRET GEOMETRIC TOLERANCING PER:					
		MATERIAL					
NEXT ASSY	USED ON	FINISH					
APPLICATION		DO NOT SCALE DRAWING					
SCALE: 1:12 WEIGHT:						SHEET 3 OF 4	

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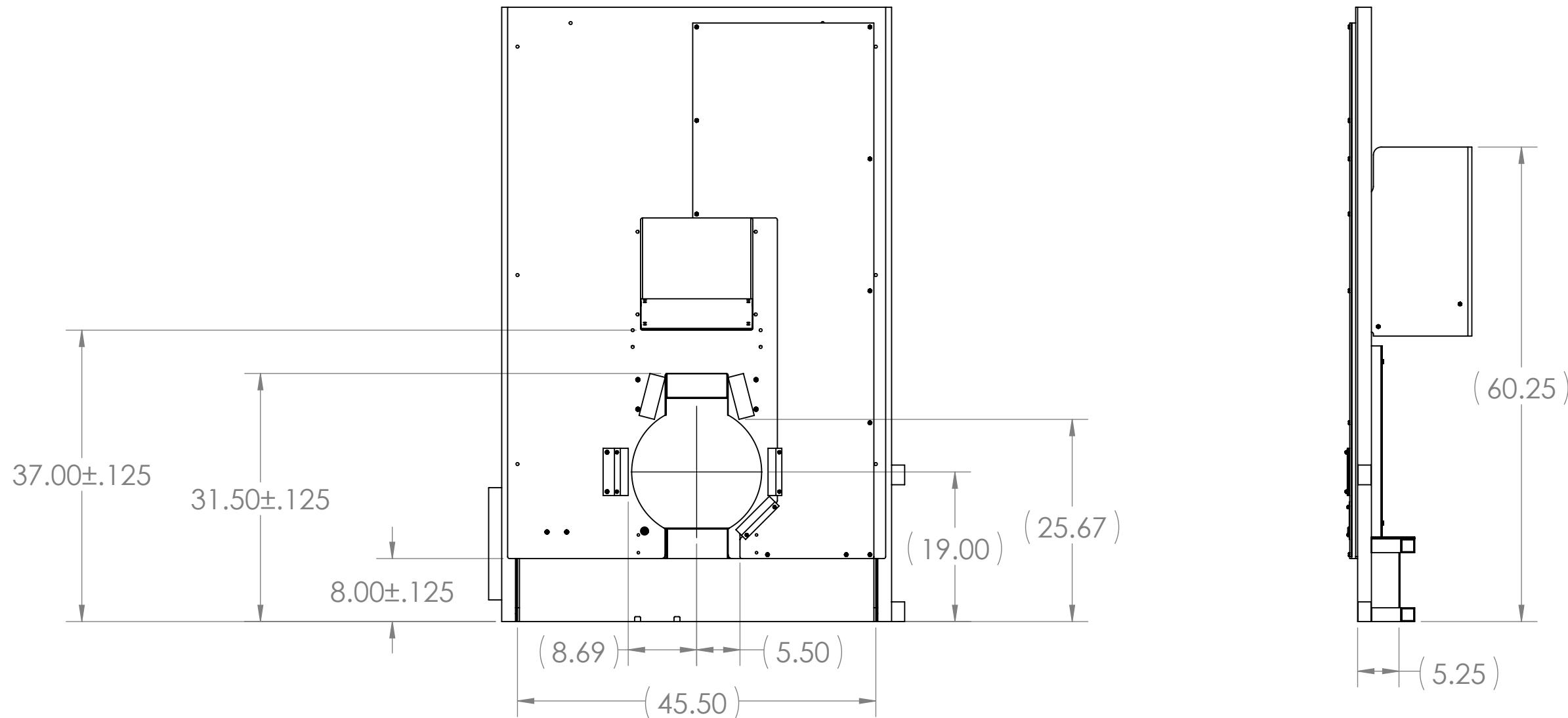
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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Loading Station Assembly, Left

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19155</b>	
SCALE: 1:16	WEIGHT:	SHEET 4 OF 4

4

3

2

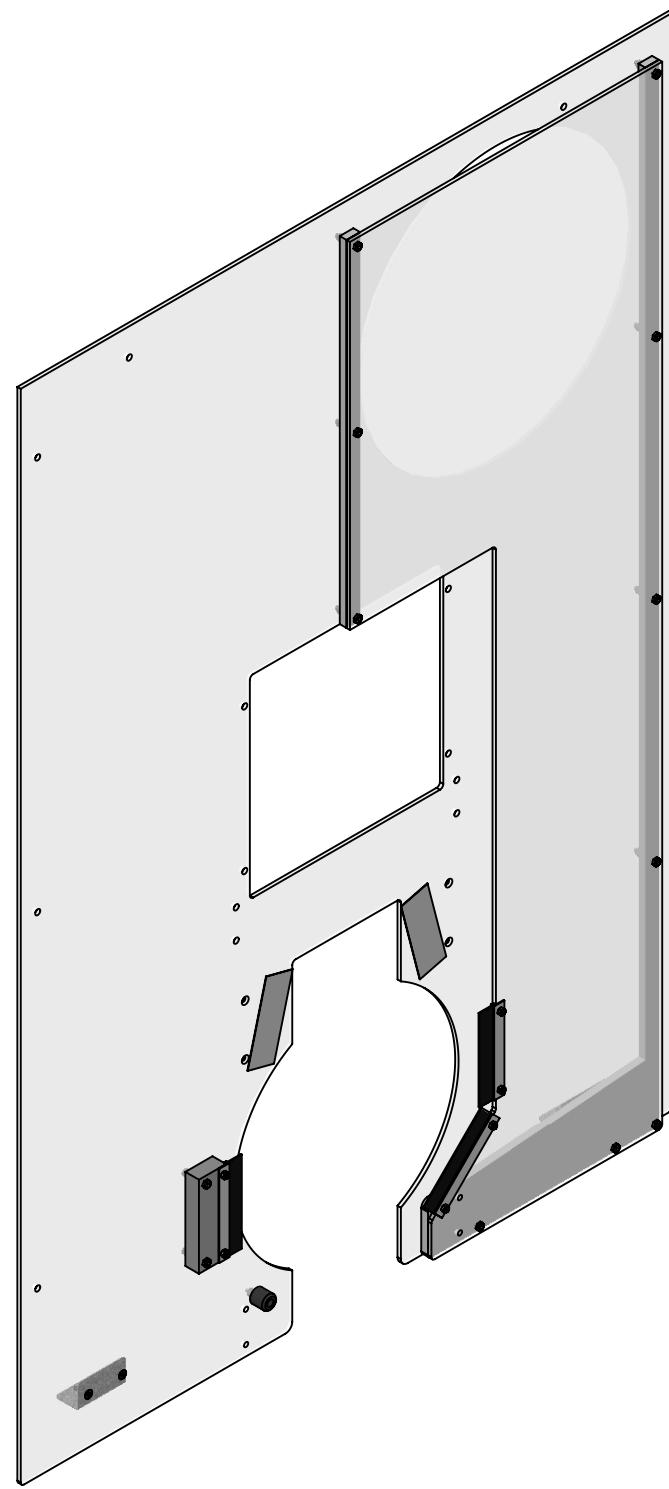
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B

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19134	Slot Guide, Large	1
2	GE-19135	Slot Guide, Small	1
3	GE-19138	Slot Guide, Angled	1
4	GE-19139	Slot Stop	1
5	GE-19140	Bumper, Rubber	1
6	GE-19142	Angle, Support	2
7	GE-19157	Loading Station Panel, Left	1
8	GE-19158	Slot Cover	1
9	GE-19190	6" brush	3
10	VisionTape	2" x 5.5" Retroreflective tape	2
11	button_hex_.25_20_1.25	Button Head, Hex, 1/4-20 x 1.25	1
12	flat_hex_.25_20_1	Steel Hex Flat Head Screw, 1/4"-20 x 1" long, fully threaded	4
13	flat_hex_10_32_1.375	Flat Head, Hex, 10-32 x 1.375"	2
14	flat_hex_10_32_.625	Flat Head, Hex, 10-32 x .625"	4
15	hex_.25_20_1.5	Steel Hex Head Screw, 1/4"-20 x 1-1/2" long, fully threaded	12
16	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	17
17	nylock_10_32	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size	6

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES:	CHECKED	
		FRACTIONAL: ±1/16	ENG APPR.	
		ANGULAR: MACH ±1° BEND ±1°	MFG APPR.	
		TWO PLACE DECIMAL: ±.01	Q.A.	
		THREE PLACE DECIMAL: ±.001	COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19156</b>			
SCALE: 1:16	WEIGHT:	SHEET 1 OF 2		

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Plastic Assembly,  
Loading Station, Left**

4

3

2

1

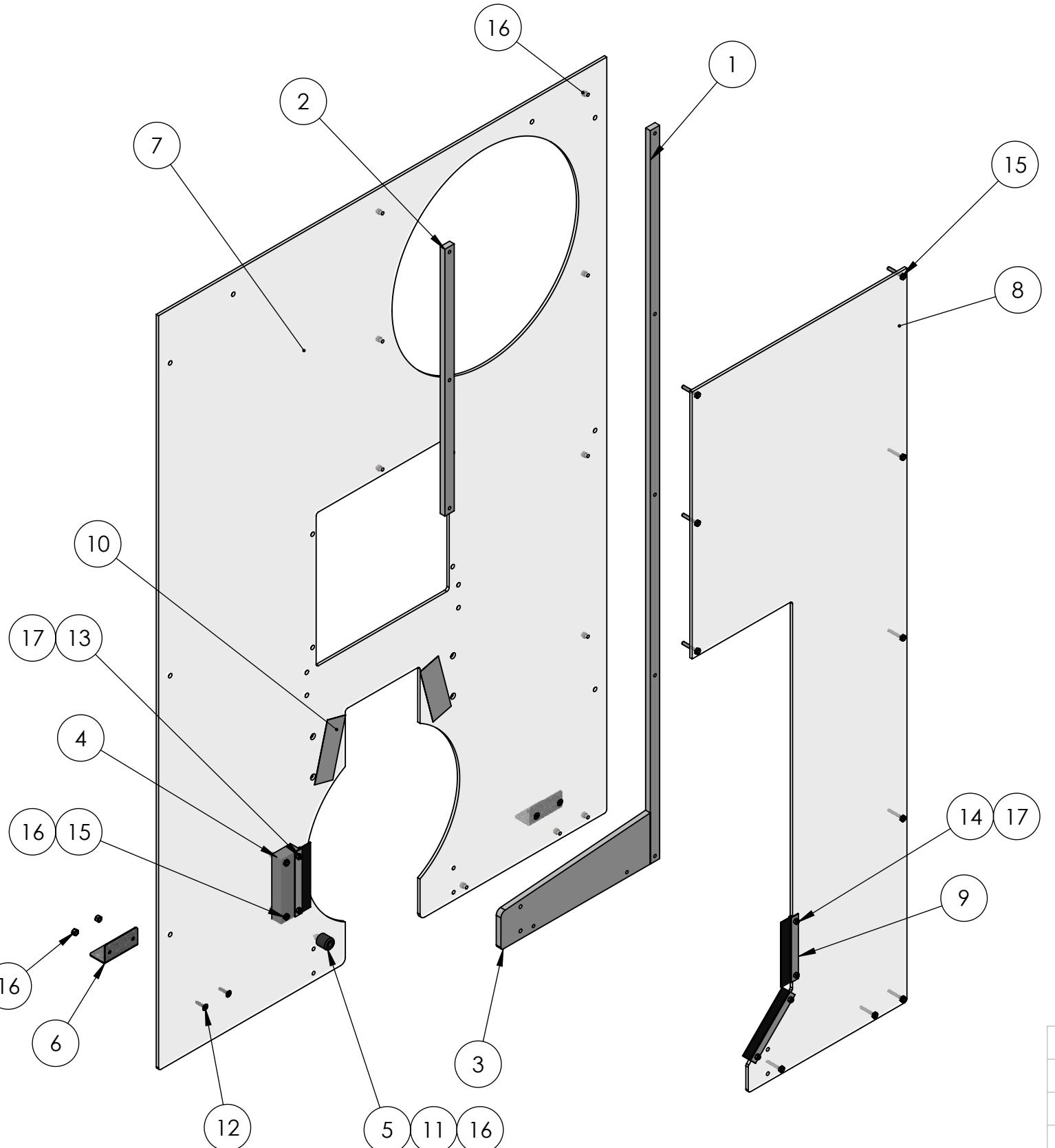
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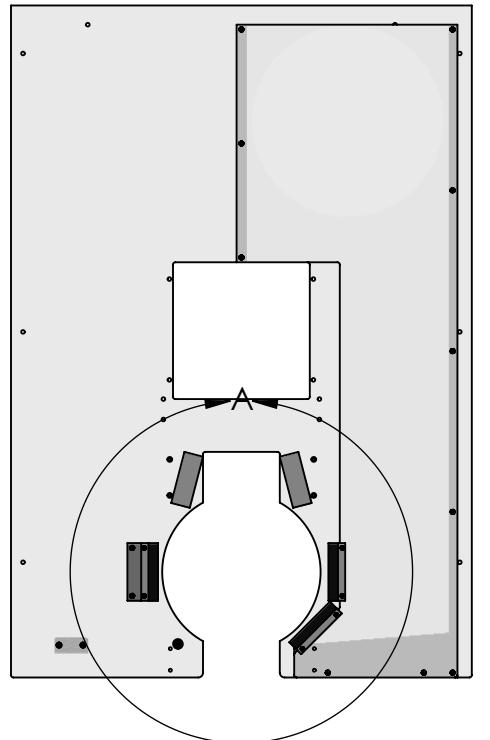
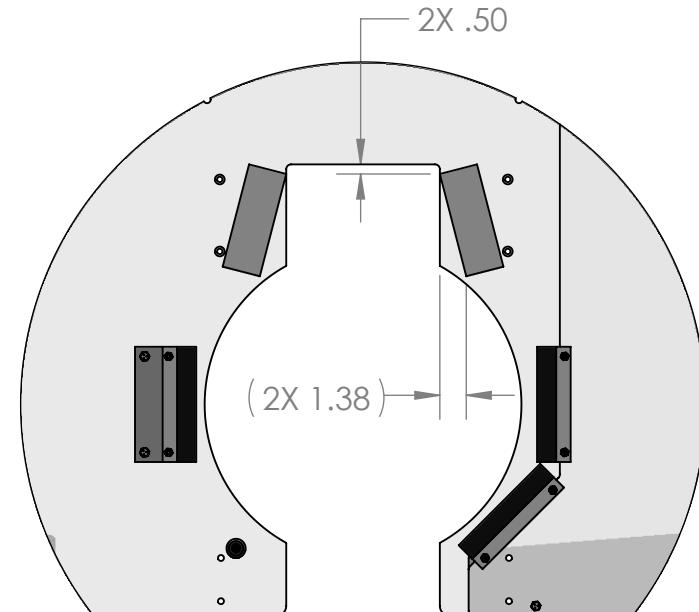
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B



		DETAIL A		NAME	DATE
		UNLESS OTHERWISE SPECIFIED DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		DRAWN	
				CHECKED	
				ENG APPR.	
				MFG APPR.	
				Q.A.	
				COMMENTS:	
				MATERIAL	
				FINISH	
NEXT ASSY	USED ON				
APPLICATION		DO NOT SCALE DRAWING			



FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE: Plastic Assembly,  
Loading Station, Left

SIZE DWG. NO. REV  
**B GE-19156**

SCALE: 1:10 WEIGHT: SHEET 2 OF 2

4

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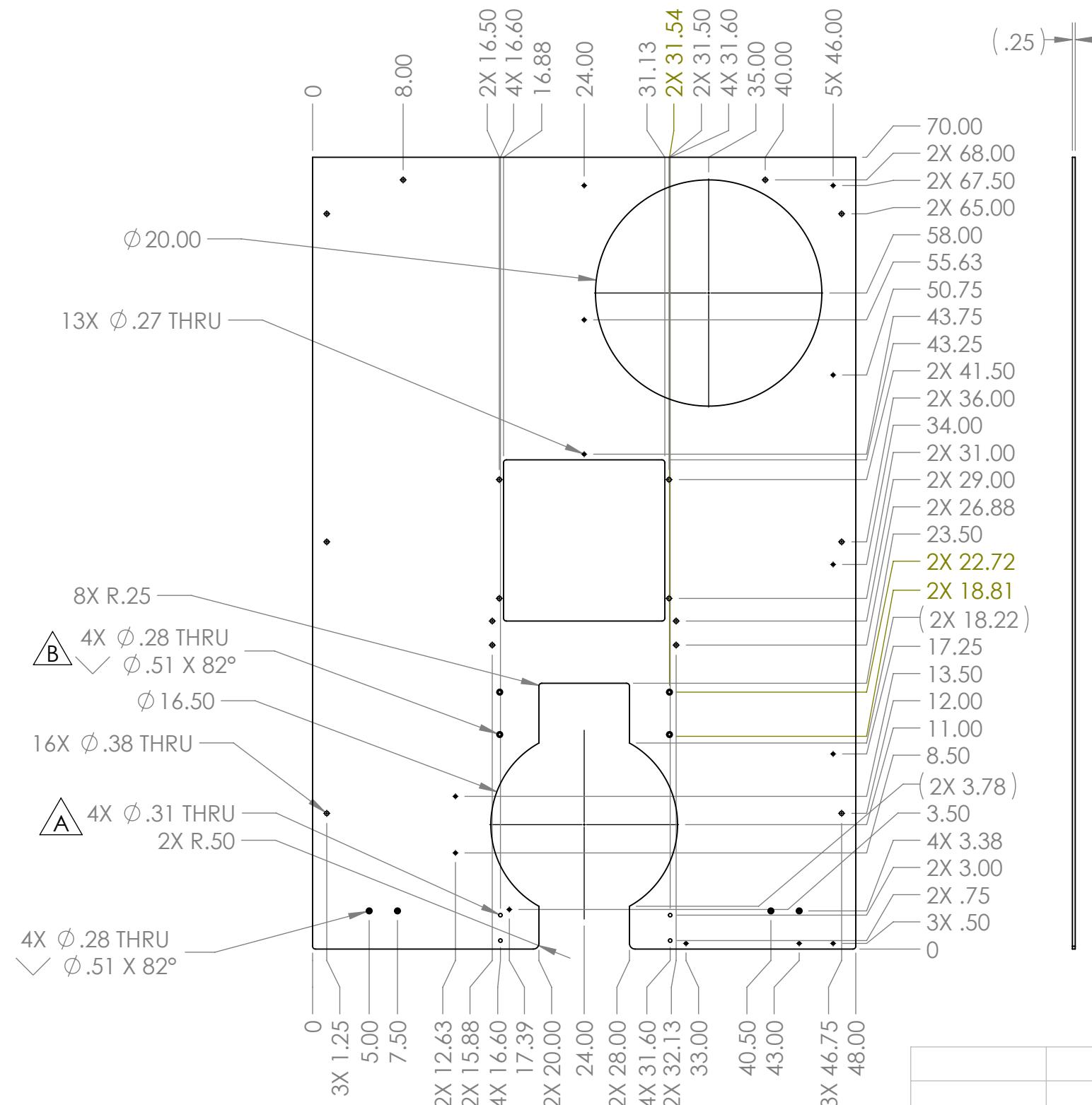
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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
A4	A	Added 8 .31 Holes	10/17/2018	MXS
A4	B	4X Ø.31 changed to C'sink	11/15/2018	DAF

- Notes:
- Material: 1/4" Polycarbonate, Clear
  - Remove all burrs and sharp edges.
  - Tag or label with part number.

	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
	DRAWN		
	CHECKED		
	ENG APPR.		
	MFG APPR.		
	Q.A.		
	COMMENTS:		
	INTERPRET GEOMETRIC TOLERANCING PER: MATERIAL		
	NEXT ASSY	USED ON	FINISH
	APPLICATION	DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**Title:** Loading Station Panel, Left

**Size:** B **Dwg. No.:** GE-19157 **Rev.:** B

**Scale:** 1:12 **Weight:** **Sheet 1 of 1**

4

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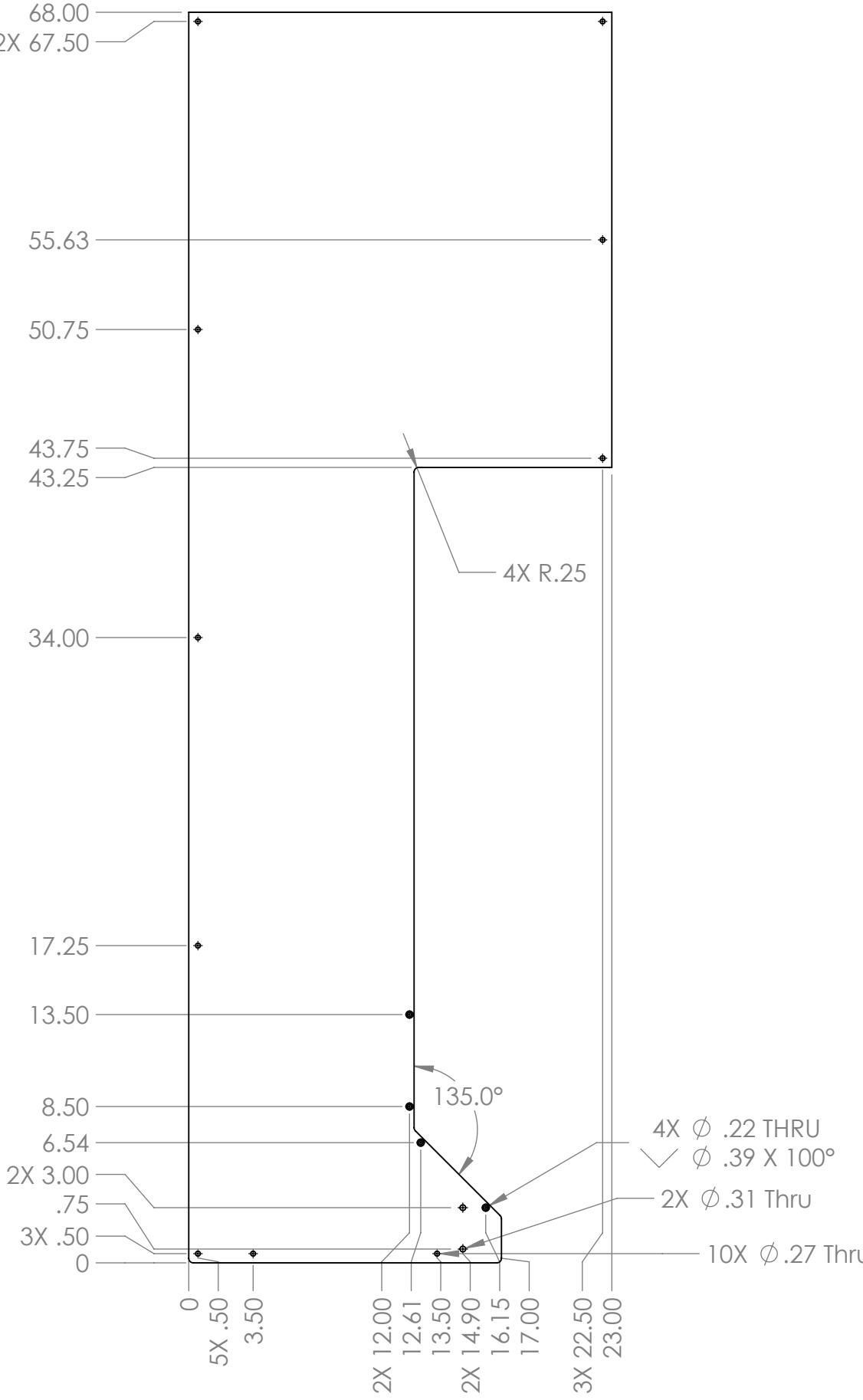
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**Note:**

1. Material: 1/4" Thick Polycarbonate Sheet Clear
2. Remove Sharp Edges and Burrs
3. Tag or Label With Part Number

		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19158</b>			
SCALE: 1:8		WEIGHT:	SHEET 1 OF 1	



**SOLIDWORKS**  
Modeling Solutions Partner

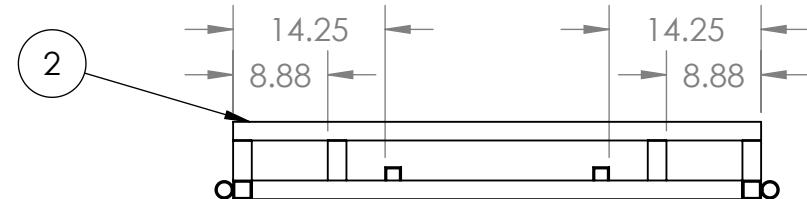
**TITLE:**  
**Slot Cover**

4

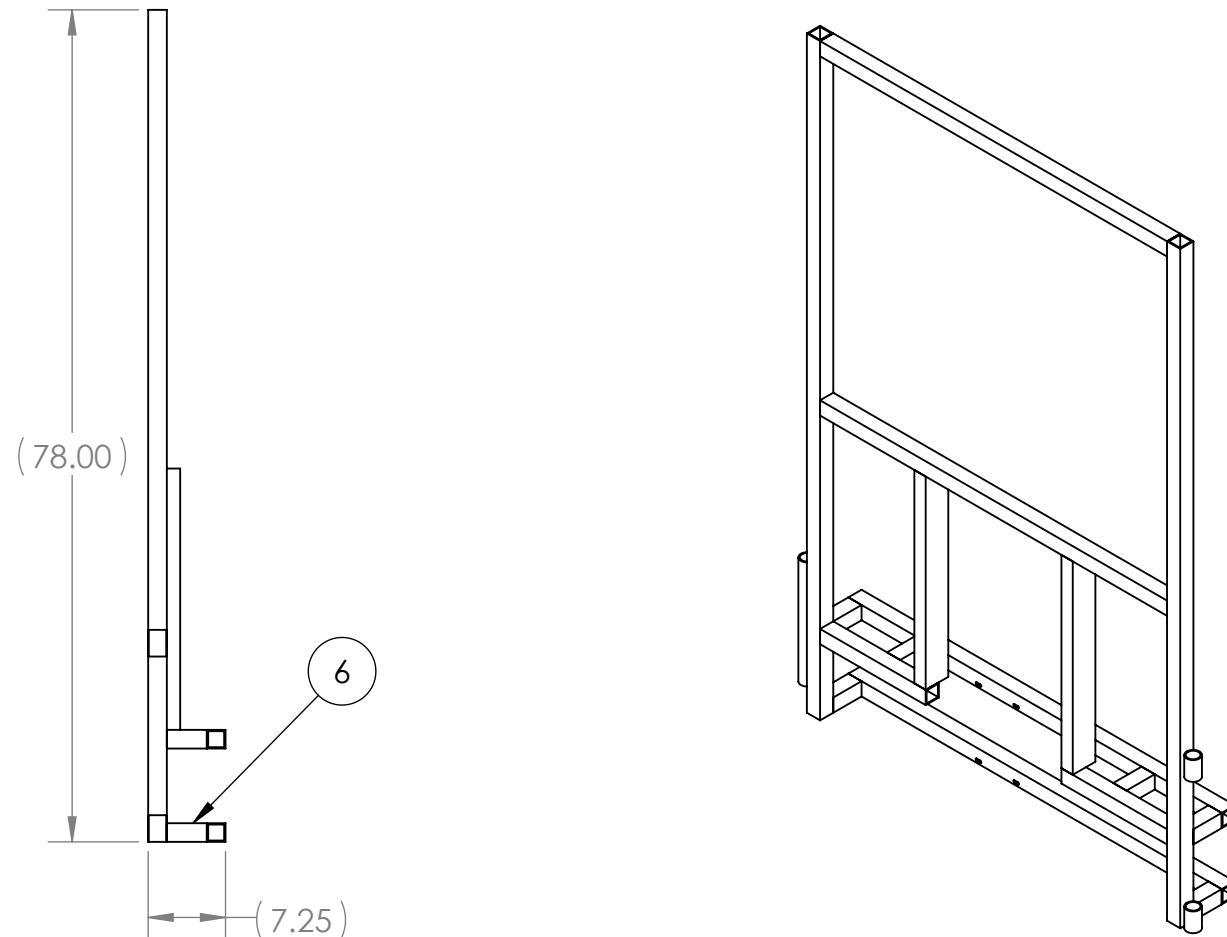
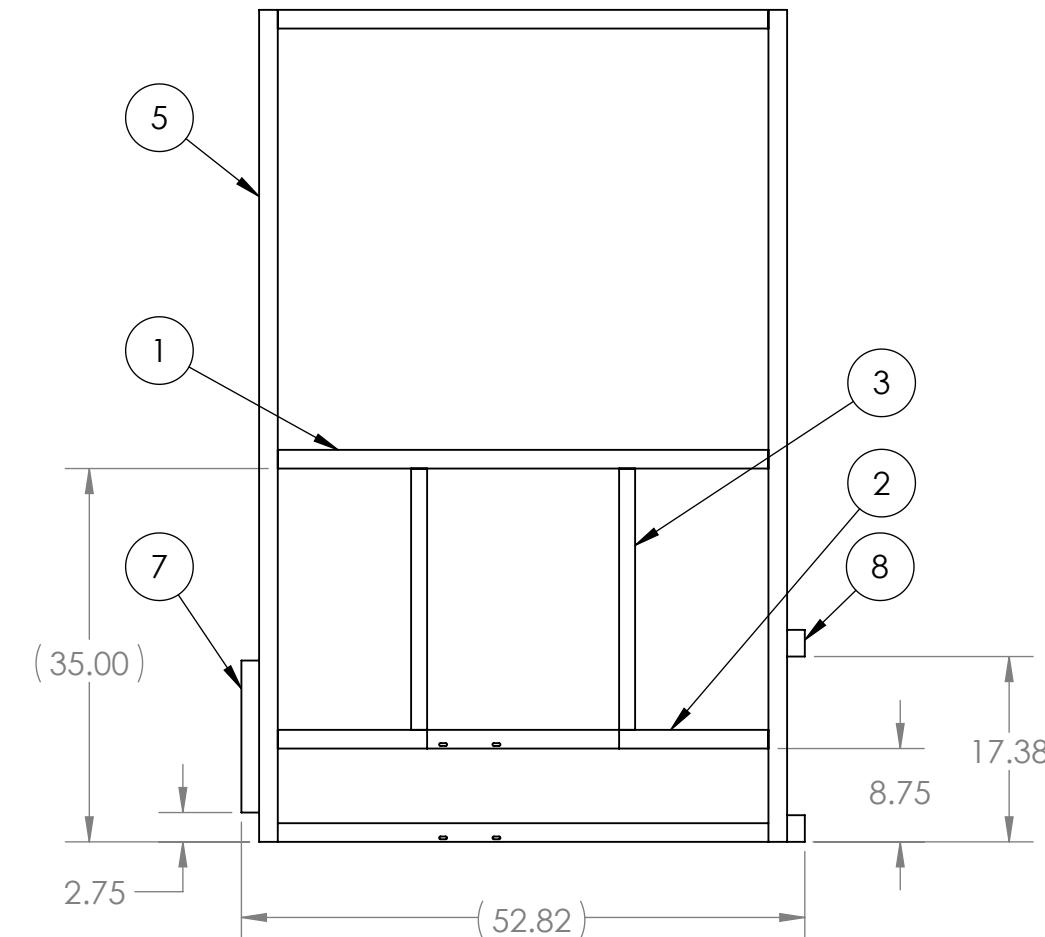
3

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REVISIONS				
ZONE	REV.	DESCRIPTION	DATE	APPROVED
A3	A	Corrected Item 3 Material Description	10/30/2018	DAF



B

B

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19159-01	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
2	GE-19159-02	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
3	GE-19159-03	1.5" x 3" x .125" Rectangular Tubing, 6061 Aluminum	2
4	GE-19159-04	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
5	GE-19159-05	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	2
6	GE-19159-07	1-3/4" x .125" thk. Square Tubing, 6063 Aluminum	6
7	GE-19159-06	1-1/4" Schedule 40 Pipe, 6061 Aluminum	1
8	GE-19159-08	1-1/4" Schedule 40 Pipe, 6061 Aluminum	2

A

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
	APPLICATION		DO NOT SCALE DRAWING		

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Loading Station  
Frame, Left**

SIZE DWG. NO. REV  
**B GE-19159 A**

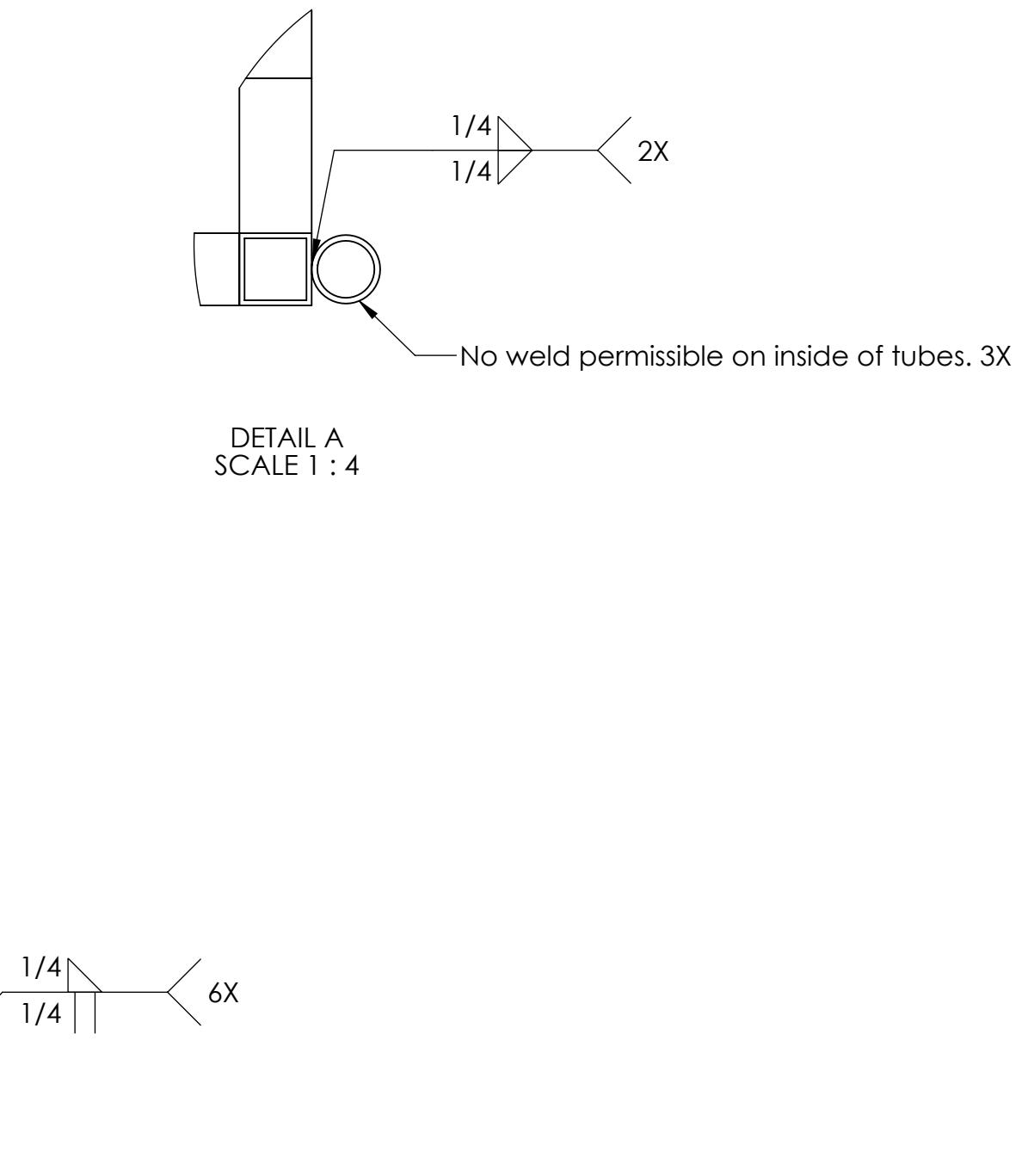
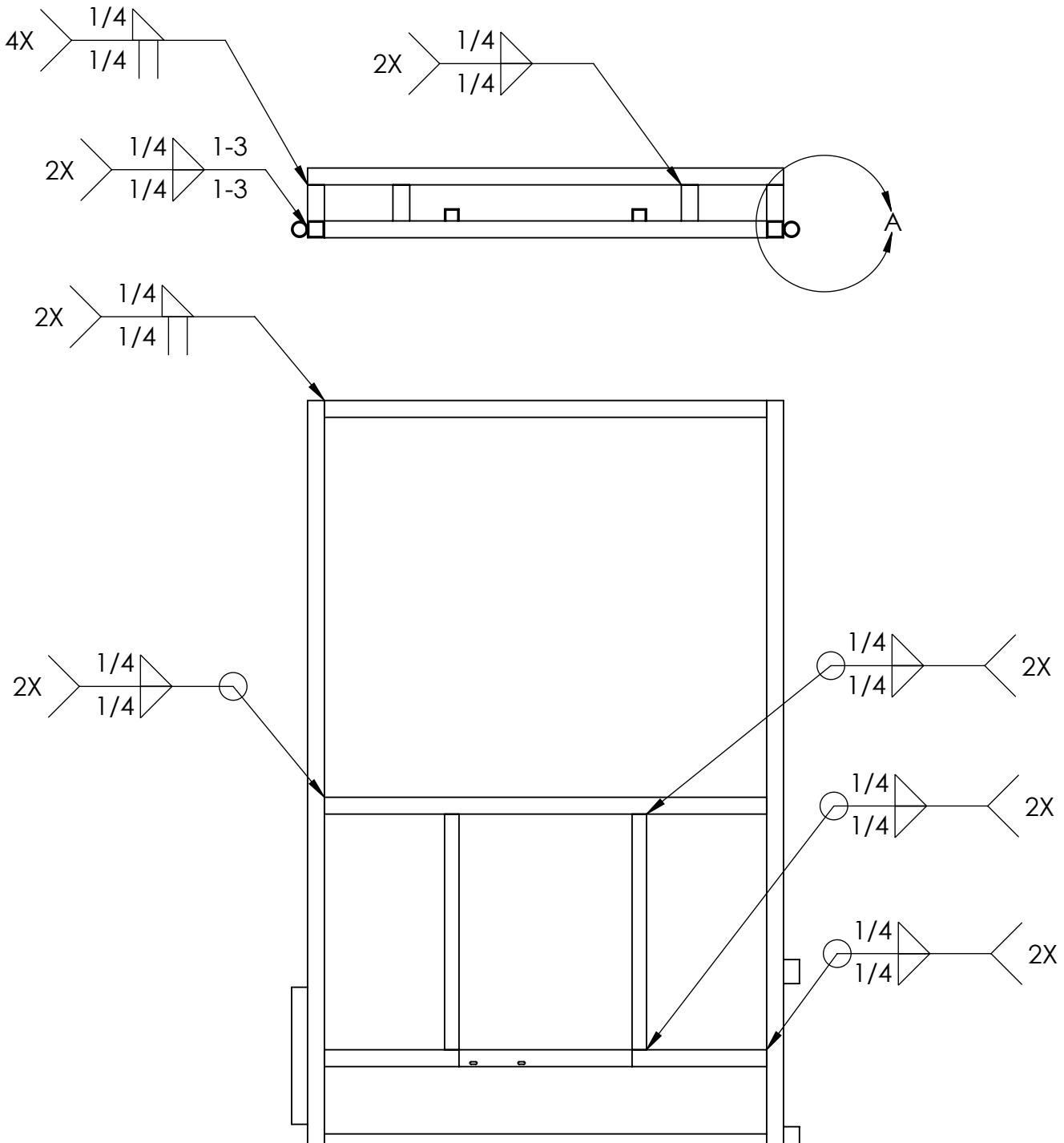
SCALE: 1:18 WEIGHT: SHEET 1 OF 4

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DETAIL A  
SCALE 1 : 4

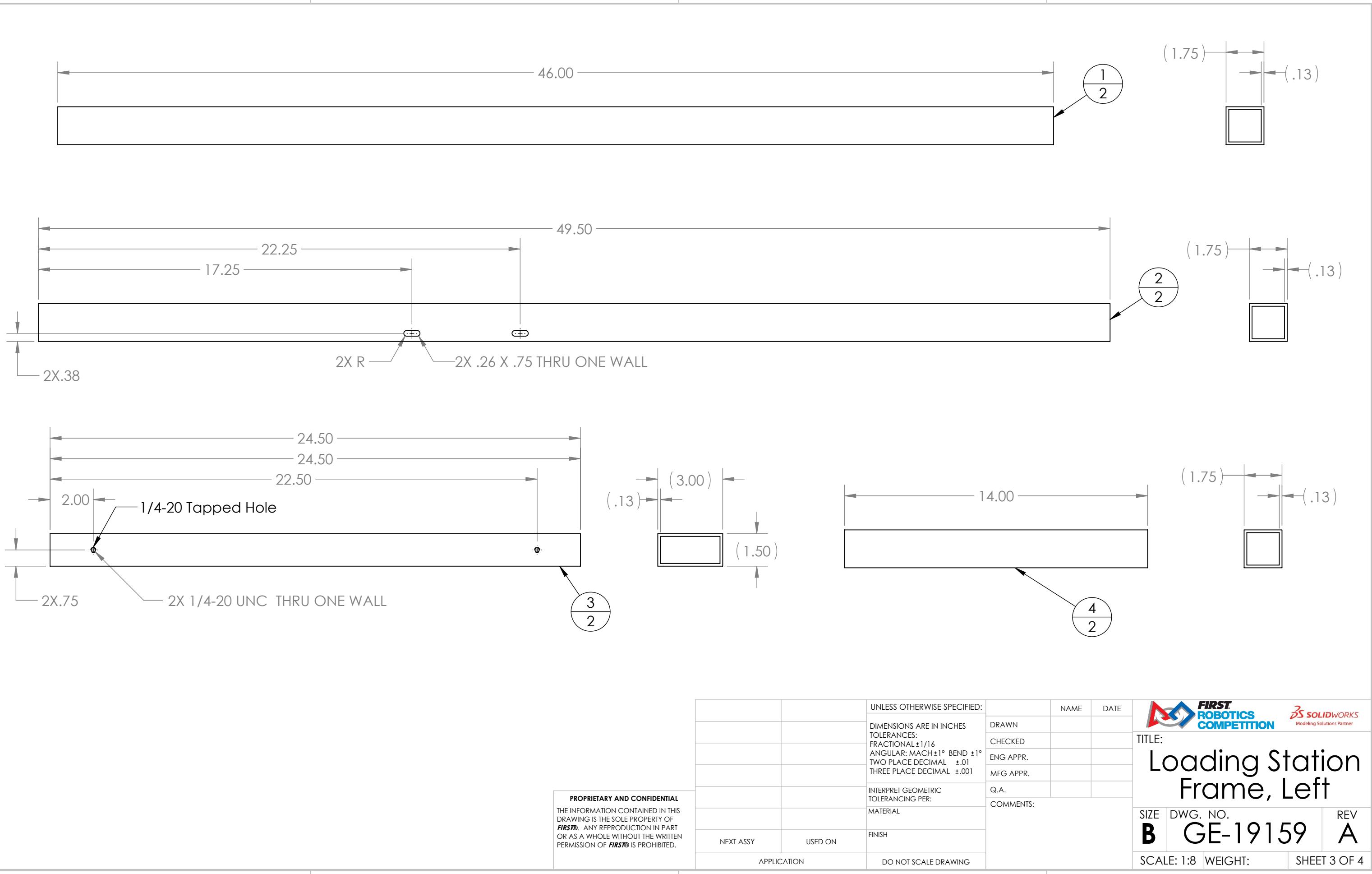
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			
			SCALE: 1:16	WEIGHT:	SHEET 2 OF 4

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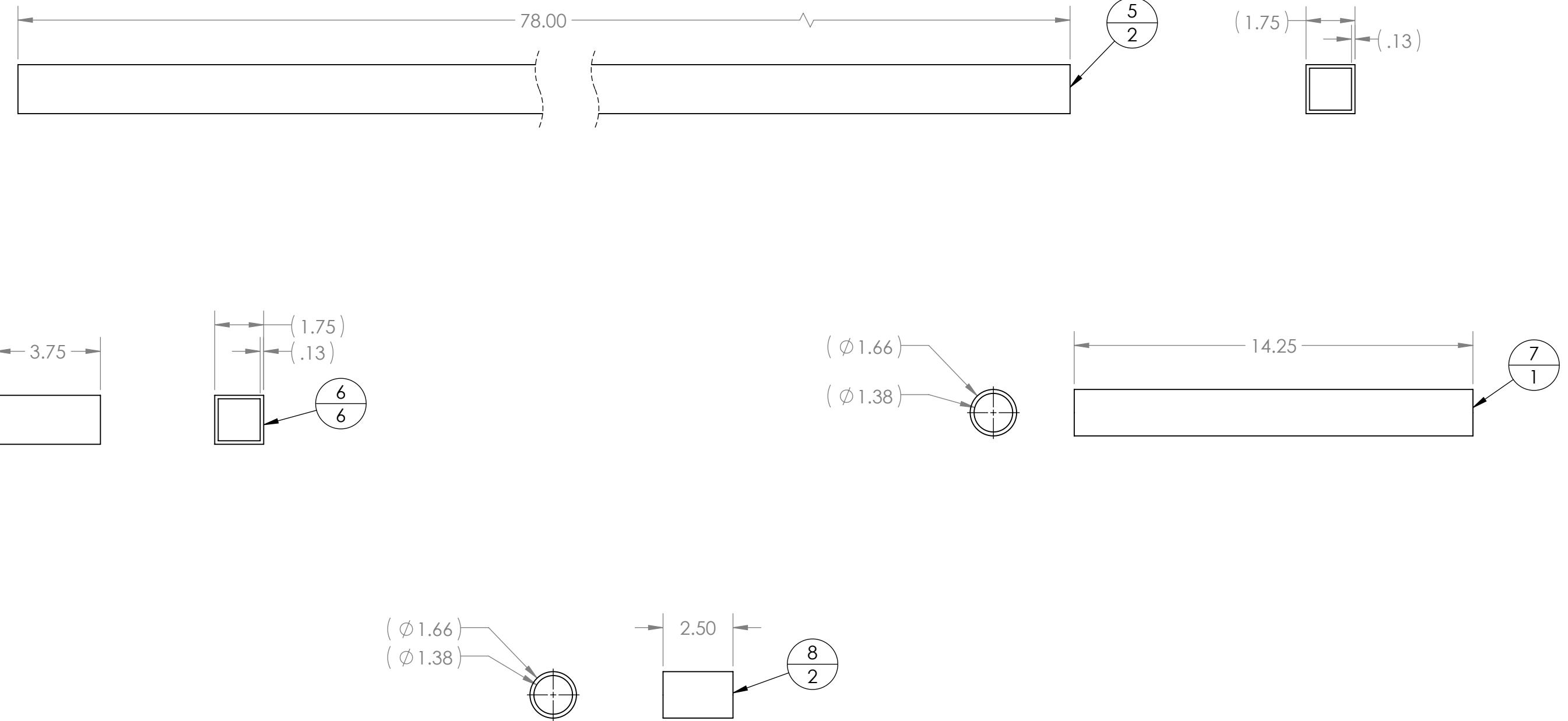
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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Title:** Loading Station Frame, Left

**Size:** B **Dwg. No.:** GE-19159 **Rev:** A

**Scale:** 1:12 **Weight:** **Sheet:** 4 of 4

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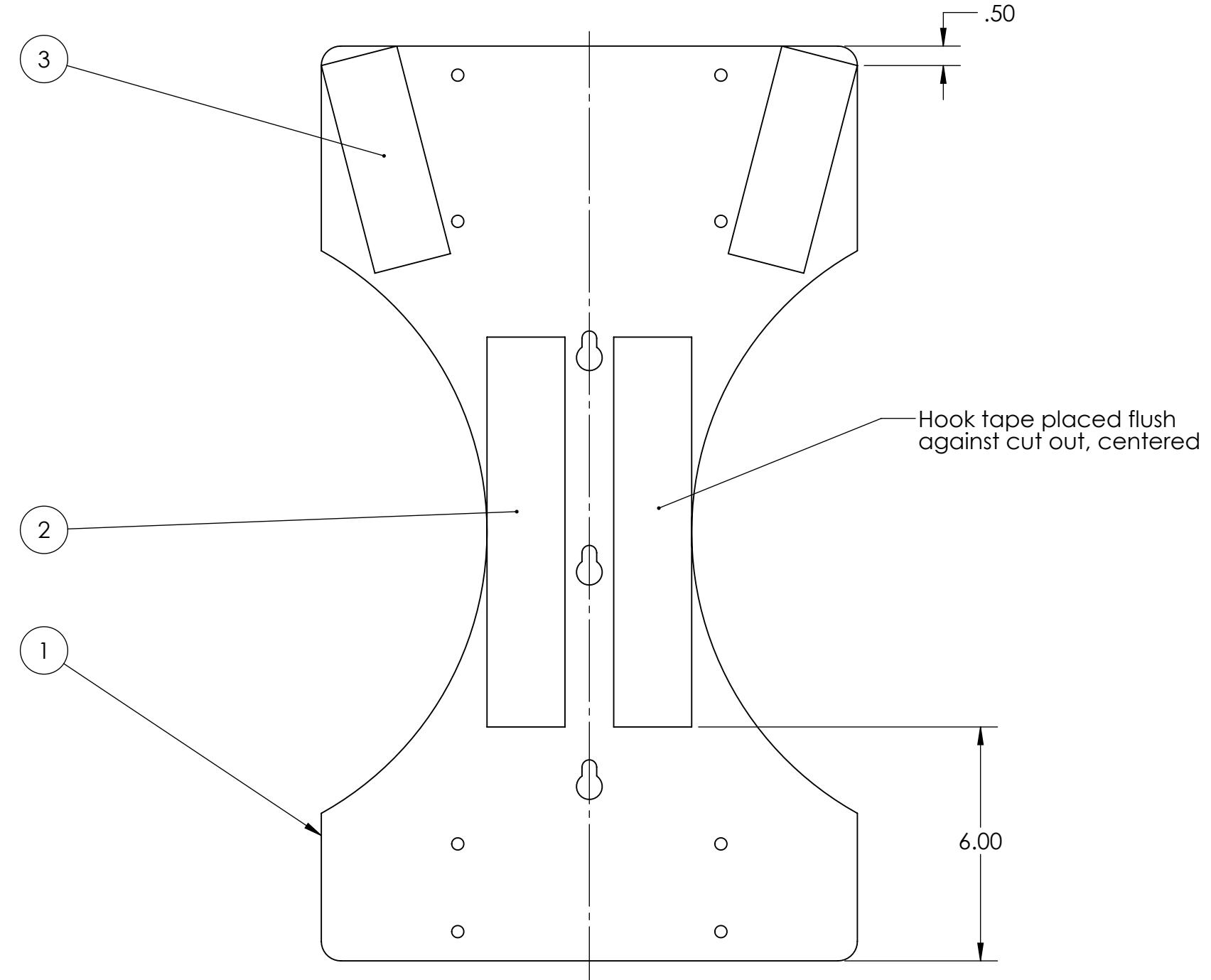
3

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B

B



Notes:  
1. Assembly exists in red and blue configurations.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.	PROPRIETARY AND CONFIDENTIAL
1	GE-19076	Cargo Ship Panel Plastic Full	1	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST®. ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST® IS PROHIBITED.
2	Hook_2_10	2" x 10" Hook, Adhesive Backed	2	
3	VisionTape	2" x 5.5" Retroreflective tape	2	

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE	
DIMENSIONS ARE IN INCHES					
TOLERANCES:					
FRACTIONAL: ±1/16					
ANGULAR: MACH ±1° BEND ±1°					
TWO PLACE DECIMAL ±.01					
THREE PLACE DECIMAL ±.001					
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
		APPLICATION	DO NOT SCALE DRAWING		
		COMMENTS:			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Panel Plastic Full Assembly**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19165</b>	
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

4

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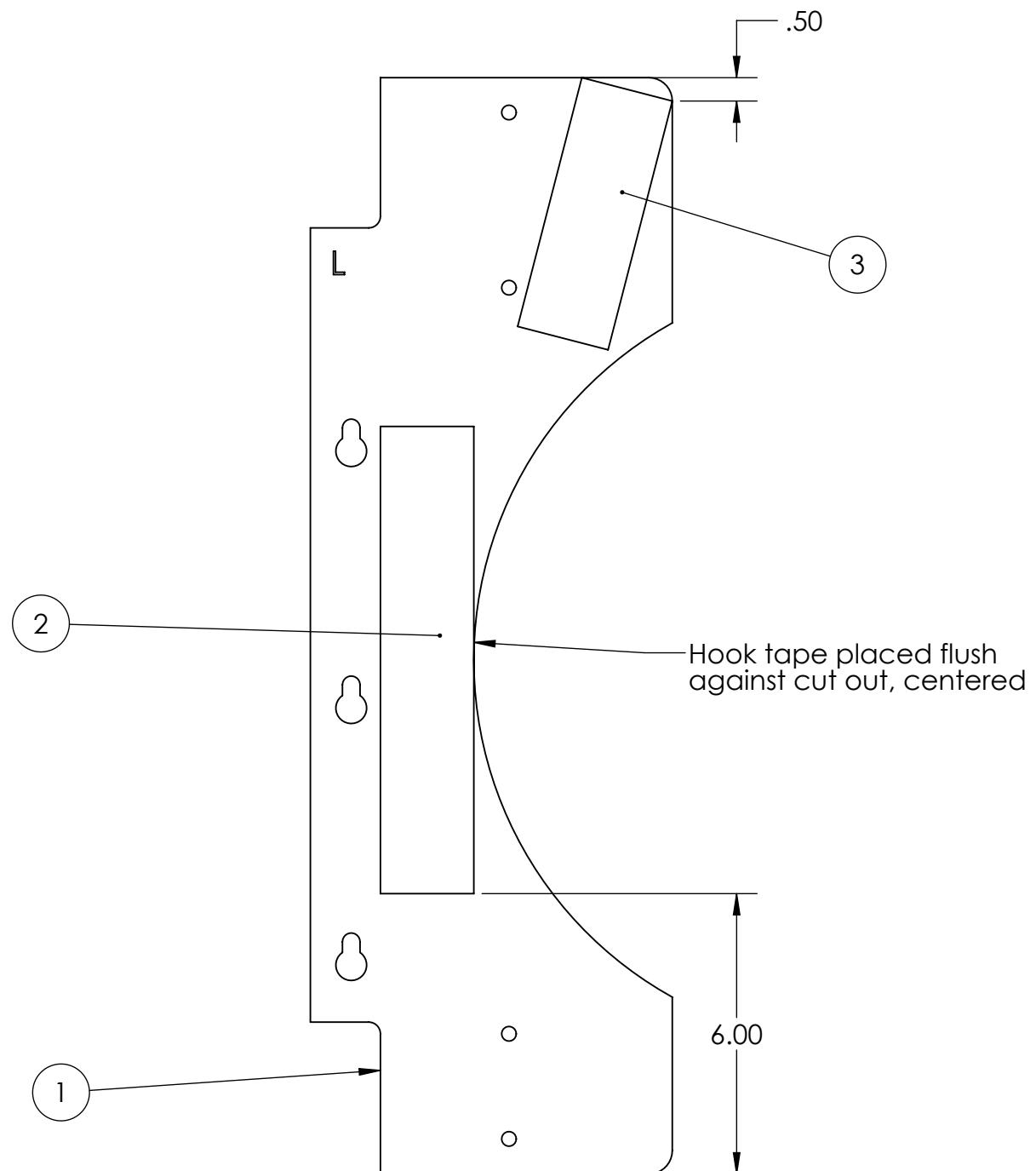
3

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B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY	PROPRIETARY AND CONFIDENTIAL
1	GE-19210	Cargo Ship Panel Plastic Left	1	THE INFORMATION CONTAINED IN THIS DRAWING IS THE SOLE PROPERTY OF FIRST <sup>®</sup> . ANY REPRODUCTION IN PART OR AS A WHOLE WITHOUT THE WRITTEN PERMISSION OF FIRST <sup>®</sup> IS PROHIBITED.
2	Hook_2_10	2" x 10" Hook, Adhesive Backed	1	
3	VisionTape	2" x 5.5" Retroreflective tape	1	

		UNLESS OTHERWISE SPECIFIED:		
		DIMENSIONS ARE IN INCHES		
		TOLERANCES:		
		FRACTIONAL: ±1/16		
		ANGULAR: MACH ±1° BEND ±1°		
		TWO PLACE DECIMAL ±.01		
		THREE PLACE DECIMAL ±.001		
		INTERPRET GEOMETRIC		
		TOLERANCING PER:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION		DO NOT SCALE DRAWING
				COMMENTS:

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Panel Plastic Half Assembly, Left**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19166</b>	
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

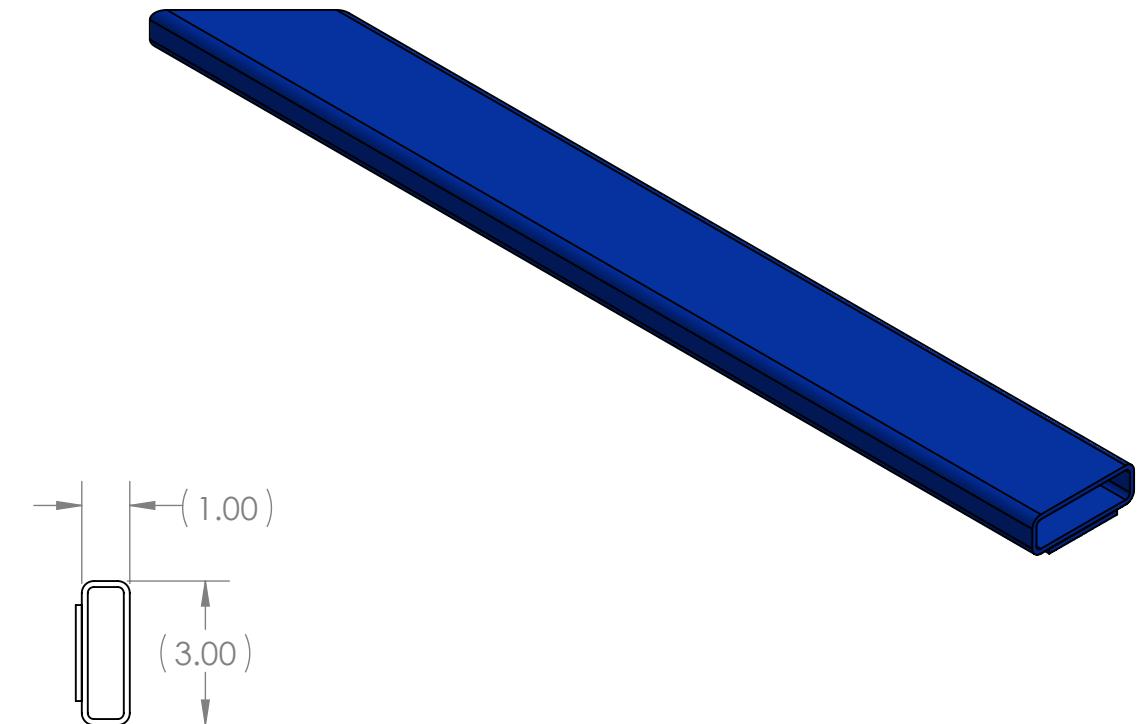
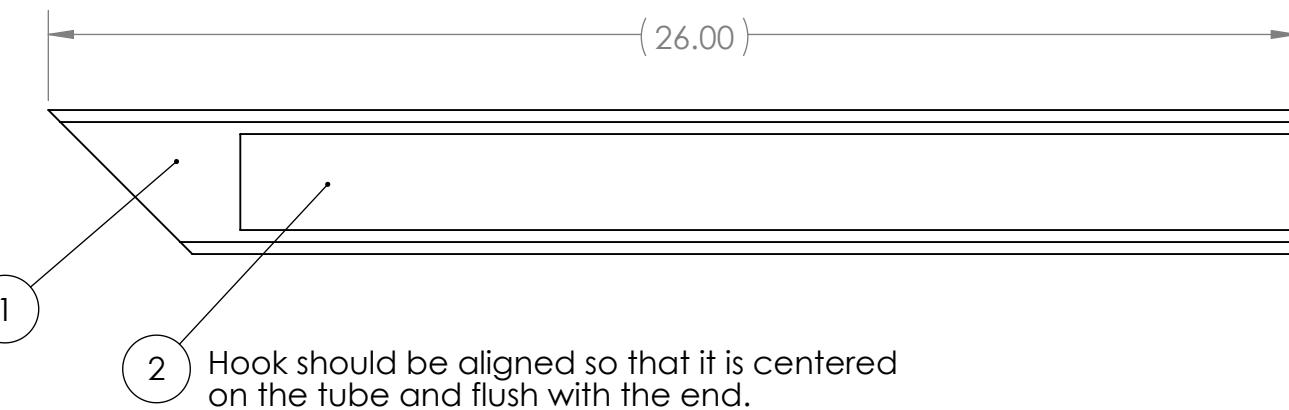
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B

Note: Item 1 can be either blue or red. Please see part drawing for more details.

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ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19038	Corral Tube Small	1
2	Hook_2_22	2" x 22" Hook Fastener, Adhesive Backed	1

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001		
		INTERPRET GEOMETRIC TOLERANCING PER:	ENG APPR.	MFG APPR.
		MATERIAL		
	NEXT ASSY	USED ON	Q.A.	COMMENTS:
		FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Corral Tube Left Small Fastener Assembly**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19167</b>	
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

4

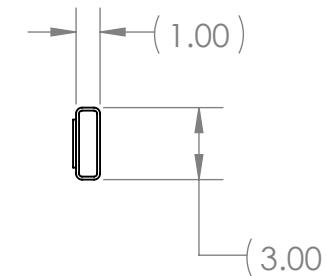
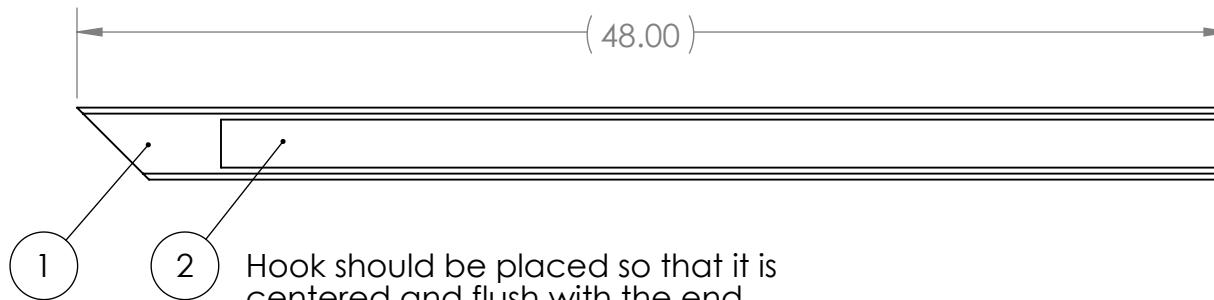
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B

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Note: Item (1) can be either blue or red. Please see part drawing for more details.

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ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19039	Corral Tube Long	1
2	Hook_2_42	2" x 42" Hook Fastener, Adhesive Backed	1

	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001	NAME	DATE
	DRAWN		
	CHECKED		
	ENG APPR.		
	MFG APPR.		
	Q.A.		
	COMMENTS:		
NEXT ASSY	USED ON	MATERIAL	
		FINISH	
APPLICATION		DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV	
<b>B</b>	<b>GE-19168</b>		
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1	

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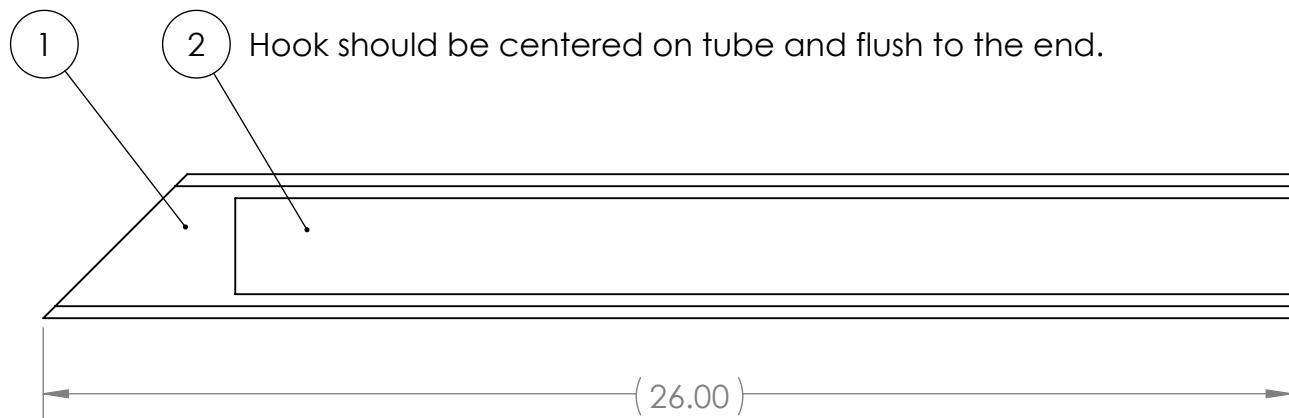
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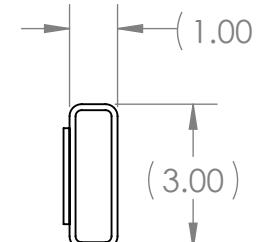
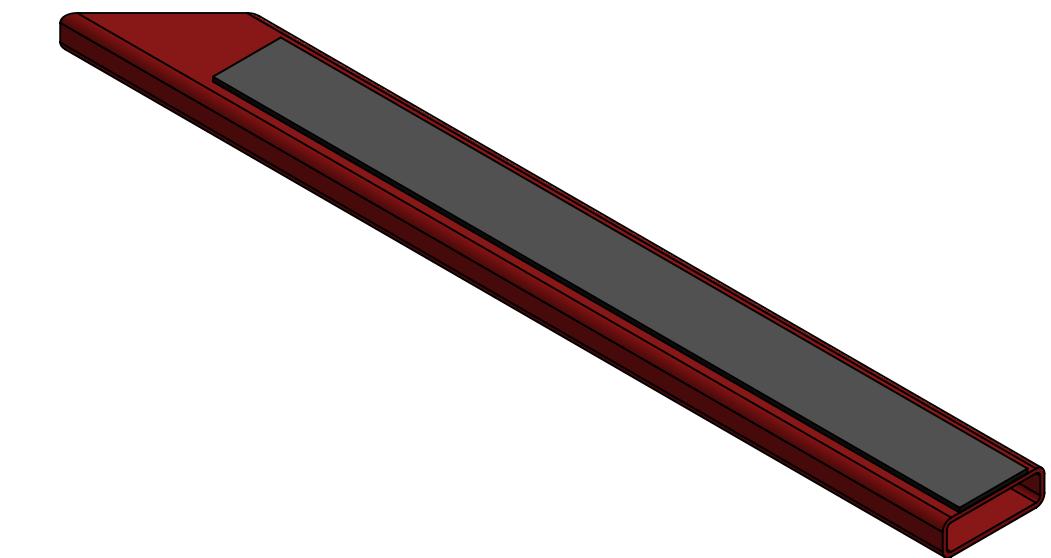
B

B



Hook should be centered on tube and flush to the end.

Notes: Item 1 can be either blue or red. Refer to part drawing for more details.



ITEM NO.	PART NUMBER	DESCRIPTION	Default/ QTY.
1	GE-19038	Corral Tube Small	1
2	Hook_2_22	2" x 22" Hook Fastener, Adhesive Backed	1



LE: Corral Tube Right  
Small Fastener  
Assembly

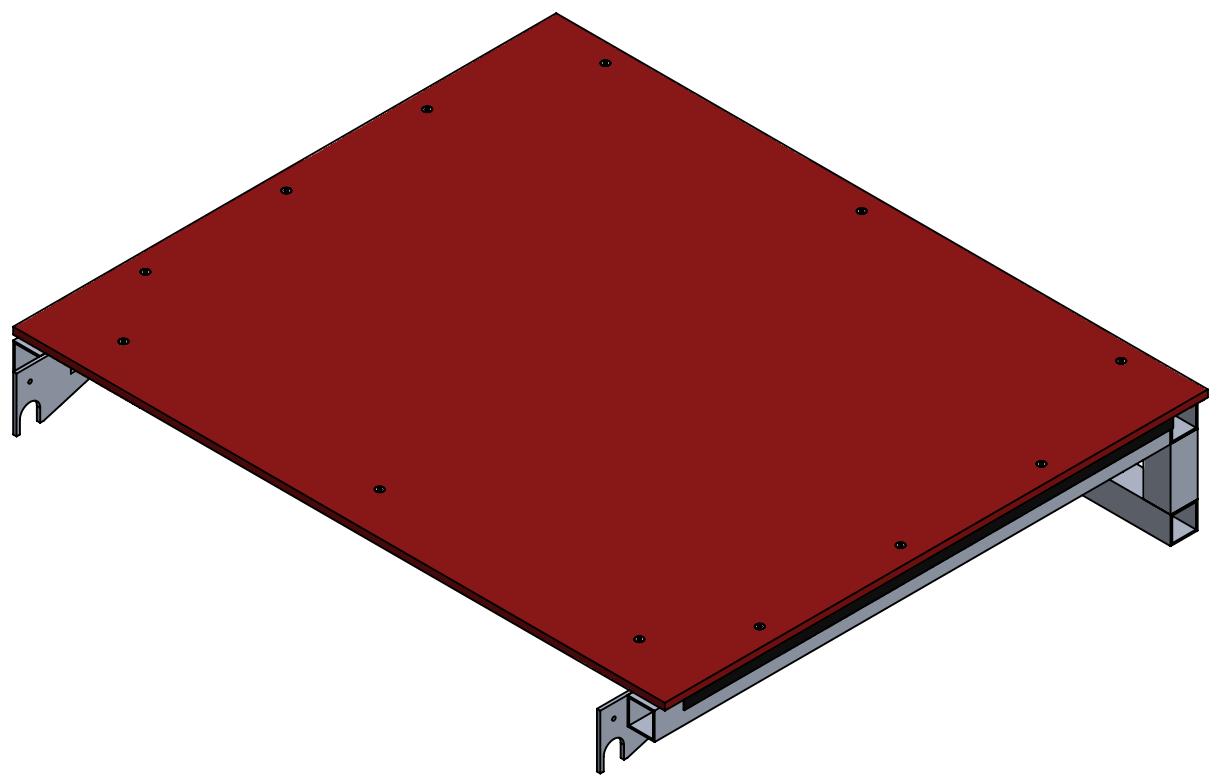
		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b> 
		DIMENSIONS ARE IN INCHES	DRAWN			
		TOLERANCES:	CHECKED			
		FRACTIONAL 1/16	ENG APPR.			
		ANGULAR: MACH 1° BEND 1°	MFG APPR.			
		TWO PLACE DECIMAL .01	Q.A.			
		THREE PLACE DECIMAL .001	COMMENTS:			
		INTERPRET GEOMETRIC TOLERANCING PER:				
		MATERIAL				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING		SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

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ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19032	HAB Level 2 Frame	1
2	GE-19035	Level 2 Top HDPE	1
3	Hook_1_46	1" X 46" Hook Fastener, Adhesive Backed	1
4	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	12
5	Hook_1_36	1" x 36" Hook, Adhesive Backed	2
6	Flat_Hex_.25-20_3.00	Steel Hex Drive Flat Head Screw 1/4"-20 Thread Size, 3" Long	12

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES:	CHECKED	
		FRACTIONAL 1/16	ENG APPR.	
		ANGULAR: MACH 1° BEND 1°	MFG APPR.	
		TWO PLACE DECIMAL .01	Q.A.	
		THREE PLACE DECIMAL .001	COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Hab 2 Fastener Assembly**

**B** **GE-19176**

SIZE DWG. NO. REV  
SCALE: 1:12 WEIGHT: SHEET 1 OF 3

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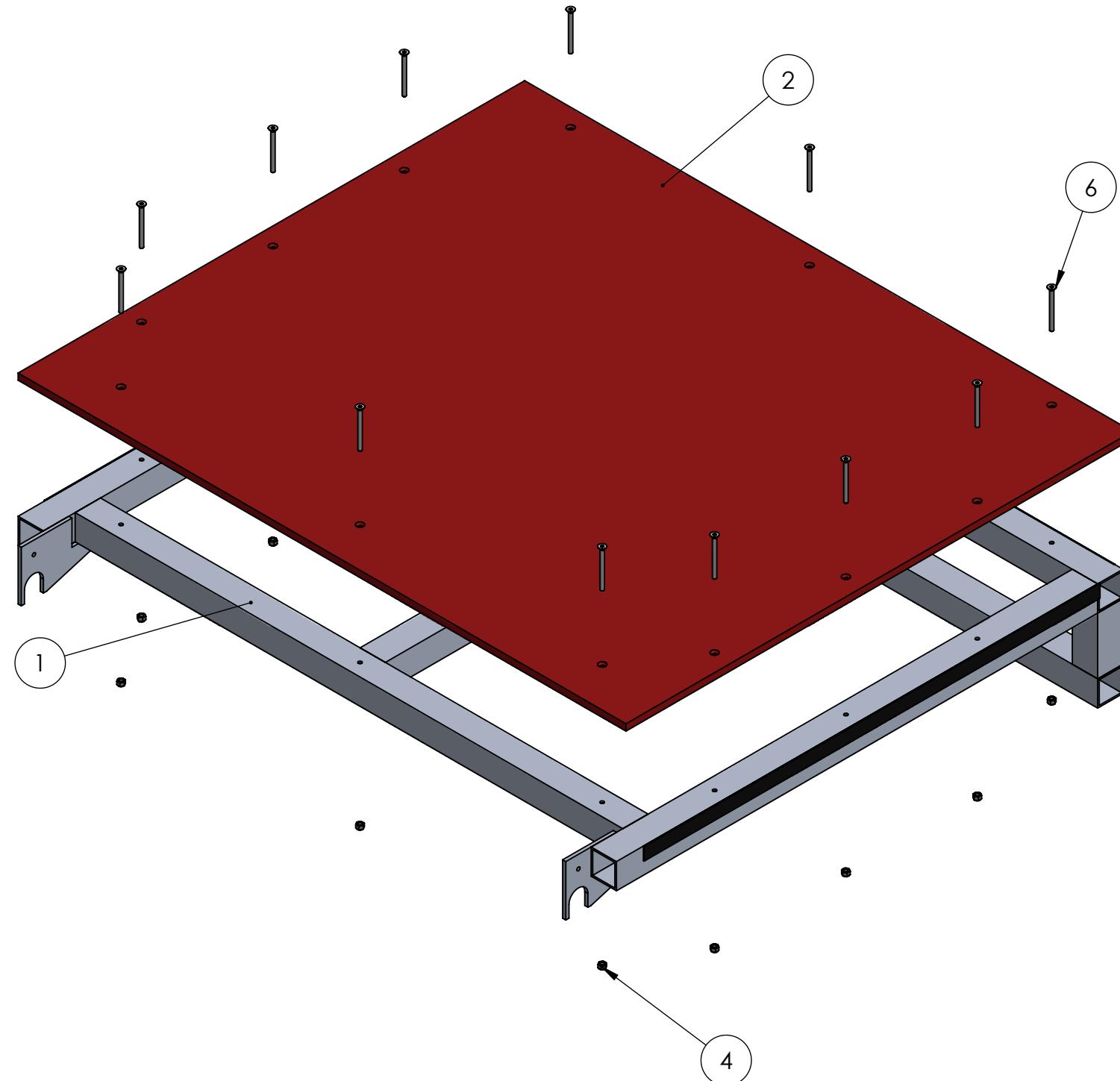
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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001			
		INTERPRET GEOMETRIC TOLERANCING PER:		DRAWN	
		MATERIAL		CHECKED	
		NEXT ASSY	USED ON	ENG APPR.	
		FINISH		MFG APPR.	
		APPLICATION		Q.A.	
		DO NOT SCALE DRAWING		COMMENTS:	
SIZE	DWG. NO.	REV			
<b>B</b>	<b>GE-19176</b>				
SCALE: 1:12		WEIGHT:		SHEET 2 OF 3	

**FIRST**  
ROBOTICS  
COMPETITION

**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:  
**Hab 2 Fastener  
Assembly**

4

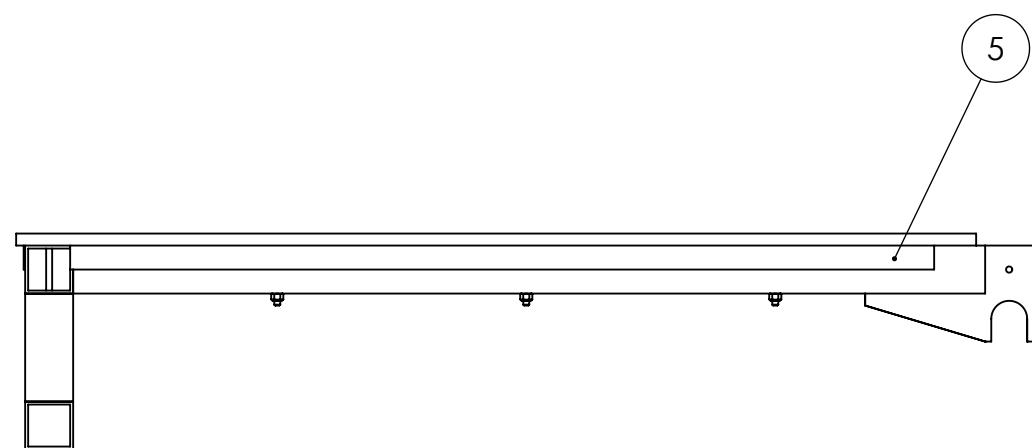
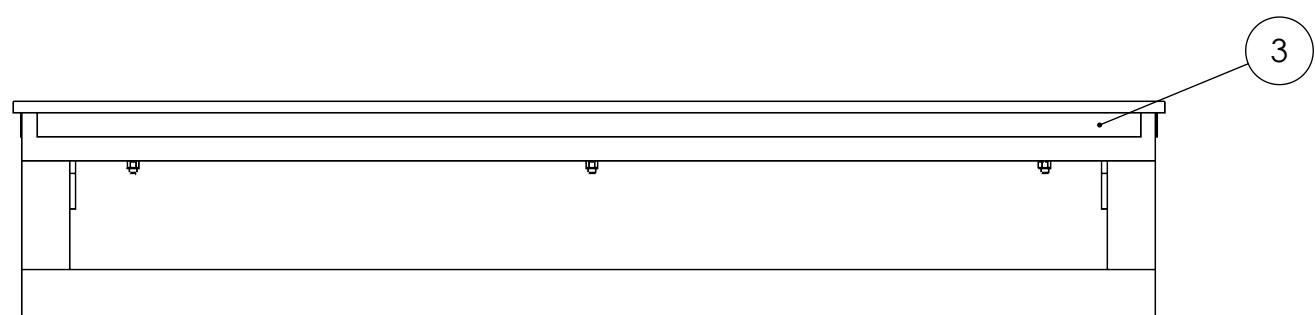
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Note:  
Repeat on opposite side

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING	SCALE: 1:12	WEIGHT:	SHEET 3 OF 3

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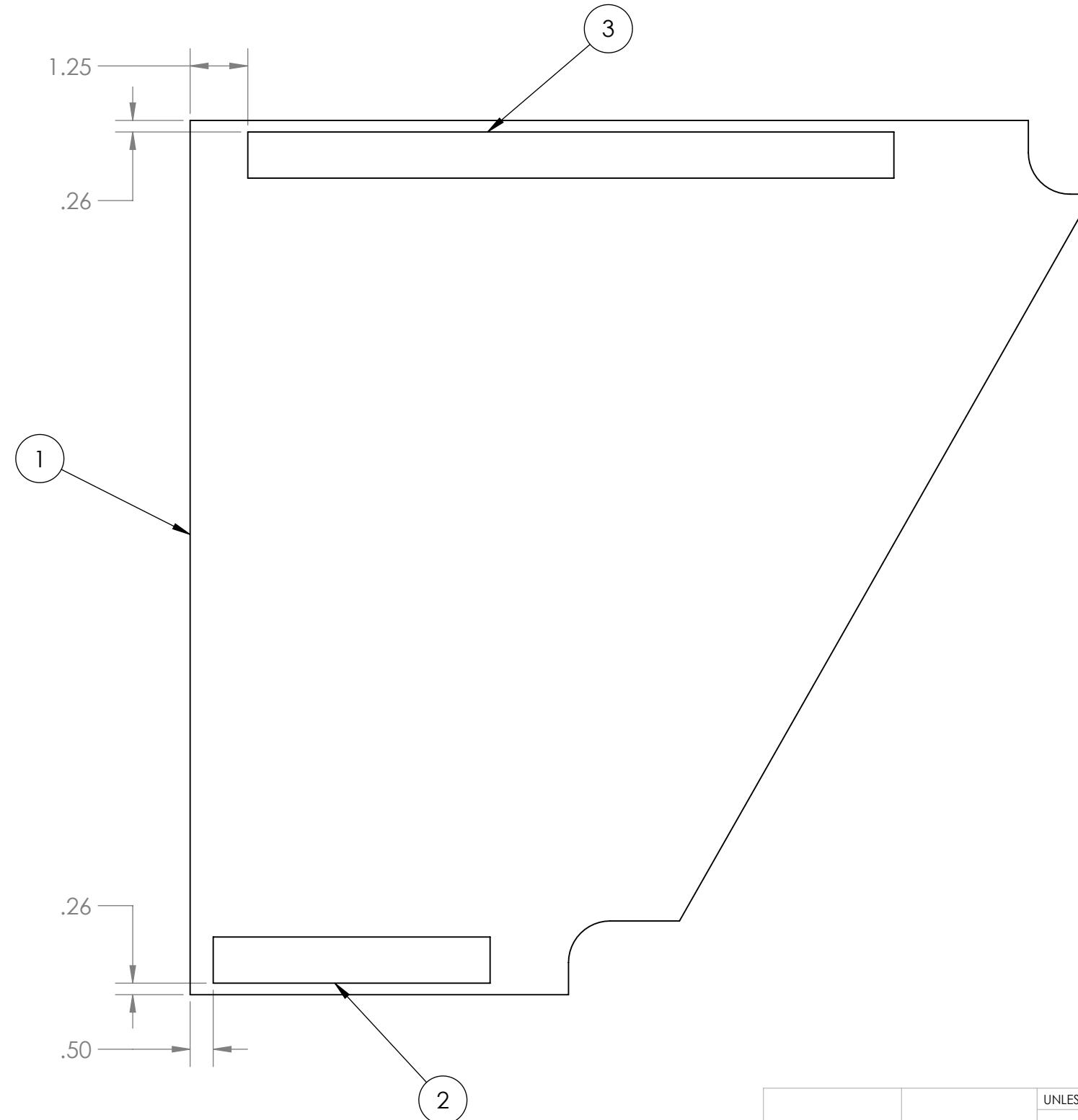
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19115	Rocket Ramp	1
2	Loop_1_6	1" x 6" Loop, Adhesive Backed	1
3	Loop_1_14	1" x 14" Loop, Adhesive Backed	1

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
	APPLICATION	DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Rocket Ramp Left  
**SIZE** **DWG. NO.** **REV**  
**B** **GE-19180**

SCALE: 1:3 WEIGHT: SHEET 1 OF 1

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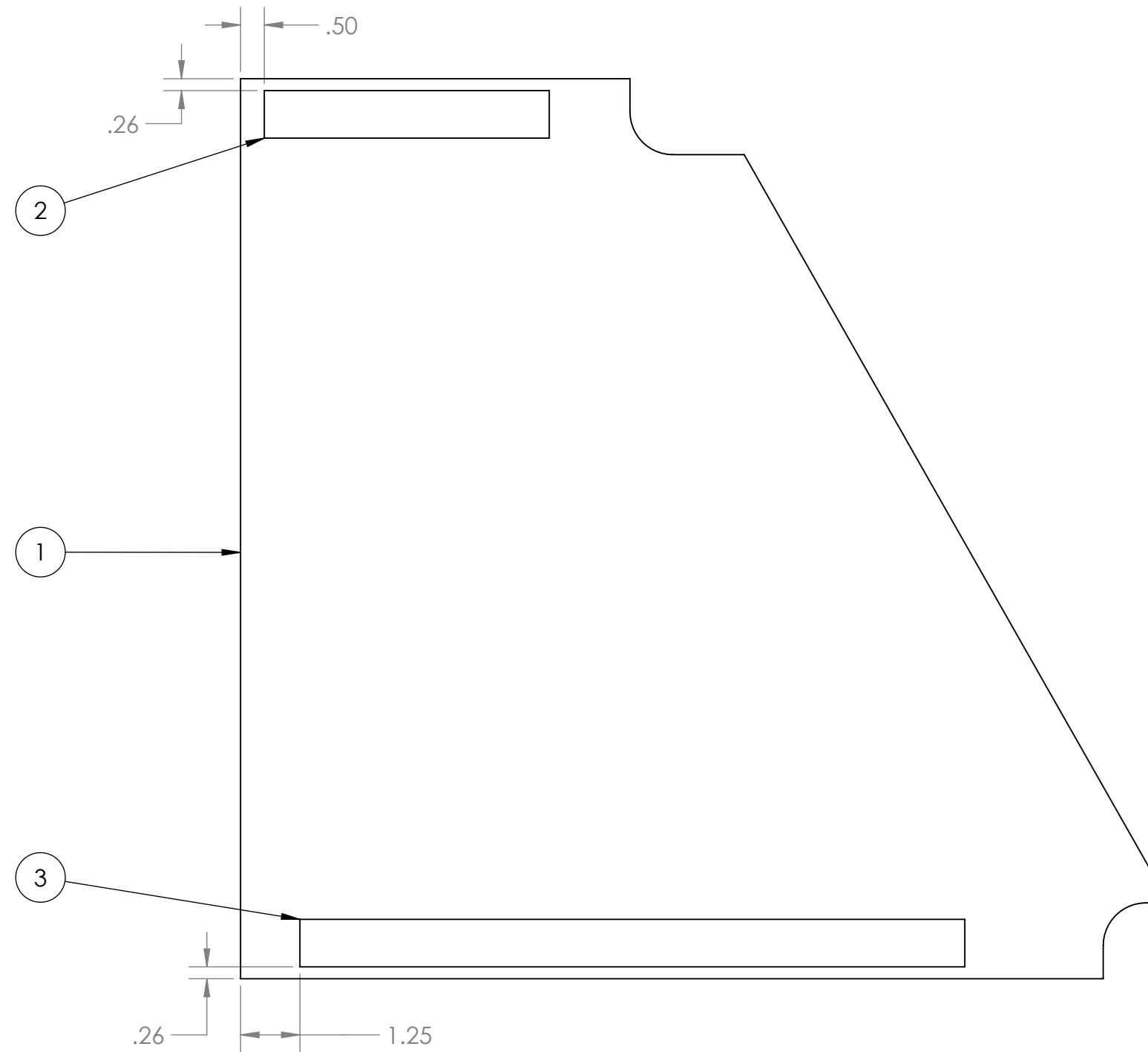
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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19115	Rocket Ramp	1
2	Loop_1_6	1" x 6" Loop, Adhesive Backed	1
3	Loop_1_14	1" x 14" Loop, Adhesive Backed	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN		
		TOLERANCES:	CHECKED		
		FRACTIONAL $\pm 1/16$	ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$	Q.A.		
		THREE PLACE DECIMAL $\pm .001$	COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**Rocket Ramp Right**

**B** **GE-19181**

SIZE DWG. NO. REV  
SCALE: 1:3 WEIGHT: SHEET 1 OF 1

4

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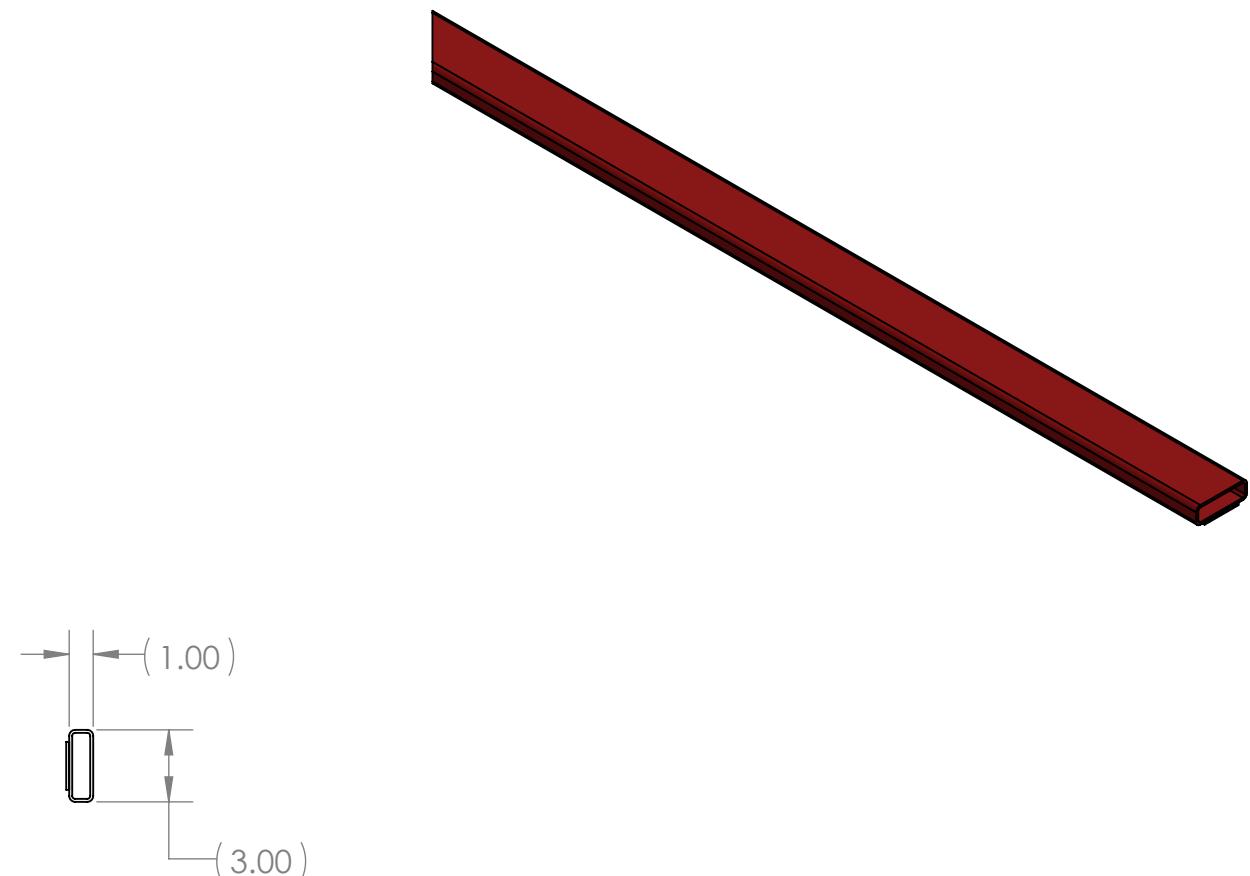
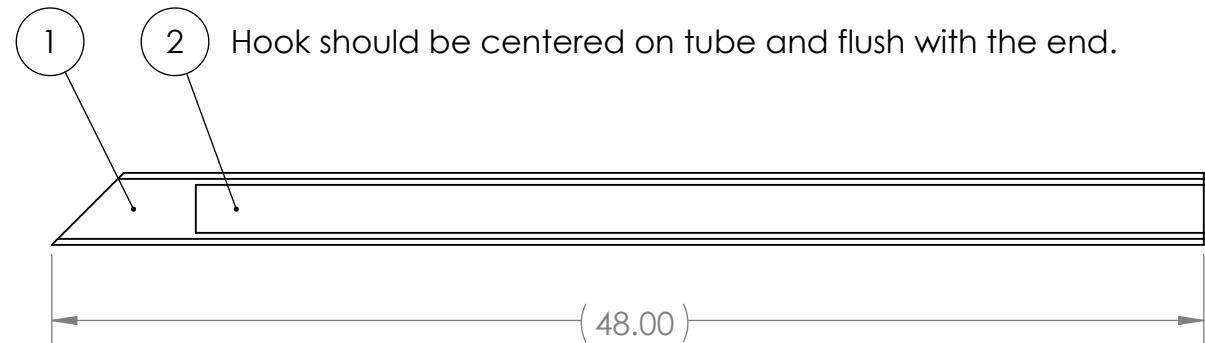
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B

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A Notes: Item ① can be either blue or red. Refer to part drawing for more details.

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ITEM NO.	PART NUMBER	DESCRIPTION	Default/QTY.
1	GE-19039	Corral Tube Long	1
2	Hook_2_42	2" x 42" Hook Fastener, Adhesive Backed	1

	UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL 1/16 ANGULAR: MACH 1° BEND 1° TWO PLACE DECIMAL .01 THREE PLACE DECIMAL .001	NAME	DATE
	DRAWN		
	CHECKED		
	ENG APPR.		
	MFG APPR.		
	Q.A.		
	COMMENTS:		
	MATERIAL		
NEXT ASSY	USED ON	FINISH	
APPLICATION		DO NOT SCALE DRAWING	

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**TITLE:** Corral Tube Left Fastener Assembly

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19182</b>	
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1

4

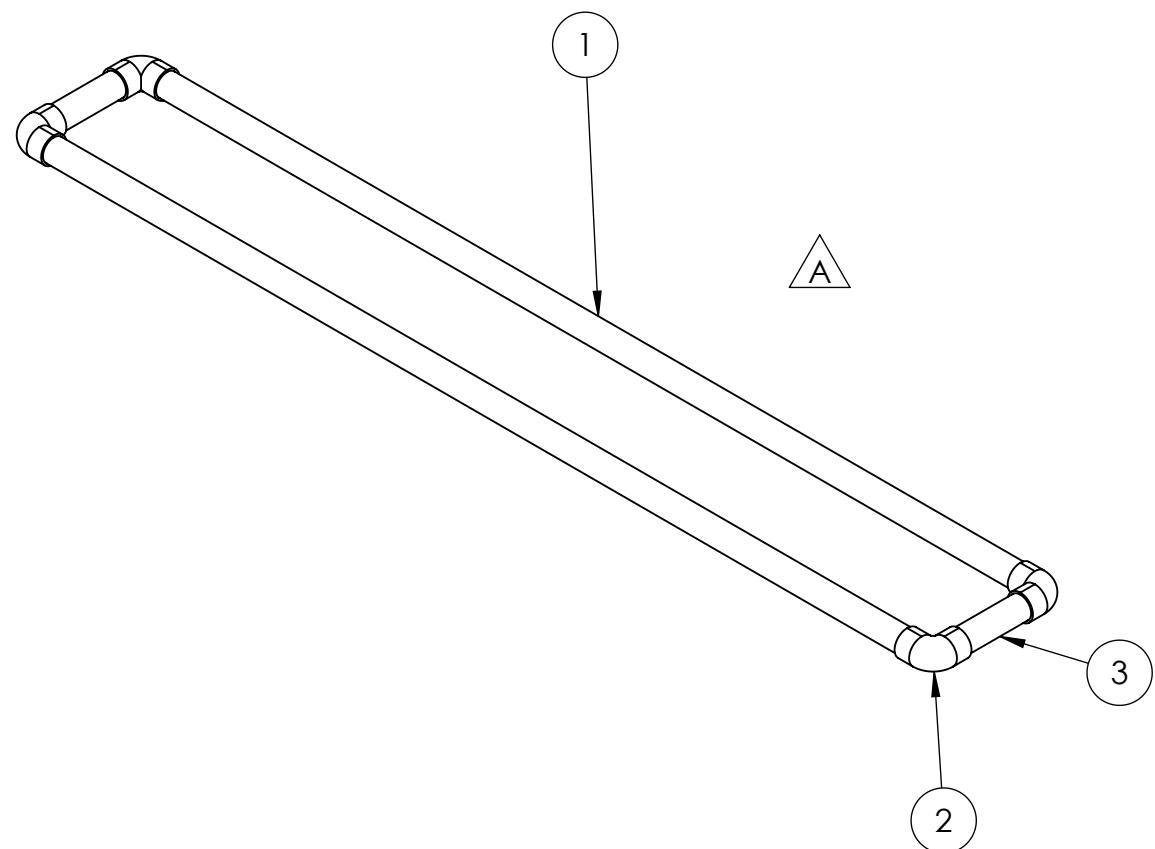
3

2

1

## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B3	A	Changed Dimension to 78"	11/19/2018	MXS
2-B3	B	Added Overall Dimension	11/19/2018	MXS



Note:  
All Lettering to face down

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES:	CHECKED	
		FRACTIONAL $\pm 1/16$	ENG APPR.	
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$	MFG APPR.	
		TWO PLACE DECIMAL $\pm .01$		
		THREE PLACE DECIMAL $\pm .001$		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.	
		MATERIAL	COMMENTS:	
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**Cargo Hold Assembly**

SIZE DWG. NO. REV  
**B GE-19183 B**

SCALE: 1:12 WEIGHT: SHEET 1 OF 5

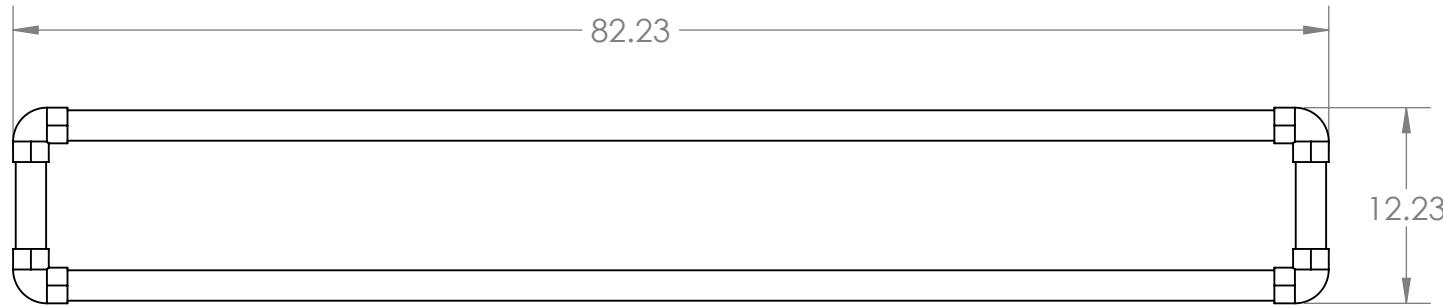
## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
1-B3	A	Changed Dimension to 78"	11/19/2018	MXS
B3	B	Added Overall Dimension	11/19/2018	MXS

B

B

B



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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE		DWG. NO.	REV	
<b>B</b>		<b>GE-19183</b>	<b>B</b>	
SCALE: 1:12		WEIGHT:	SHEET 2 OF 5	

4

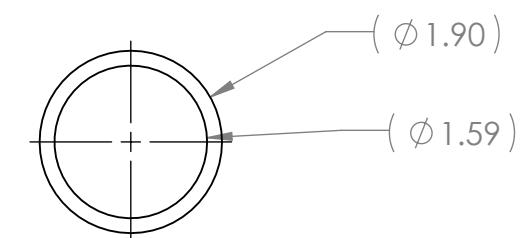
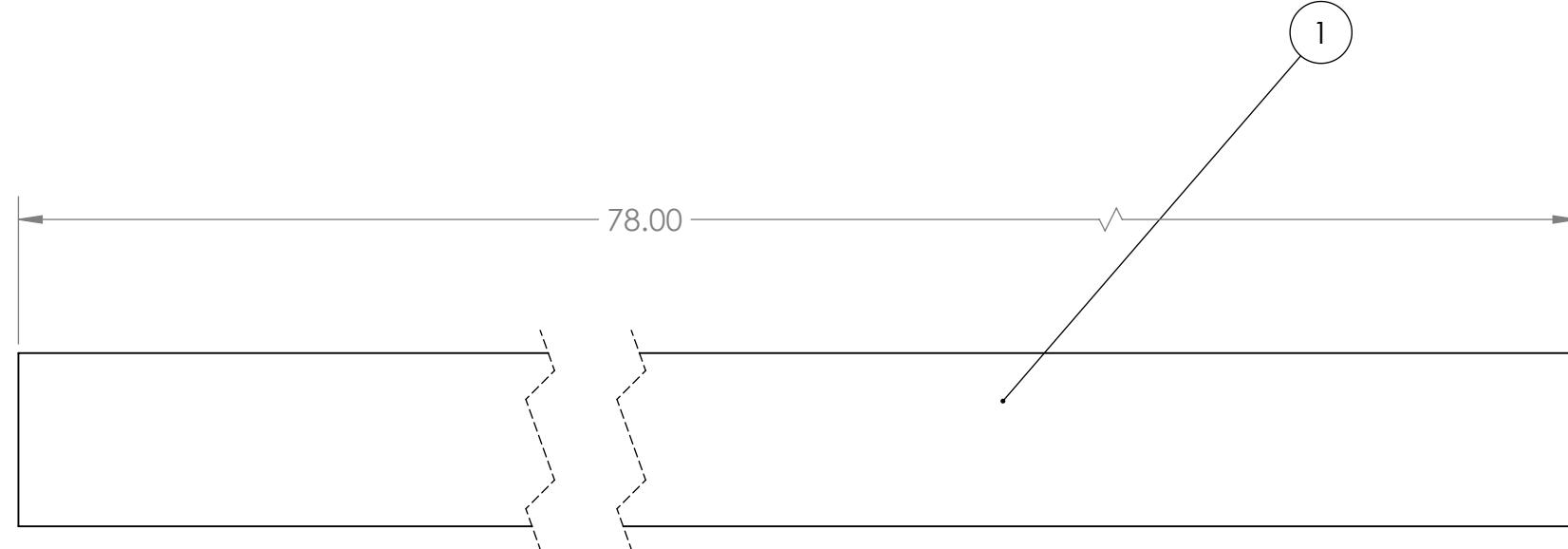
3

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**Note**

1. Material: 1 1/2" Thick Schedule 40 PVC Pipe
2. Remove Sharp Edges and Burrs
3. Tag or Label With Part Number

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
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**Cargo Hold Assembly**

<b>B</b>	<b>GE-19183</b>	<b>B</b>
SIZE	DWG. NO.	REV
SCALE: 1:2	WEIGHT:	SHEET 3 OF 5

4

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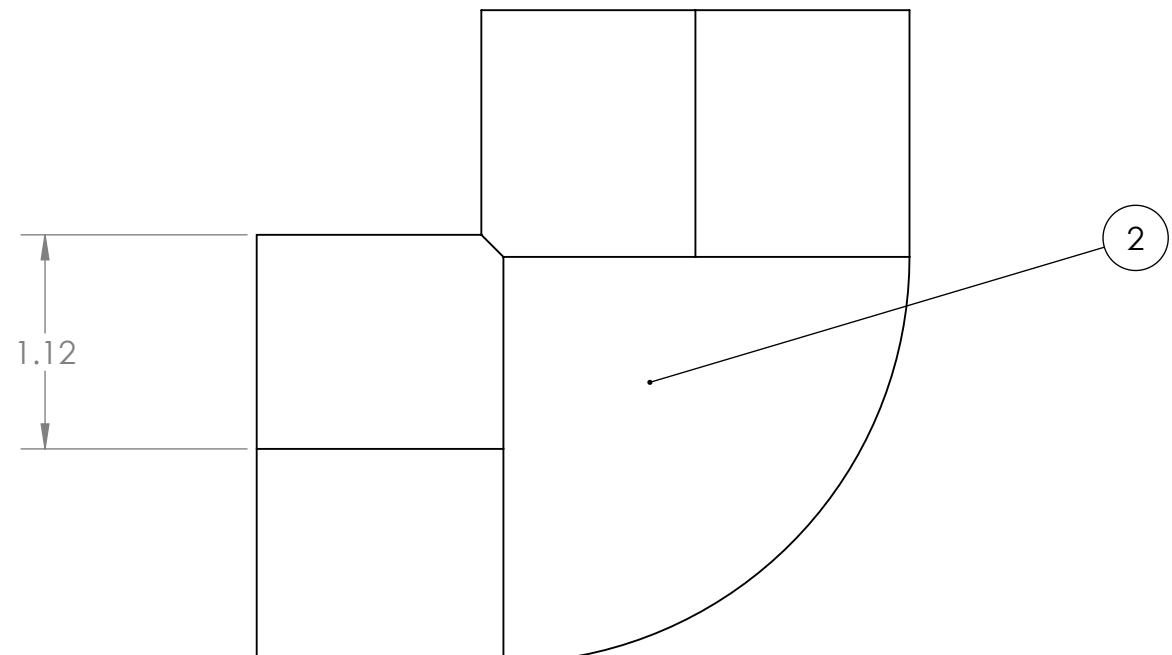
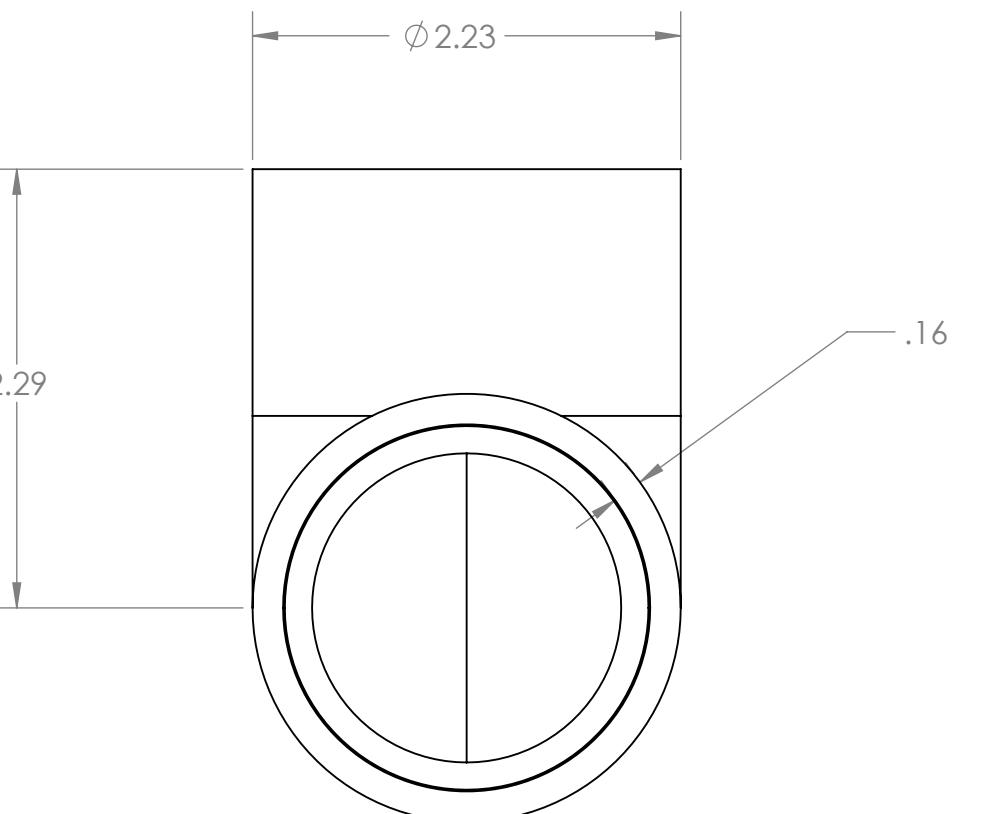
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**Note:**

1. Standard-Wall PVC Pipe Fitting for Water
2. 90 Degree Elbow Connector, White, 1-1/2 Socket Female
3. McMaster-Carr 4880K25
4. Tag or Label With Part Number

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Hold Assembly**

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19183</b>	<b>B</b>
SCALE: 1:2	WEIGHT:	SHEET 4 OF 5

4

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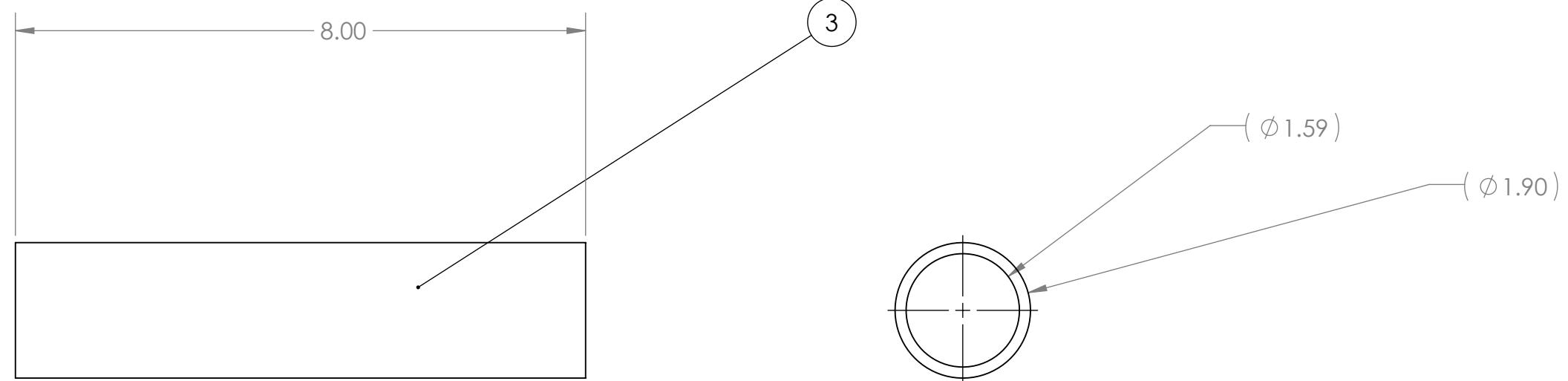
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**Note**

1. Material: 1 1/2" Thick Schedule 40 PVC Pipe
2. Remove Sharp Edges and Burrs
3. Tag or Label With Part Number

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
	APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Hold Assembly**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19183</b>	<b>B</b>
SCALE: 1:2	WEIGHT:	SHEET 5 OF 5

4

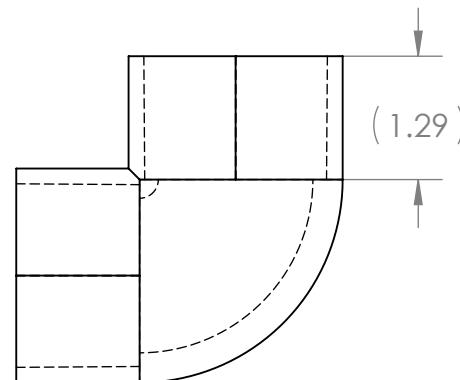
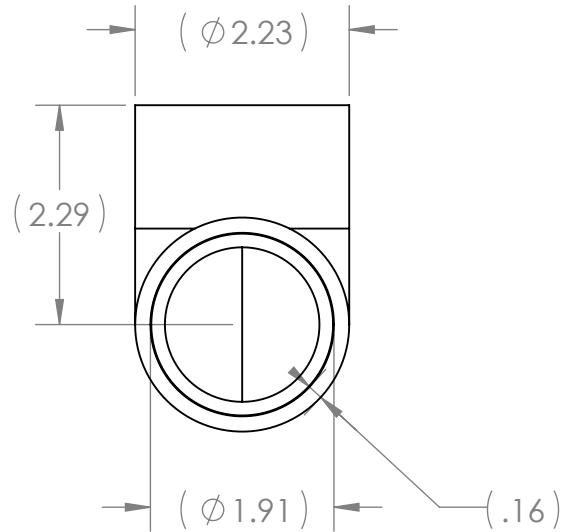
3

2

1

2

1



Note:  
 1. Vendor: McMaster-Carr  
 2. 4880K25

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		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$				
		INTERPRET GEOMETRIC TOLERANCING PER:		CHECKED		
		MATERIAL		ENG APPR.		
		NEXT ASSY		MFG APPR.		
		USED ON		Q.A.		
		FINISH		COMMENTS:		
		APPLICATION		DO NOT SCALE DRAWING		



TITLE:

# 90 Degree Elbow

SIZE	DWG. NO.	REV
A	GE-19184	B
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1

2

1

4

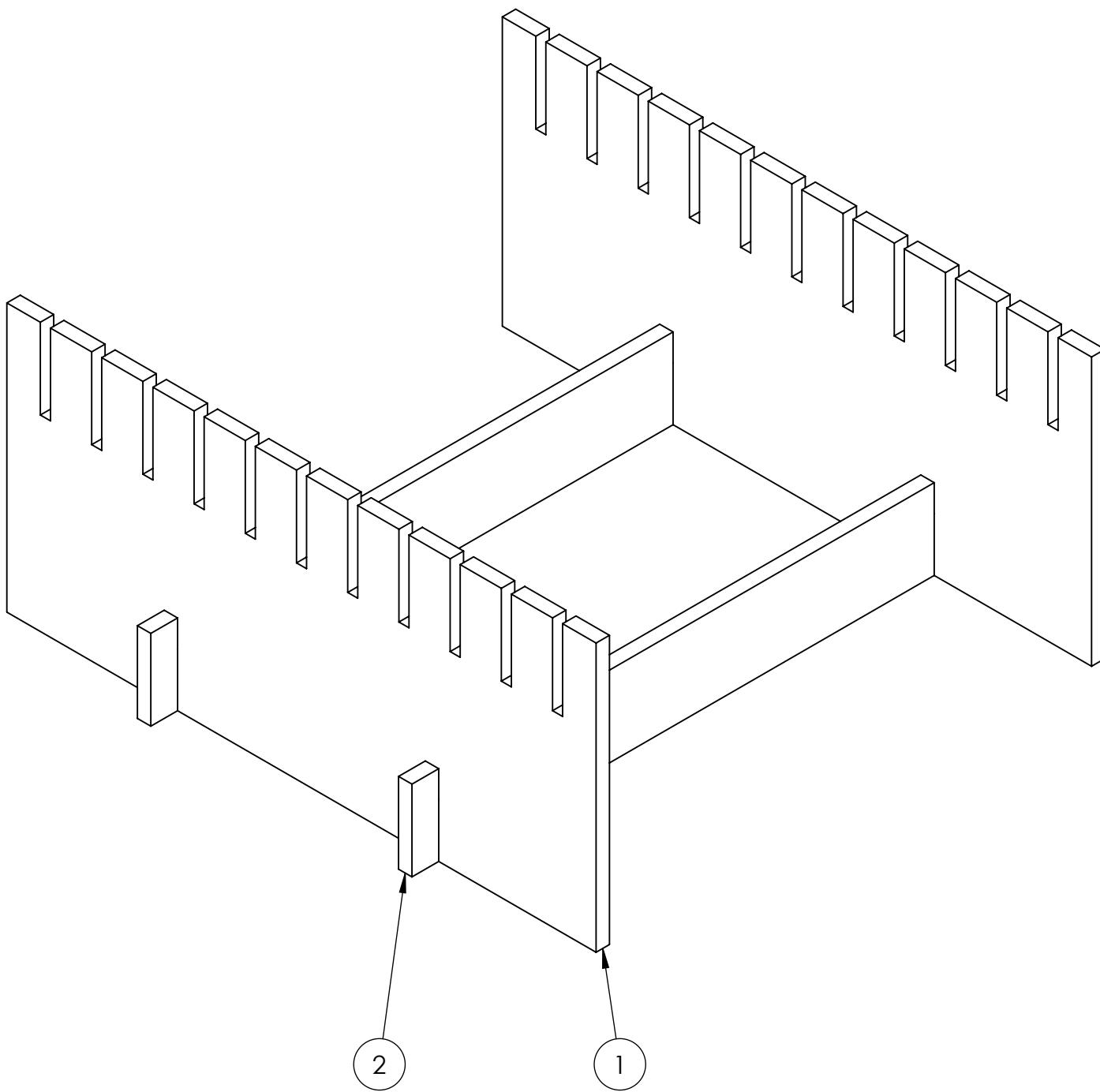
3

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ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19186-02	1/2" Thick HDPE Sheet White	2
2	GE-19186-01	1/2" Thick HDPE Sheet White	2

	UNLESS OTHERWISE SPECIFIED:		TITLE:  <b>Panel Hold Assembly</b>		
	DIMENSIONS ARE IN INCHES				
	TOLERANCES:				
	FRACTIONAL: $\pm 1/16$				
	ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$				
	TWO PLACE DECIMAL $\pm .01$				
THREE PLACE DECIMAL $\pm .001$		SIZE DWG. NO. <b>B GE-19186</b>	REV		
INTERPRET GEOMETRIC TOLERANCING PER:					
MATERIAL					
NEXT ASSY					
USED ON					
FINISH					
APPLICATION		DO NOT SCALE DRAWING			
SCALE: 1:4		WEIGHT:			
SHEET 1 OF 3					



Modeling Solutions Partner

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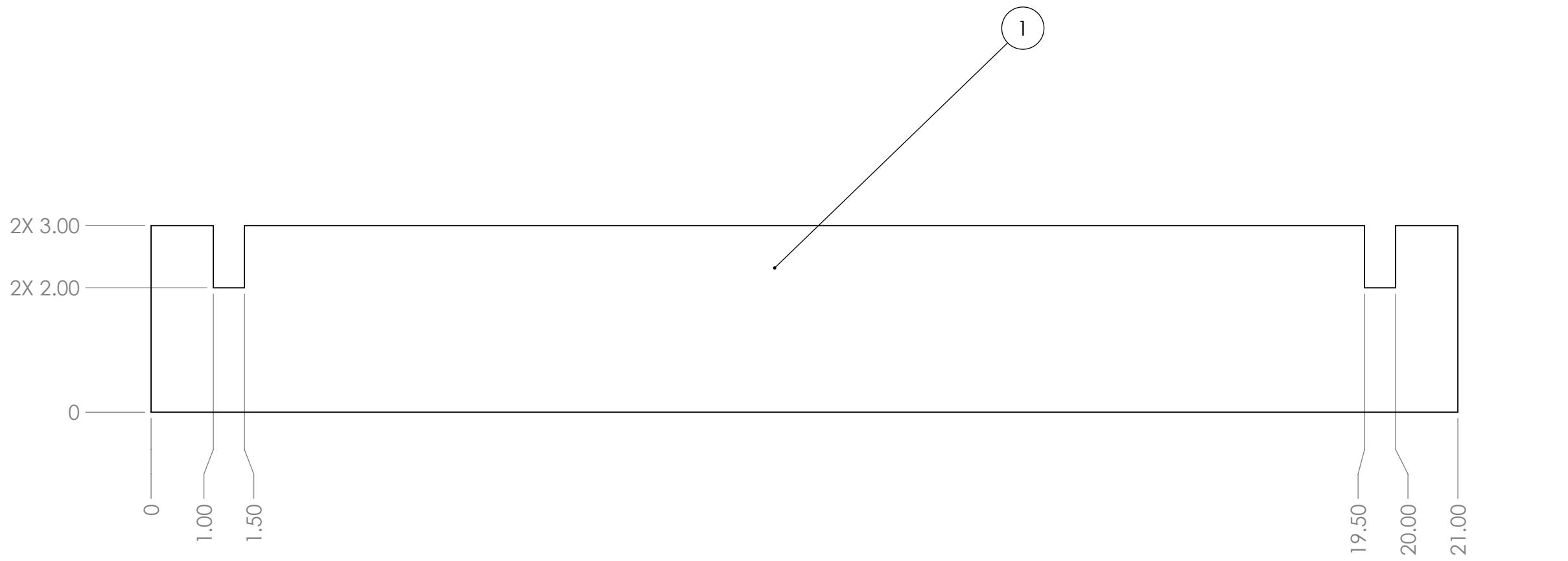
3

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**Note:**

1. Material: 1/2" Thick HDPE Sheet White
2. Finish: Smooth
3. Remove Sharp Edges and Burrs
4. Tag and Label With Part Number

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
NEXT ASSY	USED ON				
APPLICATION	DO NOT SCALE DRAWING				
SIZE	DWG. NO.			REV	
<b>B</b>	<b>GE-19186</b>				
SCALE: 1:2	WEIGHT:			SHEET 2 OF 3	

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Panel Hold**  
**Assembly**

**SIZE** DWG. NO. REV  
**B** **GE-19186**

SCALE: 1:2 WEIGHT: SHEET 2 OF 3

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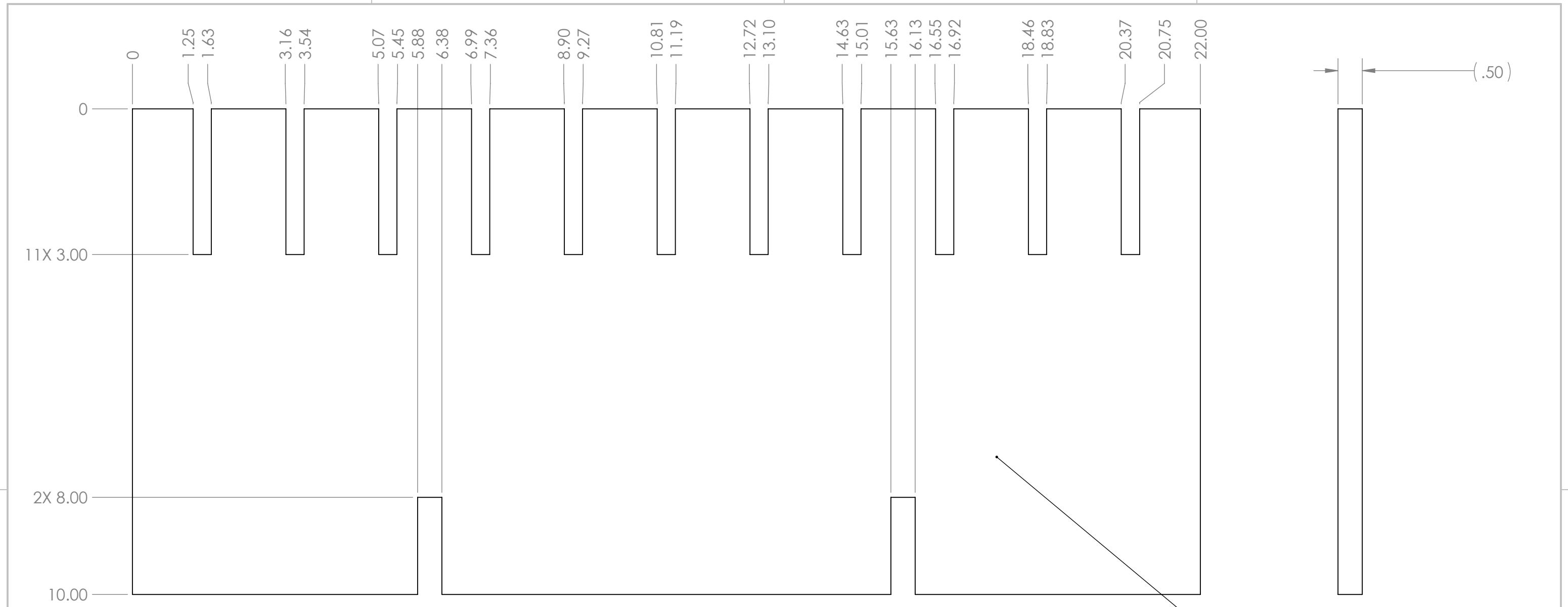
1

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Note:

1. Material: 1/2" Thick HDPE Sheet White
2. Finish: Smooth
3. Remove Sharp Edges and Burrs
4. Tag and Label With Part Number

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$			
		INTERPRET GEOMETRIC TOLERANCING PER:		Q.A.	COMMENTS:
		MATERIAL			
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			
<b>A</b>	<b>A</b>	<b>FIRST</b> <b>ROBOTICS</b> <b>COMPETITION</b>	<b>SOLIDWORKS</b> Modeling Solutions Partner	TITLE:	
<b>Panel Hold Assembly</b>		SIZE <b>B</b> DWG. NO. <b>GE-19186</b>		REV	
SCALE: 1:2		WEIGHT:		SHEET 3 OF 3	

4

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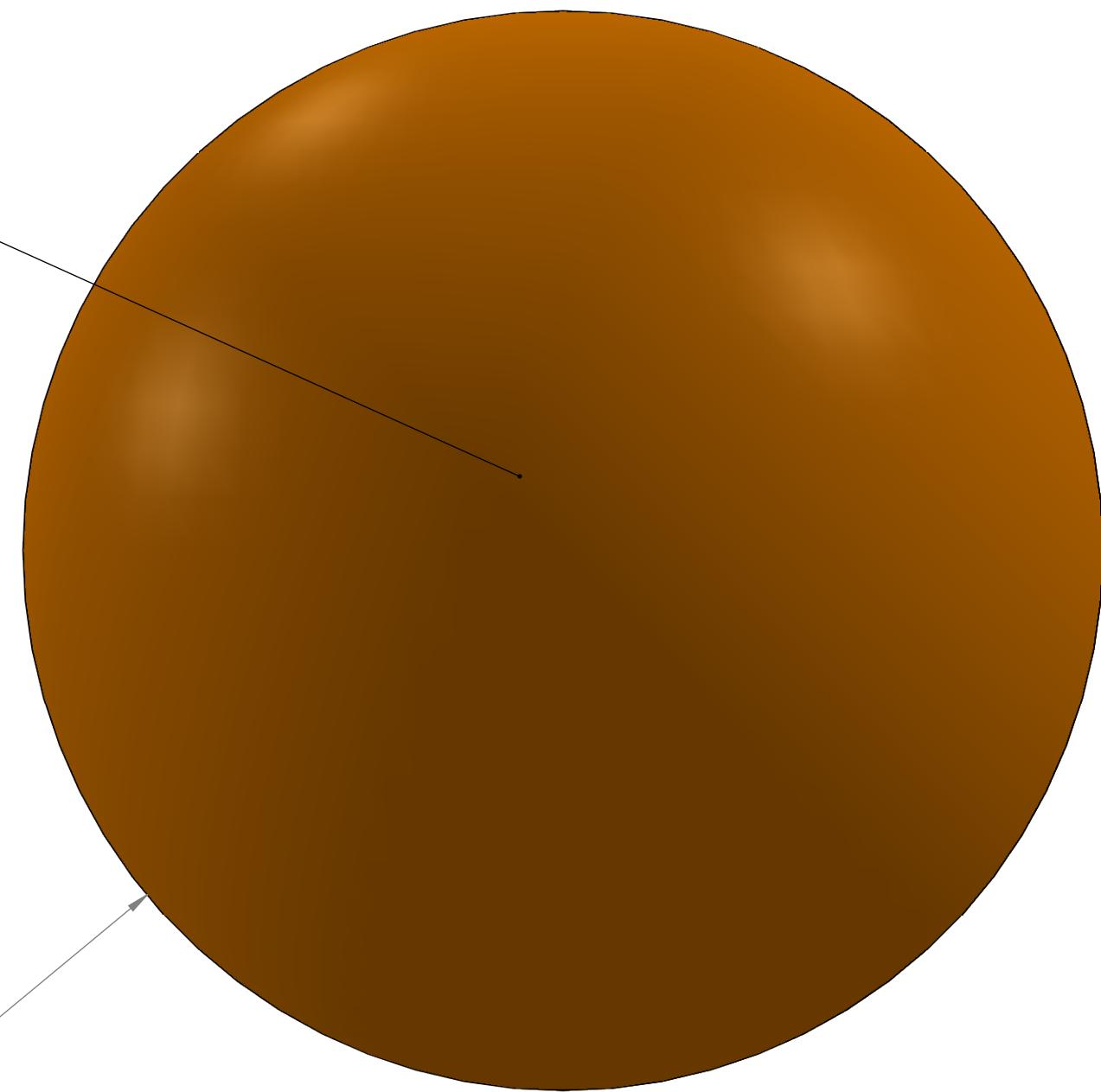
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FIRST logo applied on face.

 $\phi 13.00$ 

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## Notes:

1. Description: Sportime Playground Ball, 13 Inches
2. Source: Sportime
3. Item #: 1623139E
4. Available to teams as am-4000\_cargo from AndyMark
5. Closest Item # sold by Sportime: 1293618

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		UNLESS OTHERWISE SPECIFIED:		NAME DATE	
		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL: $\pm 1/16$			
		ANGULAR: MACH $\pm 1^\circ$	BEND $\pm 1^\circ$		
		TWO PLACE DECIMAL	$\pm .01$		
		THREE PLACE DECIMAL	$\pm .001$		
		INTERPRET GEOMETRIC TOLERANCING PER:		TITLE:  <b>Cargo</b>	
		MATERIAL			
		NEXT ASSY	USED ON		
		FINISH		SIZE DWG. NO. <b>B GE-19187</b>	
		APPLICATION			
		DO NOT SCALE DRAWING			
		SCALE: 1:2		REV	
		WEIGHT:		SHEET 1 OF 1	

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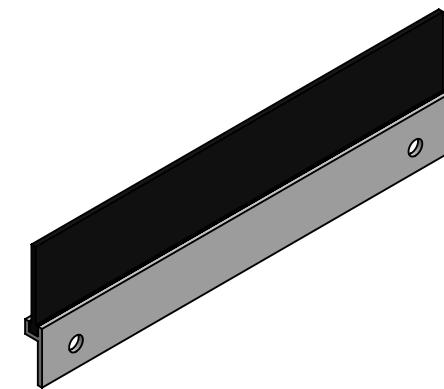
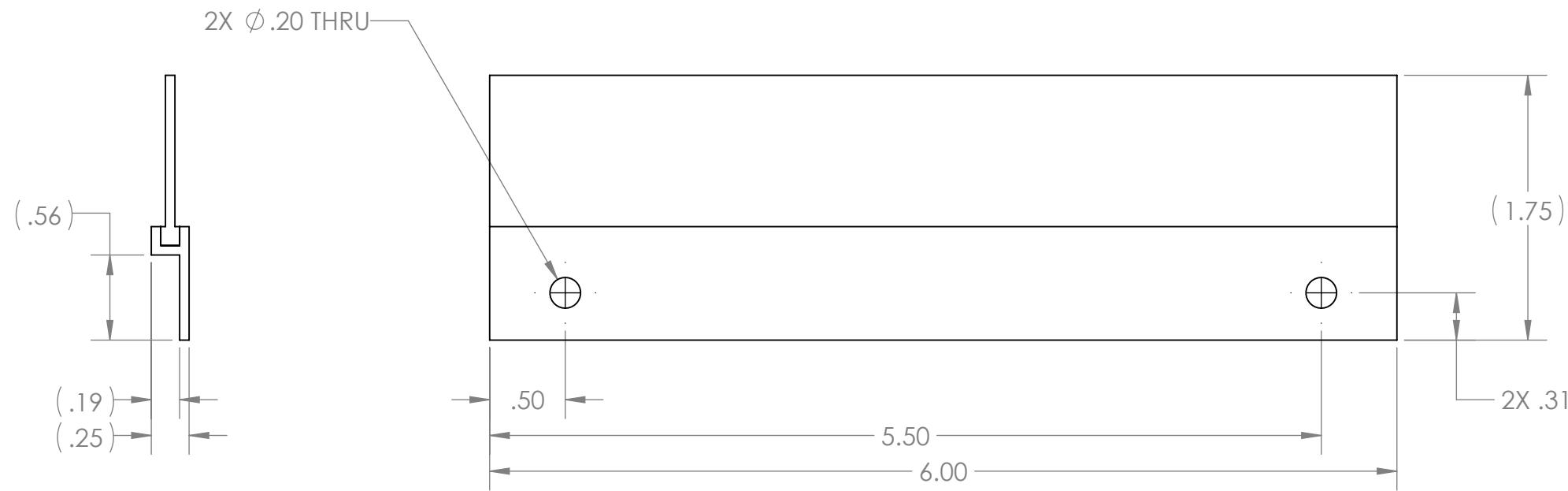
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## Notes:

1. Supplier: Home Depot
2. Brand: Frost King
3. Description: 1-3/4 in. x 36 in. White Plastic and Brush Door Sweep
4. Model #: C35PH
5. Home Depot SKU: 291722
6. Remove all burrs and sharp edges.
7. Bag or tag with part number.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Brush Assembly 6", Loading Station

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19190</b>	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1

4

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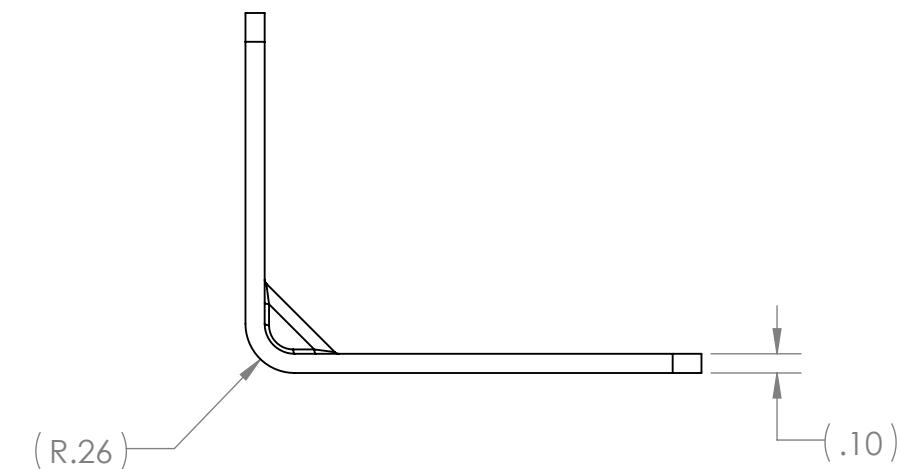
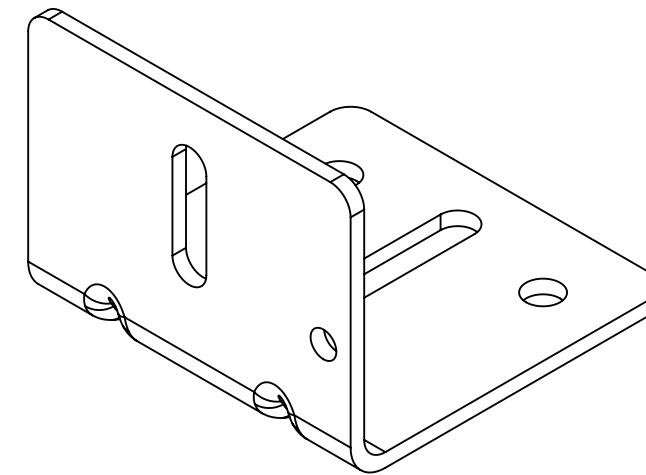
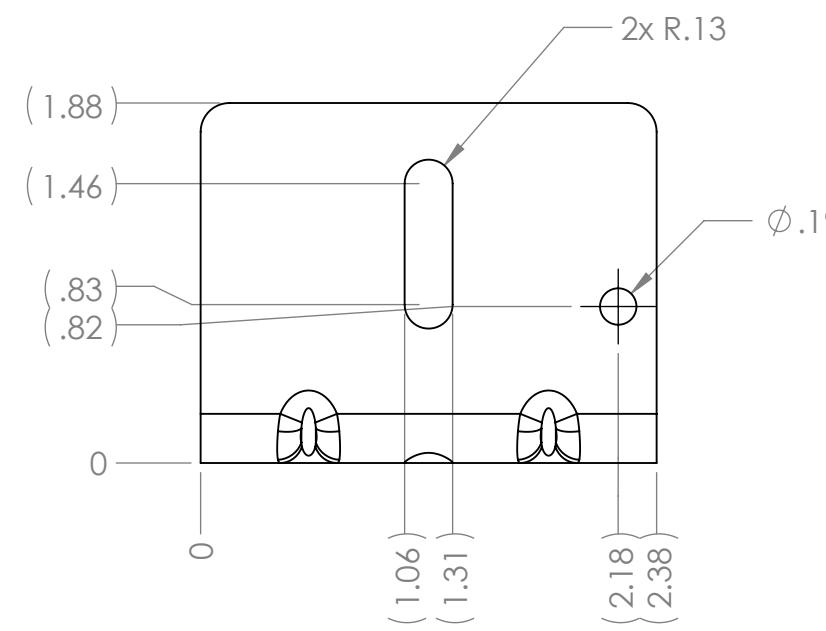
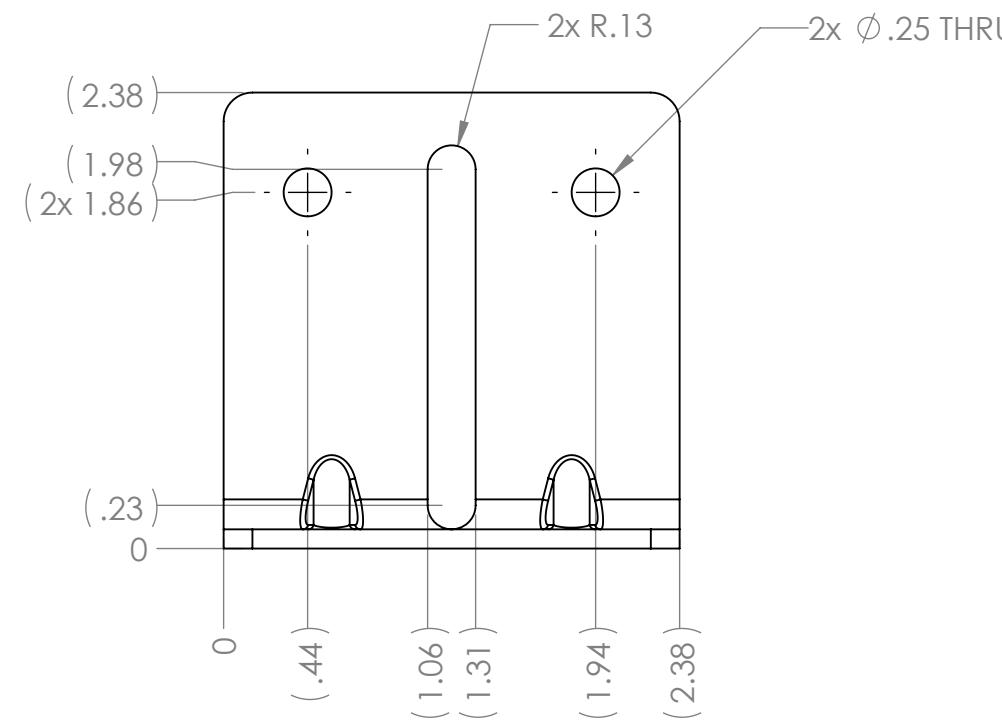
1

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- Notes:
1. Corner Bracket, Galvanized Steel, 1-7/8" x 2-3/8" x 2-3/8"
  2. Source: McMaster-Carr
  3. Part Number: 15275A63
  4. Equivalent Substitutions Allowed

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cargo Ship Corner Bracket**

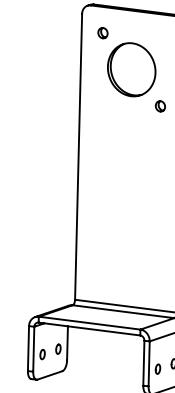
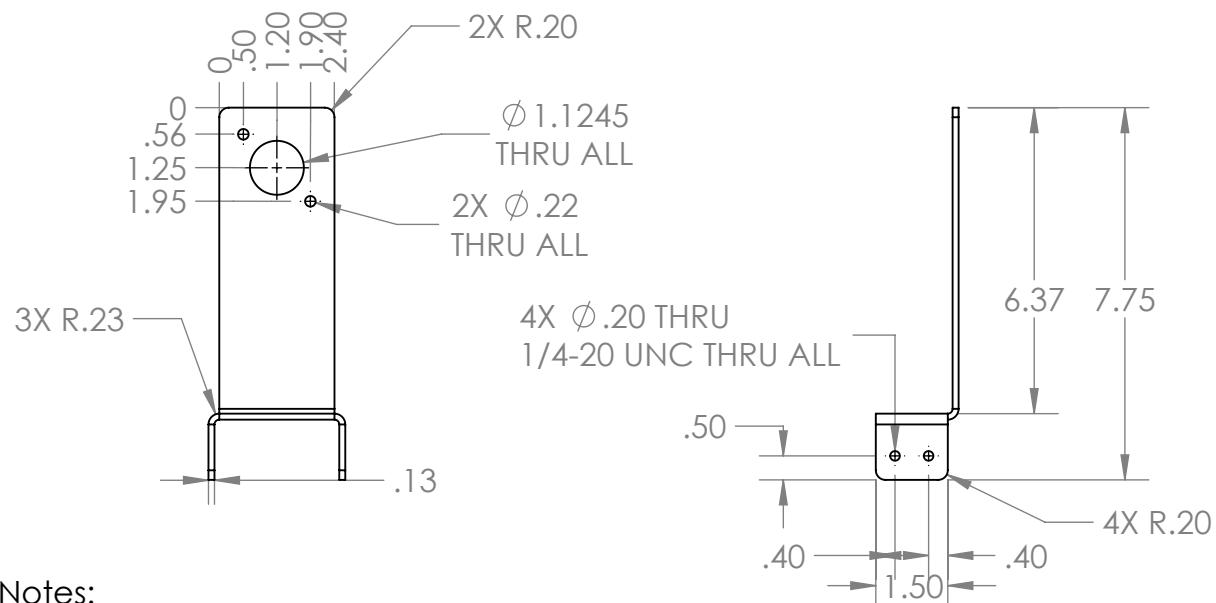
SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19195</b>	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1

2

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B

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## Notes:

Material: 11 GA Galvanized Steel Sheet Metal  
Remove all burrs and sharp edges

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN		
			CHECKED		
			ENG APPR.		
			MFG APPR.		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.		
		MATERIAL	COMMENTS:		
NEXT ASSY	USED ON	FINISH			
APPLICATION		DO NOT SCALE DRAWING			



TITLE

# Shutter Motor Bracket

SIZE	DWG. NO.	REV
<b>A</b>	<b>GE-19196</b>	
SCALE: 1:4		WEIGHT:
		SHEET 1 OF 1

2

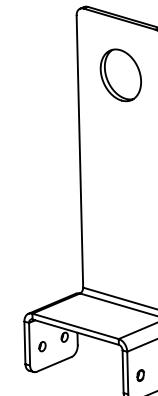
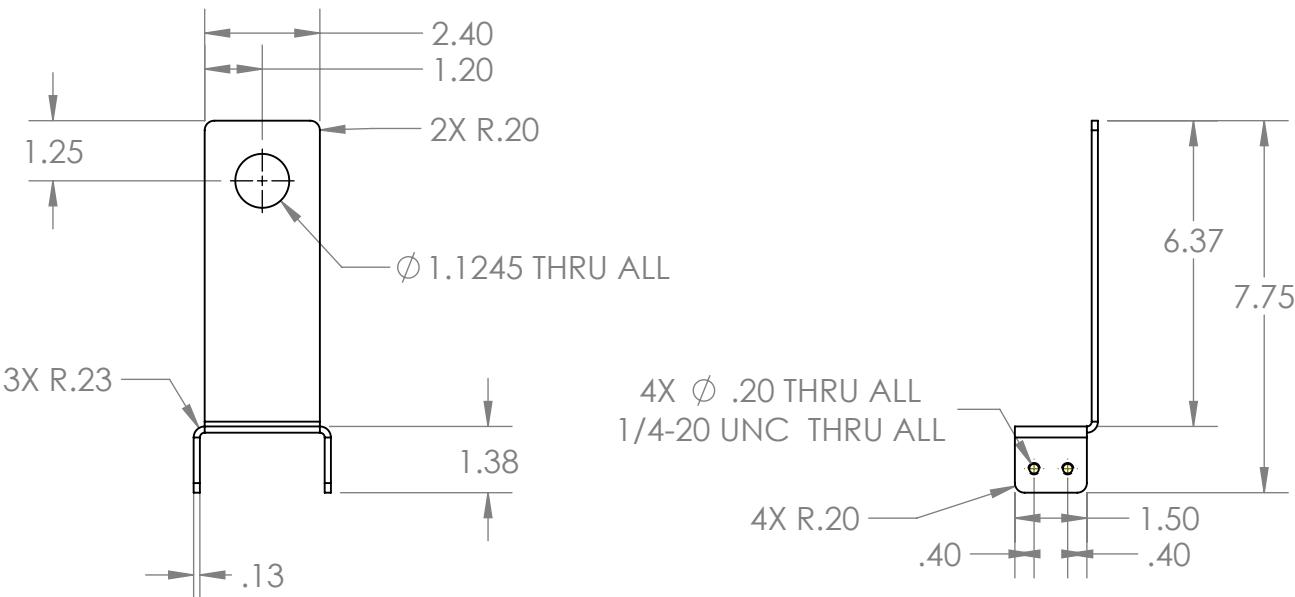
1

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## Notes:

Material: 11 GA Galvanized Steel Sheet Metal  
Remove all burrs and sharp edges

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		UNLESS OTHERWISE SPECIFIED:			NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN				
TOLERANCES:		CHECKED				
FRACTIONAL $\pm 1/16$		ENG APPR.				
ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		MFG APPR.				
TWO PLACE DECIMAL $\pm .01$		Q.A.				
THREE PLACE DECIMAL $\pm .001$		COMMENTS:				
INTERPRET GEOMETRIC TOLERANCING PER:						
MATERIAL						
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				



**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:

# Shutter Bracket

SIZE	DWG. NO.	REV
A	GE-19197	
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1

2

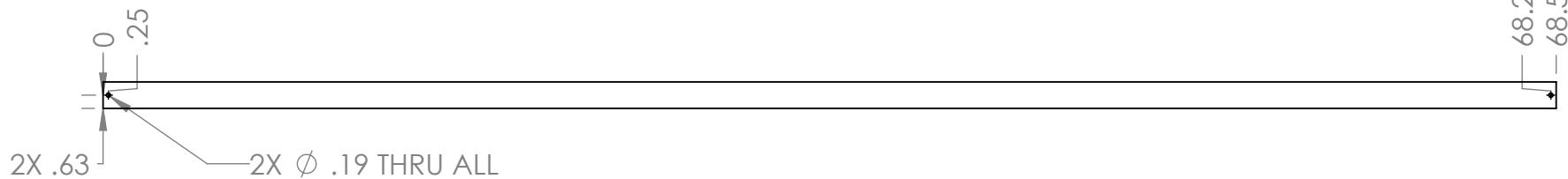
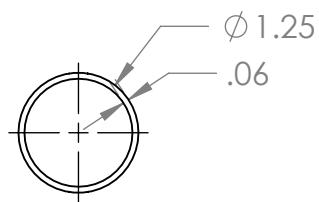
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**Notes:**

Material: VersaRoller Tube, 1-1/4" OD x 1-1/8" ID x 1/16" Wall

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		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$				
		INTERPRET GEOMETRIC TOLERANCING PER:		CHECKED		
		MATERIAL		ENG APPR.		
		NEXT ASSY		MFG APPR.		
		USED ON		Q.A.		
		FINISH		COMMENTS:		
		APPLICATION		DO NOT SCALE DRAWING		

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TITLE:

Shutter Pipe

SIZE	DWG. NO.	REV
<b>A</b>	<b>GE-19198</b>	
SCALE: 1:16		WEIGHT:
SHEET 1 OF 1		

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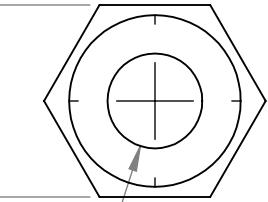
2.80

2.90

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 $\phi .247 +.003$ 

## Notes:

Material: 7075-T6 Aluminum Black Anodized 1/2" Hex Shaft

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		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$				
		INTERPRET GEOMETRIC TOLERANCING PER:		CHECKED		
		MATERIAL		ENG APPR.		
		NEXT ASSY		MFG APPR.		
		USED ON		Q.A.		
		FINISH		COMMENTS:		
		APPLICATION		DO NOT SCALE DRAWING		


**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:

# Shutter Middle Axe

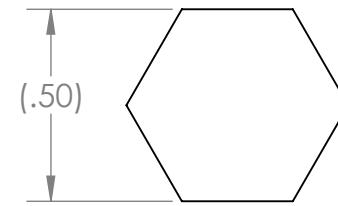
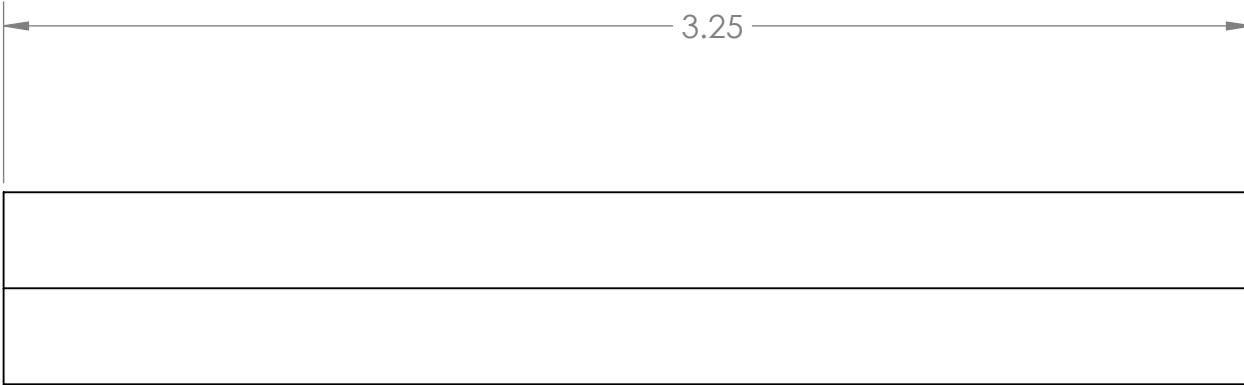
SIZE	DWG. NO.	REV
A	GE-19199	
SCALE: 2:1	WEIGHT:	SHEET 1 OF 1

2

1

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## Notes:

Material: 7075-T6 Aluminum Black Anodized Hex Shaft 1/2"

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		UNLESS OTHERWISE SPECIFIED:			NAME	DATE
		DIMENSIONS ARE IN INCHES		DRAWN		
		TOLERANCES:		CHECKED		
		FRACTIONAL $\pm 1/16$		ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$		Q.A.		
		THREE PLACE DECIMAL $\pm .001$		COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:	MATERIAL			
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				



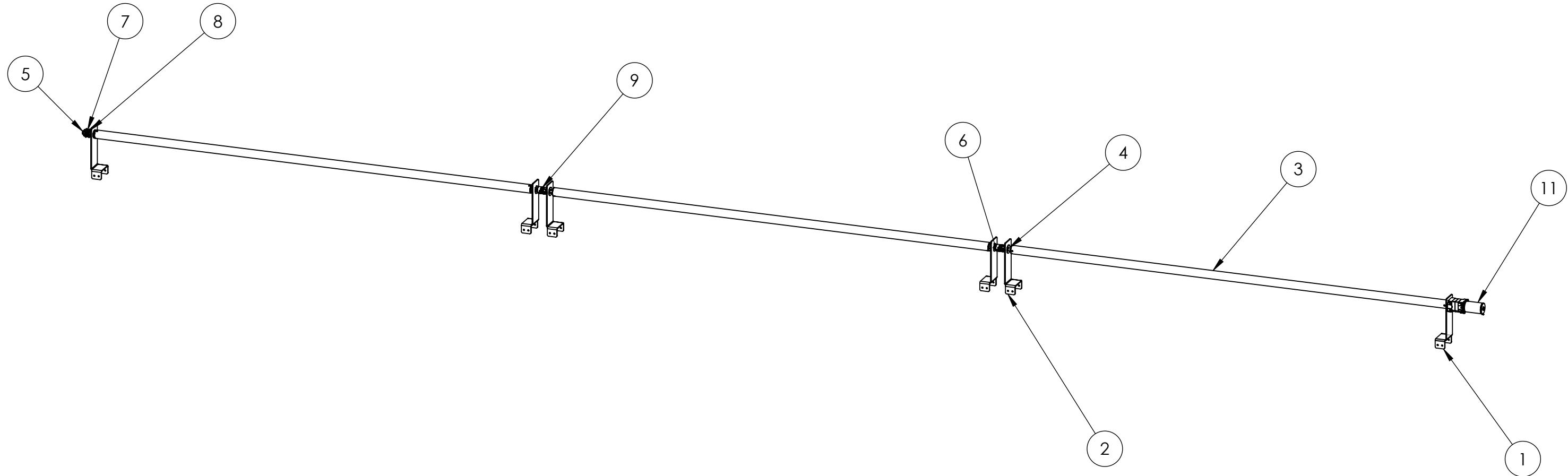
**SOLIDWORKS**  
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**TITLE:**  
**Shutter End Axle**

SIZE	DWG. NO.	REV
<b>A</b>	<b>GE-19200</b>	
SCALE: 2:1	WEIGHT:	SHEET 1 OF 1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	GE-19196	Shutter Motor Bracket	1
2	GE-19197	Shutter Bracket	5
3	GE-19198	Shutter Pipe	3
4	GE-19199	Shutter Middle Axle	4
5	GE-19200	Shutter End Axle	1
6	GE-19215	1/2" Hex Bearing	5
7	GE-19235	HTD Timing Pulley, 18 Tooth	1
8	GE-19237	Hex Shaft Collar	2
9	GE-19243	Coupler Assembly	2
10	GE-19248	Versa Hub	6
11	217-3351/217-4973/217-2816/217-2820	Bag Motor w/ 50:1 gear reduction and hex output	1

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE DWG. NO.		REV		
<b>B GE-19201</b>				
SCALE: 1:24	WEIGHT:	SHEET 1 OF 2		

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

## Title: Shutter Assembly

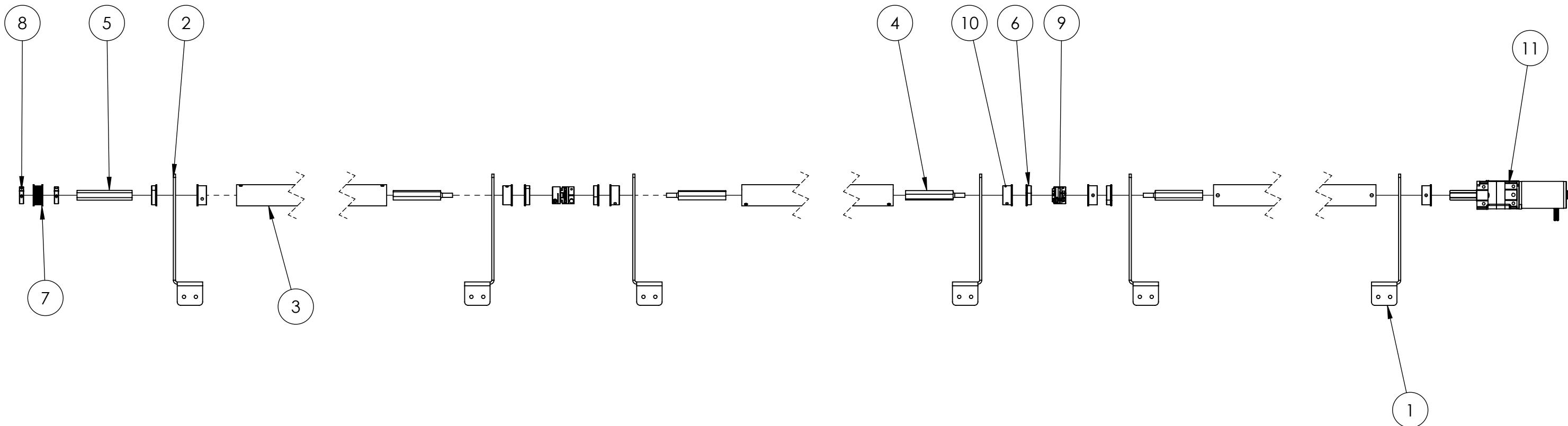
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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
 Modeling Solutions Partner

**Shutter Assembly**

SIZE DWG. NO. REV  
**B GE-19201**

SCALE: 1:32 WEIGHT: SHEET 2 OF 2

4

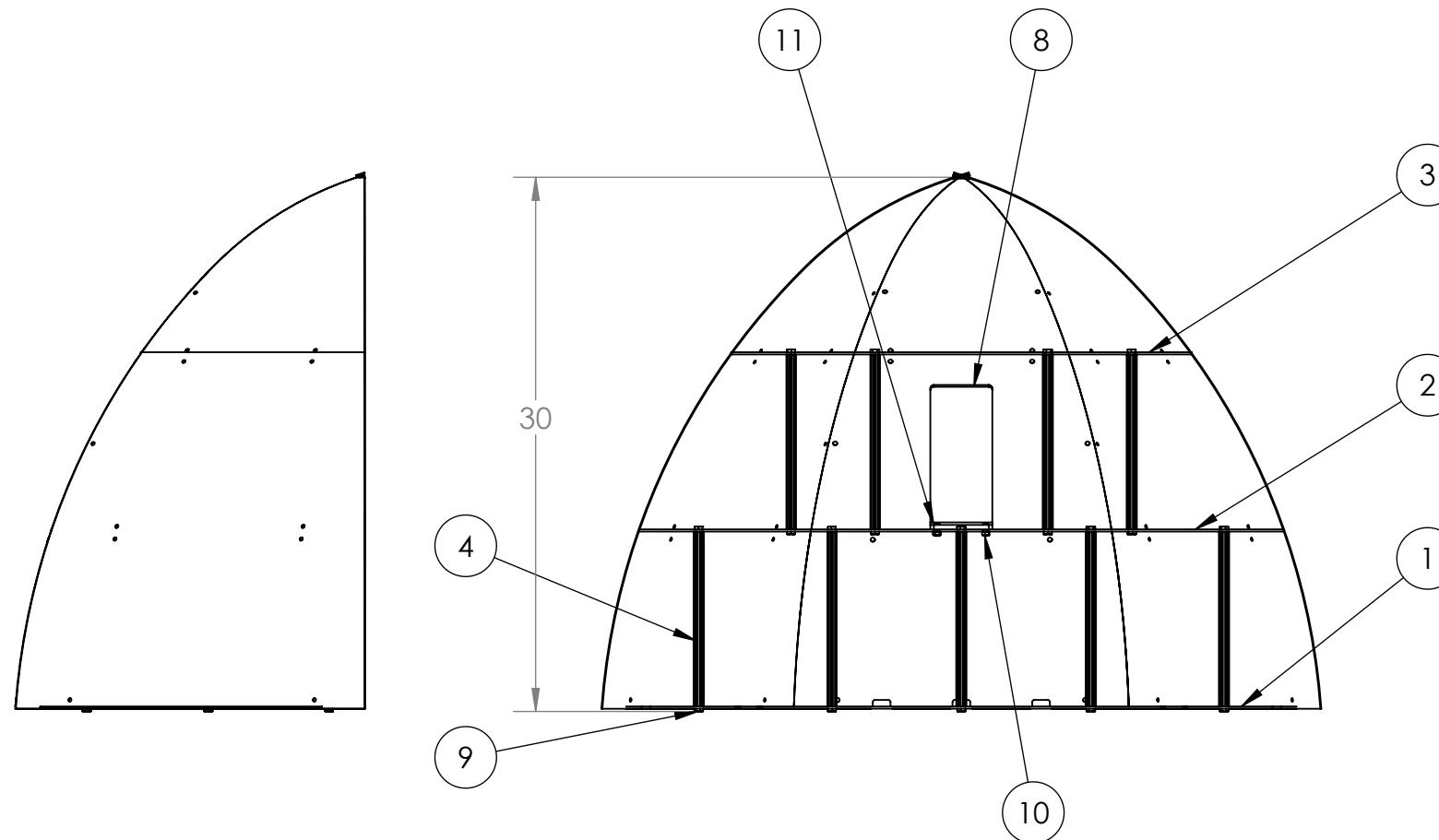
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2

1

B

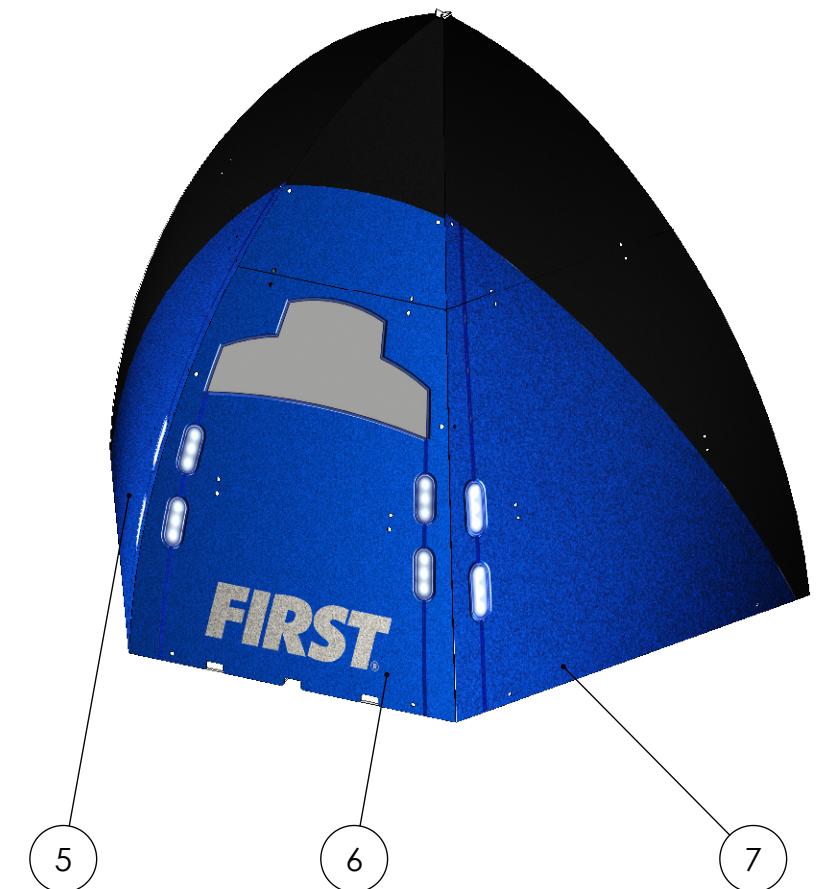
B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19203	Nose Cone Bottom Shelf	1
2	GE-19204	Nose Cone Middle Shelf	1
3	GE-19205	Nose Cone Top Shelf	1
4	GE-19206	Nose Cone Churro	9
5	GE-19207	Nose Cone Left Face	1
6	GE-19208	Nose Cone Center Face	1
7	GE-19209	Nose Cone Right Face	1
8	GE-19216	Light Mounting Bracket	1
9	hex_.25_20_.75	Steel Hex Head Screw, 1/4"-20 x 3/4" long, fully threaded	18
10	nylock_10_32	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size	4
11	round_hex_10_32_.625_full	Round Hex Head, #10-32 x 5/8" long, fully threaded	4

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UNLESS OTHERWISE SPECIFIED:  
DIMENSIONS ARE IN INCHES  
TOLERANCES:  
FRACTIONAL: ±1/16  
ANGULAR: MACH ±1° BEND ±1°  
TWO PLACE DECIMAL ±.01  
THREE PLACE DECIMAL ±.001  
  
INTERPRET GEOMETRIC  
TOLERANCING PER:  
  
NEXT ASSY      USED ON      FINISH  
APPLICATION      DO NOT SCALE DRAWING



Notes:  
1. Assembly exists in red and blue configurations.

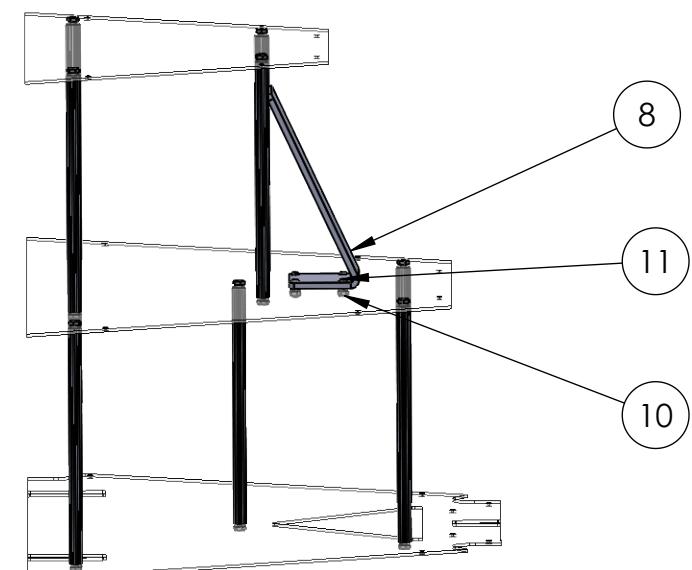
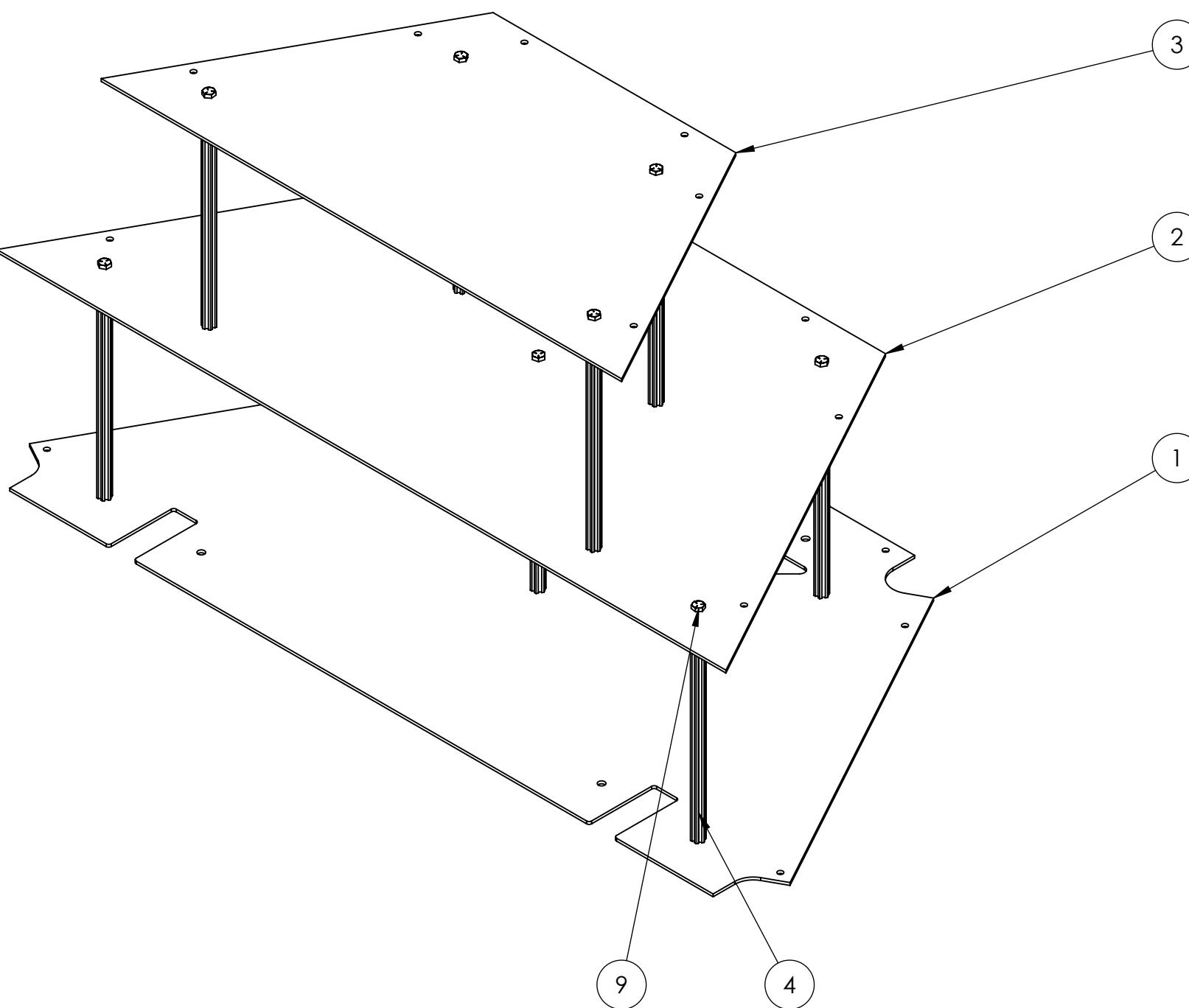
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	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
TITLE:	FIRST ROBOTICS COMPETITION			
SOLIDWORKS	Modeling Solutions Partner			
Nose Cone Assembly				REV
SIZE	DWG. NO.	B GE-19202		
SCALE: 1:10	WEIGHT:	SHEET 1 OF 2		

4

3

2

1



#### Notes:

1. Assemble base frame with items 1, 2, 3, 4 (qty. 9), and 9 (qty 18).
2. Attach item 8 to the assembly using items 10 and 11 (4x each).
3. Attach items 5, 6, and 7 using black cable ties.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		NAME	DATE
		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV			
<b>B</b>	<b>GE-19202</b>				
SCALE: 1:5	WEIGHT:	SHEET 2 OF 2			

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

## Nose Cone Assembly

4

3

2

1

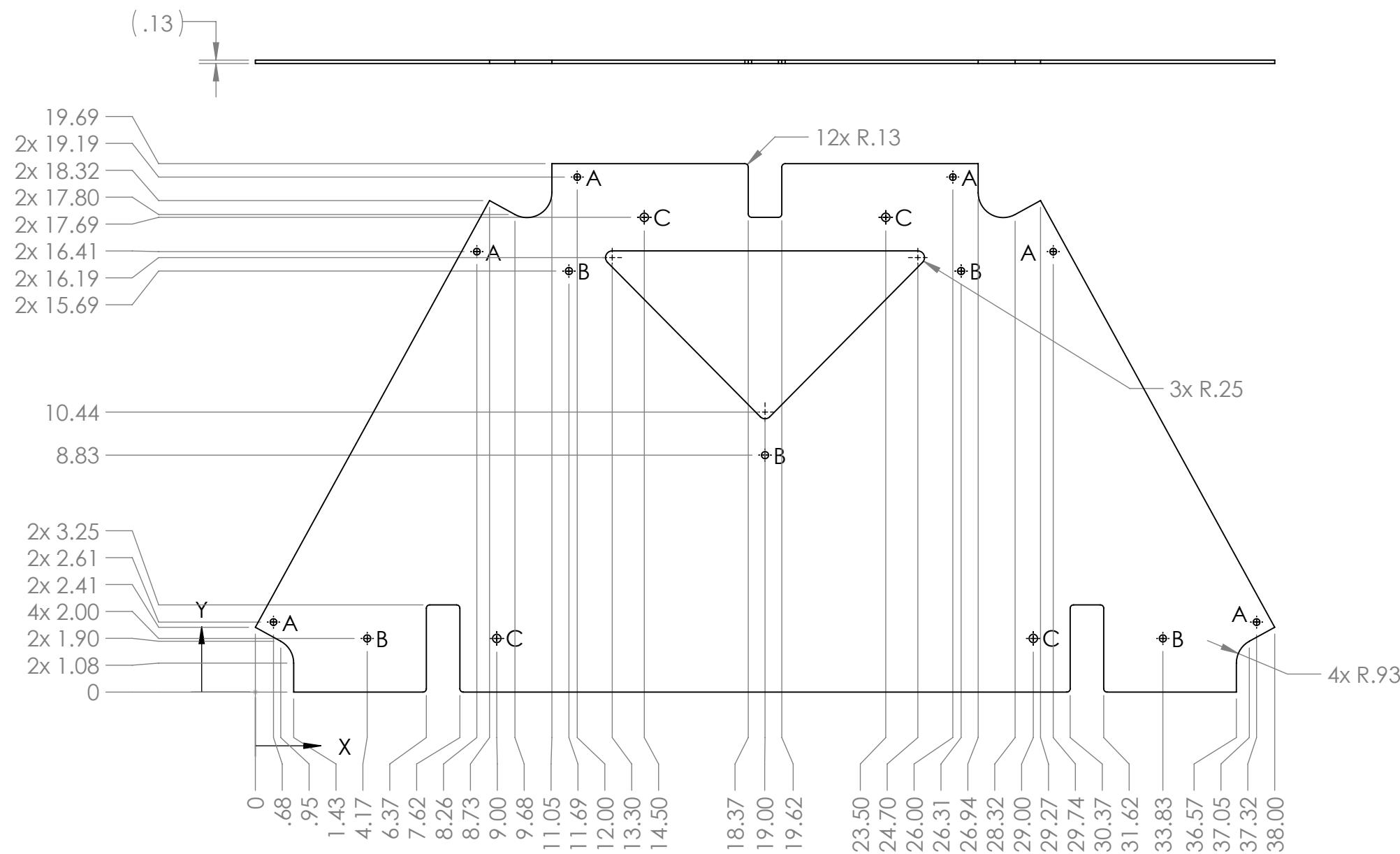
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TAG	SIZE	QUANTITY
A	$\phi .25$ THRU ALL	6
B	$\phi .27$ THRU ALL	5
C	$\phi .31$ THRU ALL	4



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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SCALE: 1:5	WEIGHT:	SHEET 1 OF 1	REV	
<b>B</b> GE-19203				



TITLE: Nose Cone Bottom Shelf

SIZE DWG. NO. **B** GE-19203 REV

SCALE: 1:5 WEIGHT: SHEET 1 OF 1

4

3

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1

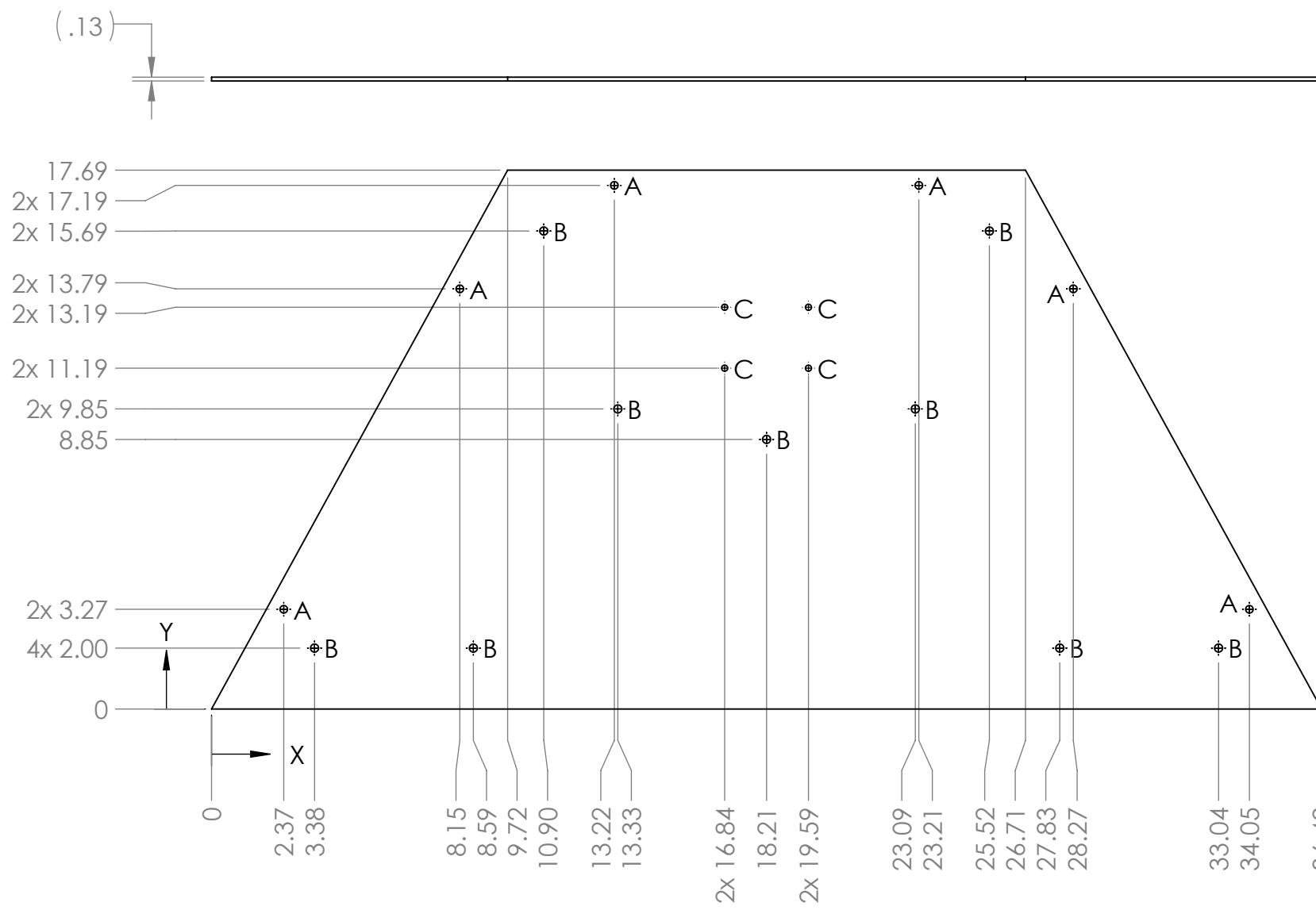
4

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TAG	SIZE	QUANTITY
A	$\phi .25$ THRU ALL	6
B	$\phi .27$ THRU ALL	9
C	$\phi .20$ THRU ALL	4



- Notes:
1. Material: 1/8" thick, clear polycarbonate.
  2. Remove all burrs and sharp edges.
  3. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19204</b>			
SCALE: 1:5	WEIGHT:	SHEET 1 OF 1		



## Nose Cone Middle Shelf

4

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2

1

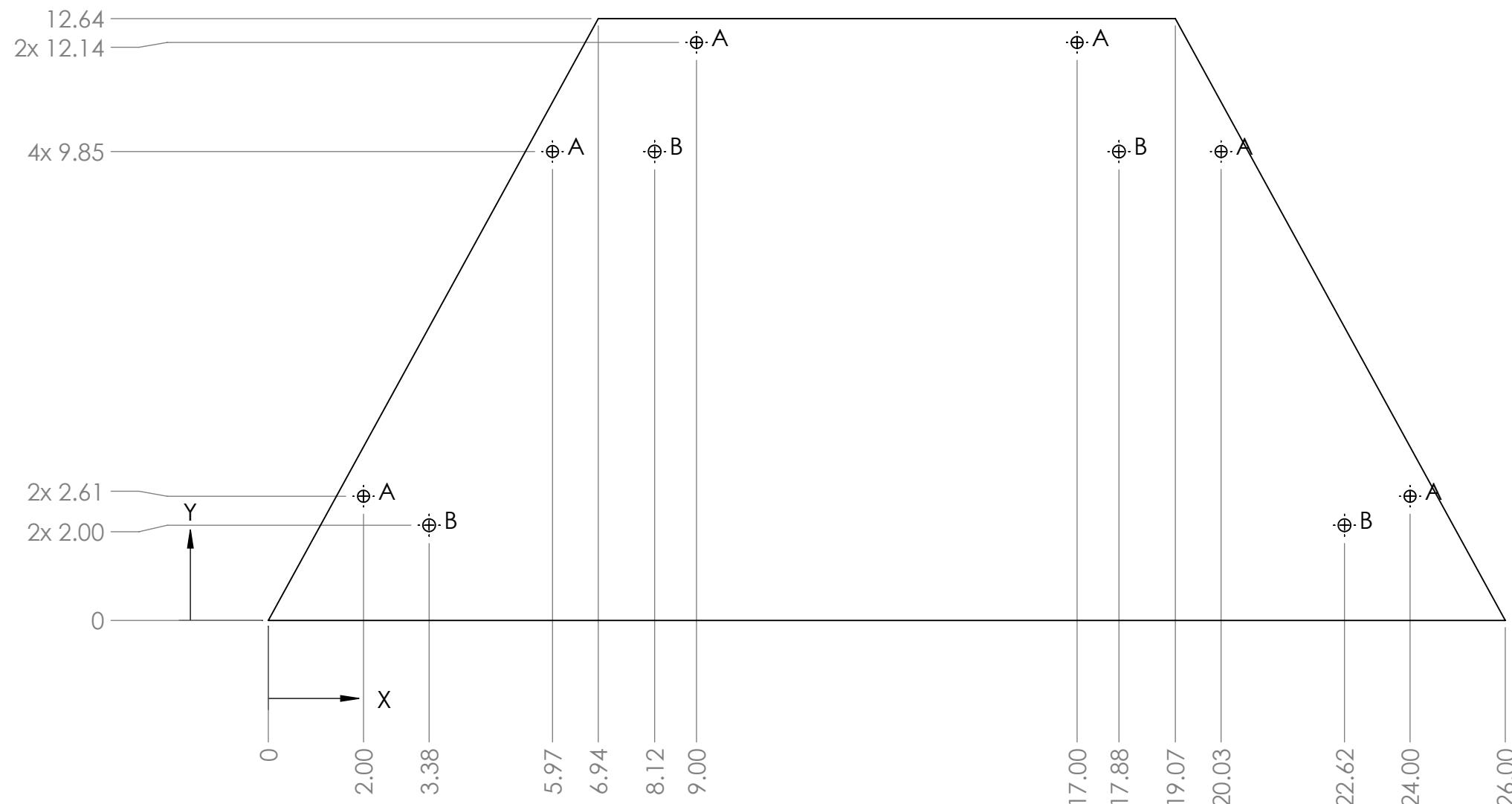
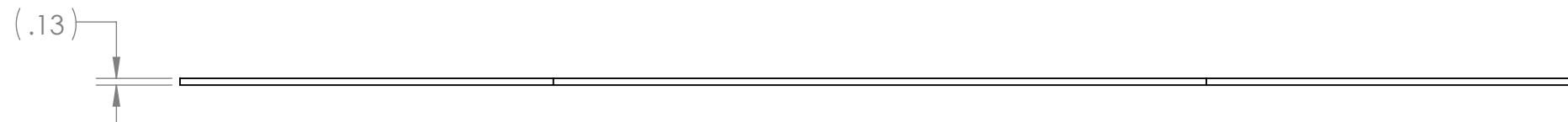
4

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TAG	SIZE	QUANTITY
A	$\phi .25$ THRU ALL	6
B	$\phi .27$ THRU ALL	4

**Notes:**

- Material: 1/8" thick, clear polycarbonate.
- Remove all burrs and sharp edges.
- Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE DWG. NO.		REV		
<b>B GE-19205</b>				
SCALE: 1:3		WEIGHT:	SHEET 1 OF 1	

 **FIRST**  
**ROBOTICS**  
**COMPETITION**  **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:**  
**Nose Cone Top Shelf**

4

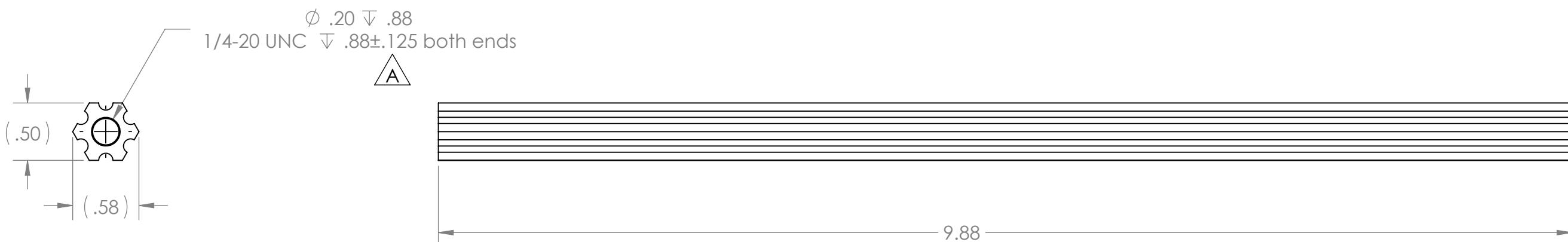
3

2

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## REVISIONS

ZONE	REV.	DESCRIPTION	DATE	APPROVED
B3	A	Added tolerance to tap depth.	11/1/2018	CPO



## Note:

1. Make from AndyMark Part AM-3101-6 or equivalent.
2. Remove Sharp Edges and Burrs.
3. Label or tag with Part Number.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Nose Cone Churro

**SIZE** DWG. NO. **B** GE-19206 **REV** **A**

SCALE: 1:1 WEIGHT: SHEET 1 OF 1

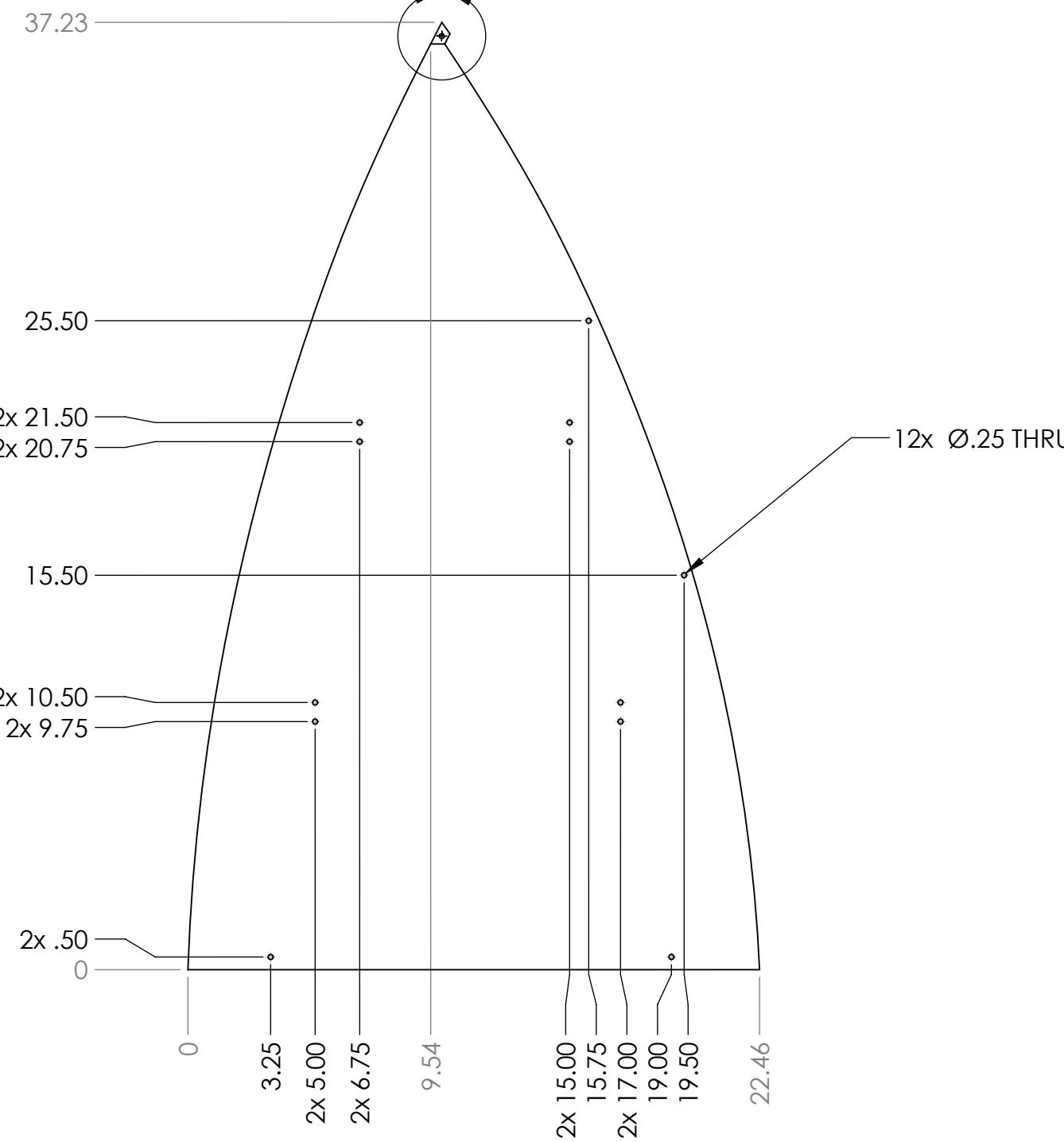
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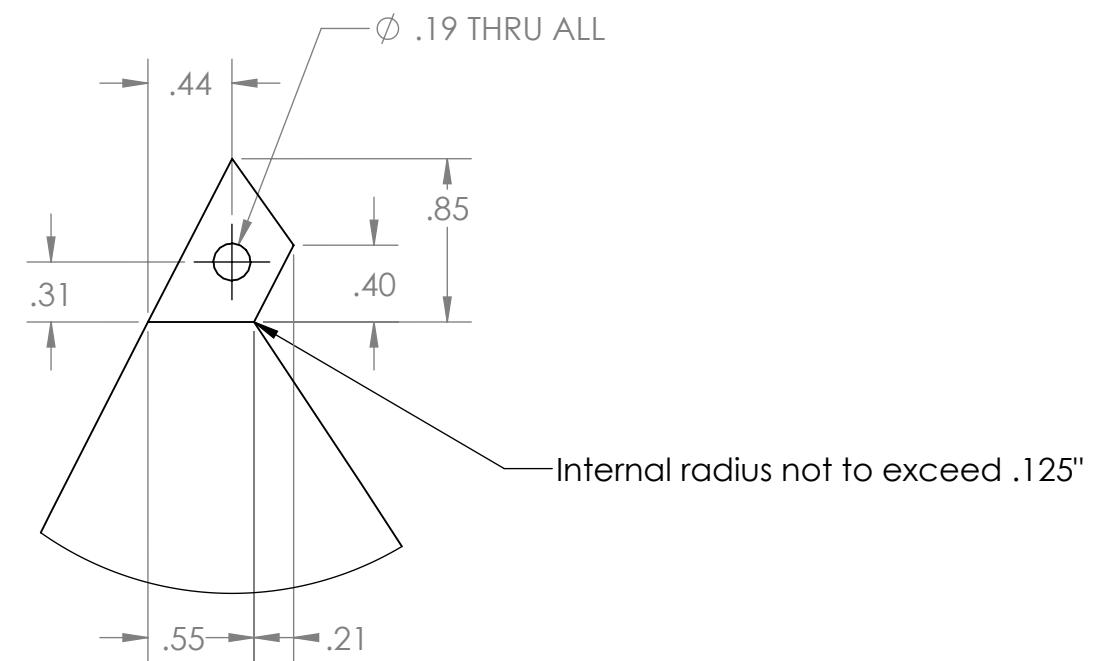
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B



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DETAIL A  
SCALE 1 : 1



		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL ±.01 THREE PLACE DECIMAL ±.001	NAME	DATE
	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	INTERPRET GEOMETRIC TOLERANCING PER:		Q.A.	
	MATERIAL		COMMENTS:	
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Nose Cone Left Face

<b>SIZE</b>	<b>DWG. NO.</b>	<b>REV</b>
<b>B</b>	<b>GE-19207</b>	
SCALE: 1:6	WEIGHT:	SHEET 1 OF 1

4

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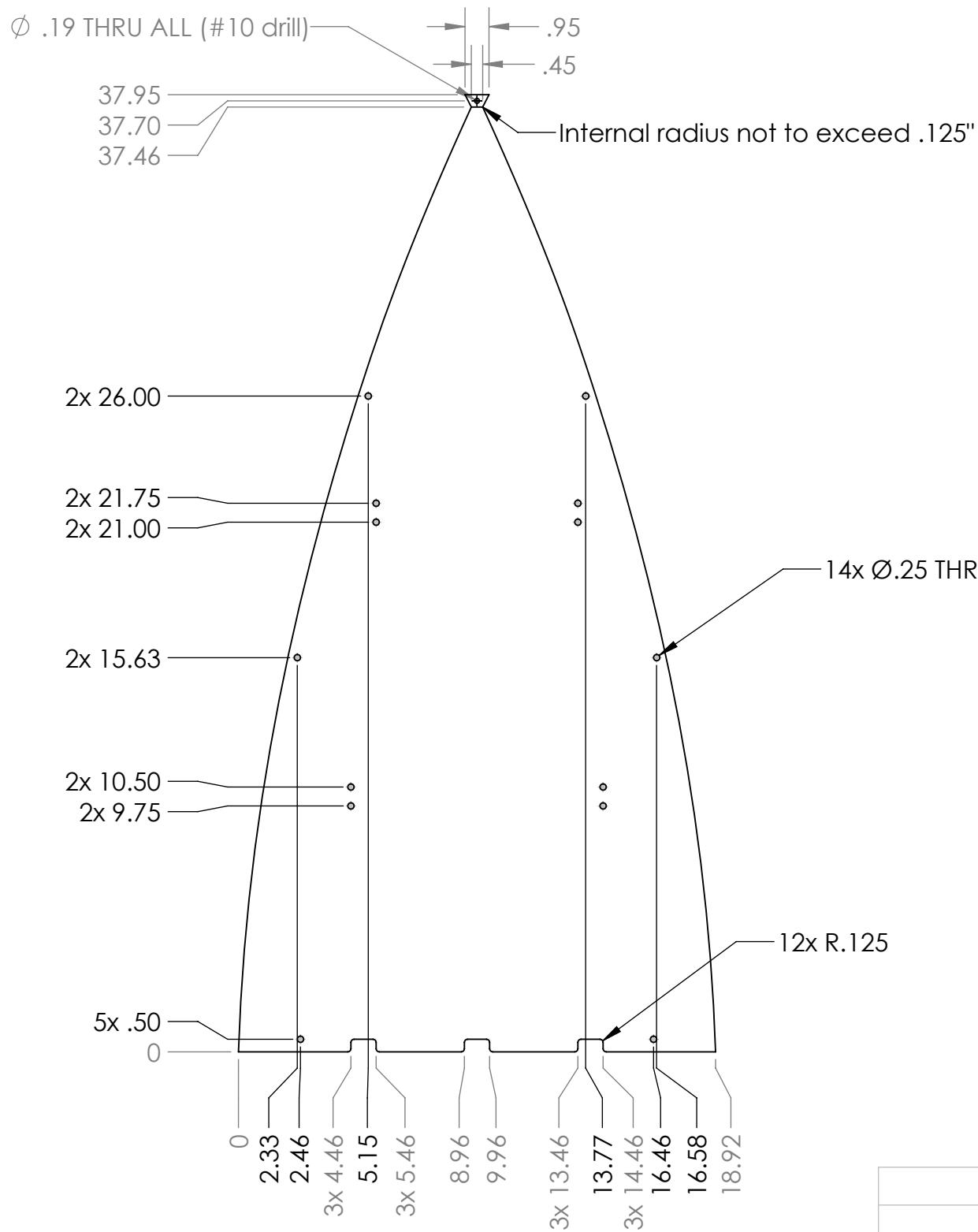
3

2

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B

B



- Notes:
1. Material: 1/16" thick polycarbonate, clear.
  2. Remove all burrs and sharp edges.
  3. Vinyl to be applied to face.
  4. Tag or label with part number.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL: ±1/16 ANGULAR: MACH ±1° BEND ±1° TWO PLACE DECIMAL: ±.01 THREE PLACE DECIMAL: ±.001	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SCALE: 1:6	WEIGHT:			SHEET 1 OF 1

FIRST ROBOTICS COMPETITION  
SOLIDWORKS  
Modeling Solutions Partner

TITLE: Nose Cone Center Face  
SIZE: B DWG. NO. GE-19208 REV: 1  
SCALE: 1:6 WEIGHT: SHEET 1 OF 1

4

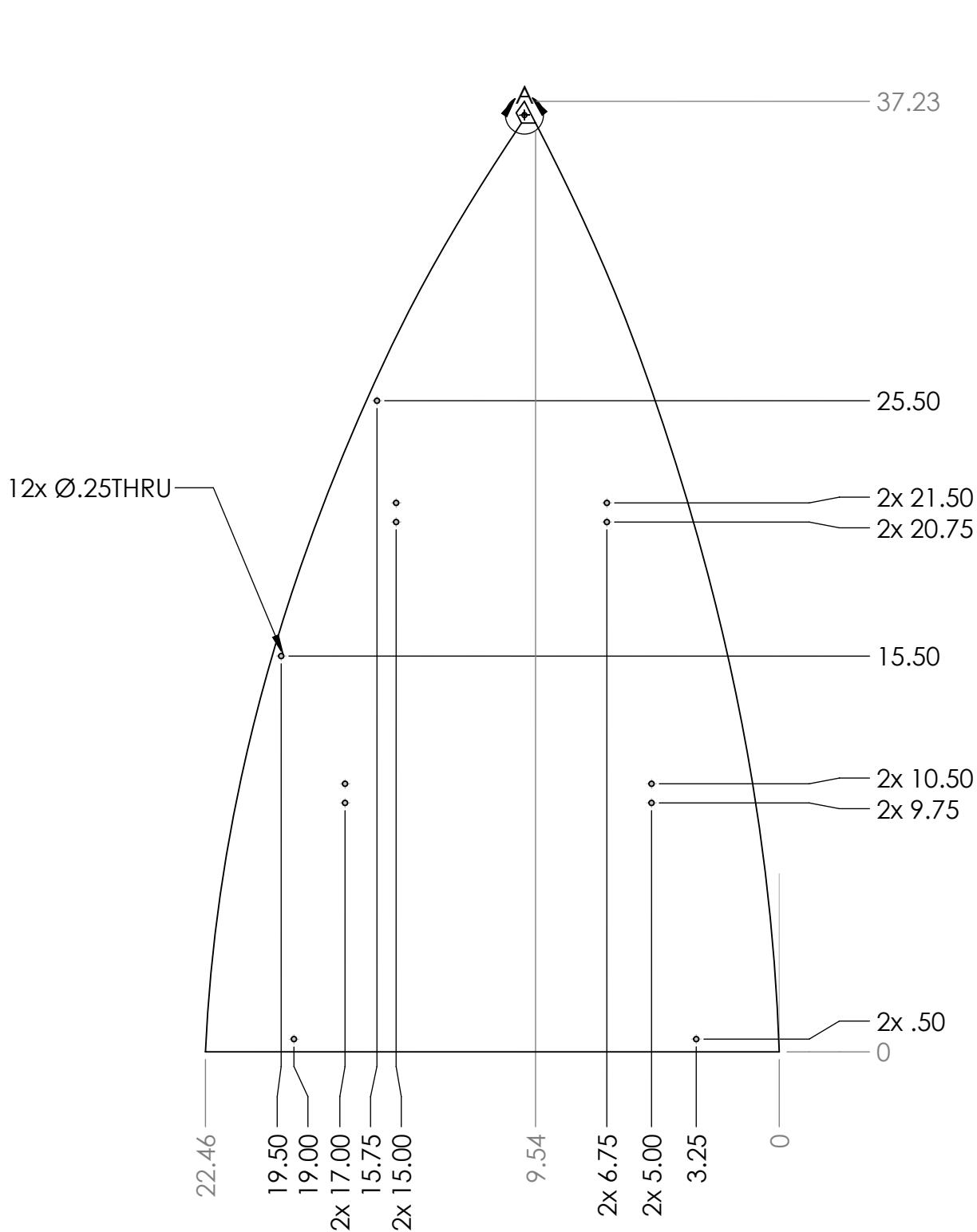
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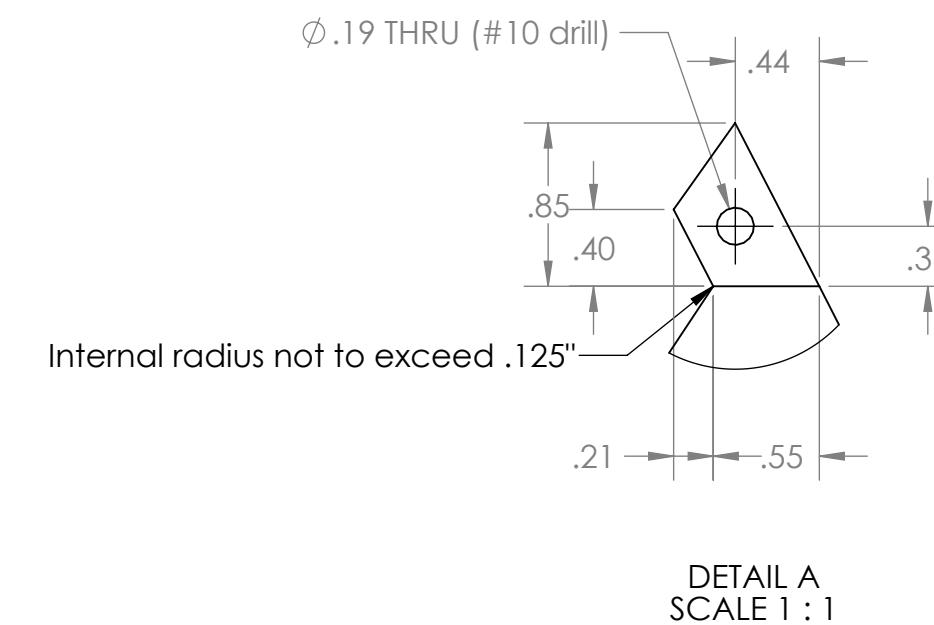
B

B

**Notes:**

1. Material: 1/16" thick polycarbonate, clear.
2. Remove all burrs and sharp edges.
3. Vinyl to be applied to face.
4. Tag or label with part number.

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DETAIL A  
SCALE 1 : 1

		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES			DRAWN	
TOLERANCES:			CHECKED	
FRACTIONAL ±1/16			ENG APPR.	
ANGULAR: MACH ±1° BEND ±1°			MFG APPR.	
TWO PLACE DECIMAL ±.01			Q.A.	
THREE PLACE DECIMAL ±.001			COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
		NEXT ASSY	USED ON	FINISH
		APPLICATION		DO NOT SCALE DRAWING

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** Nose Cone Right Face

**SIZE** DWG. NO. REV  
**B** GE-19209

SCALE: 1:6 WEIGHT: SHEET 1 OF 1

4

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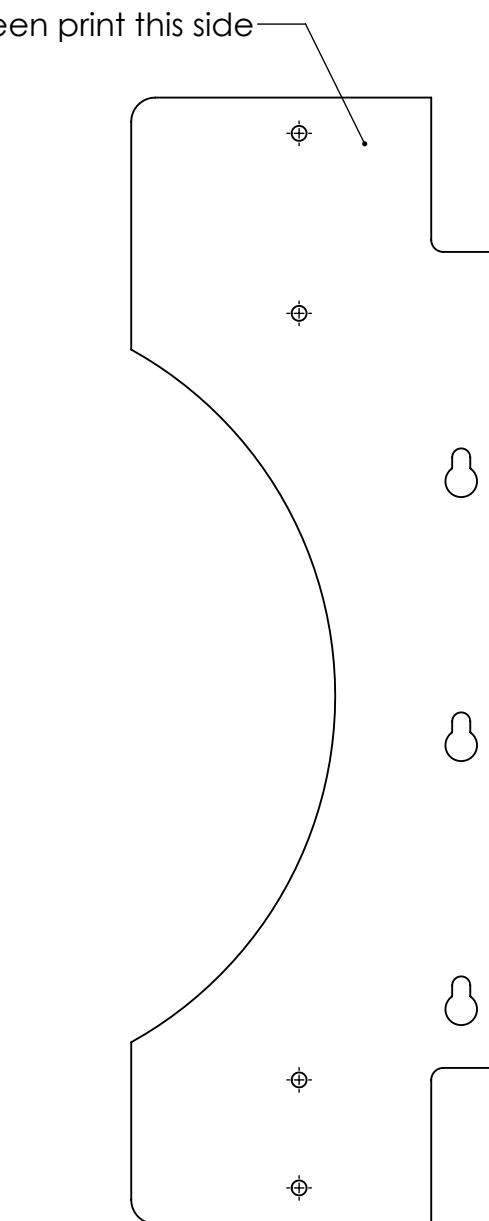
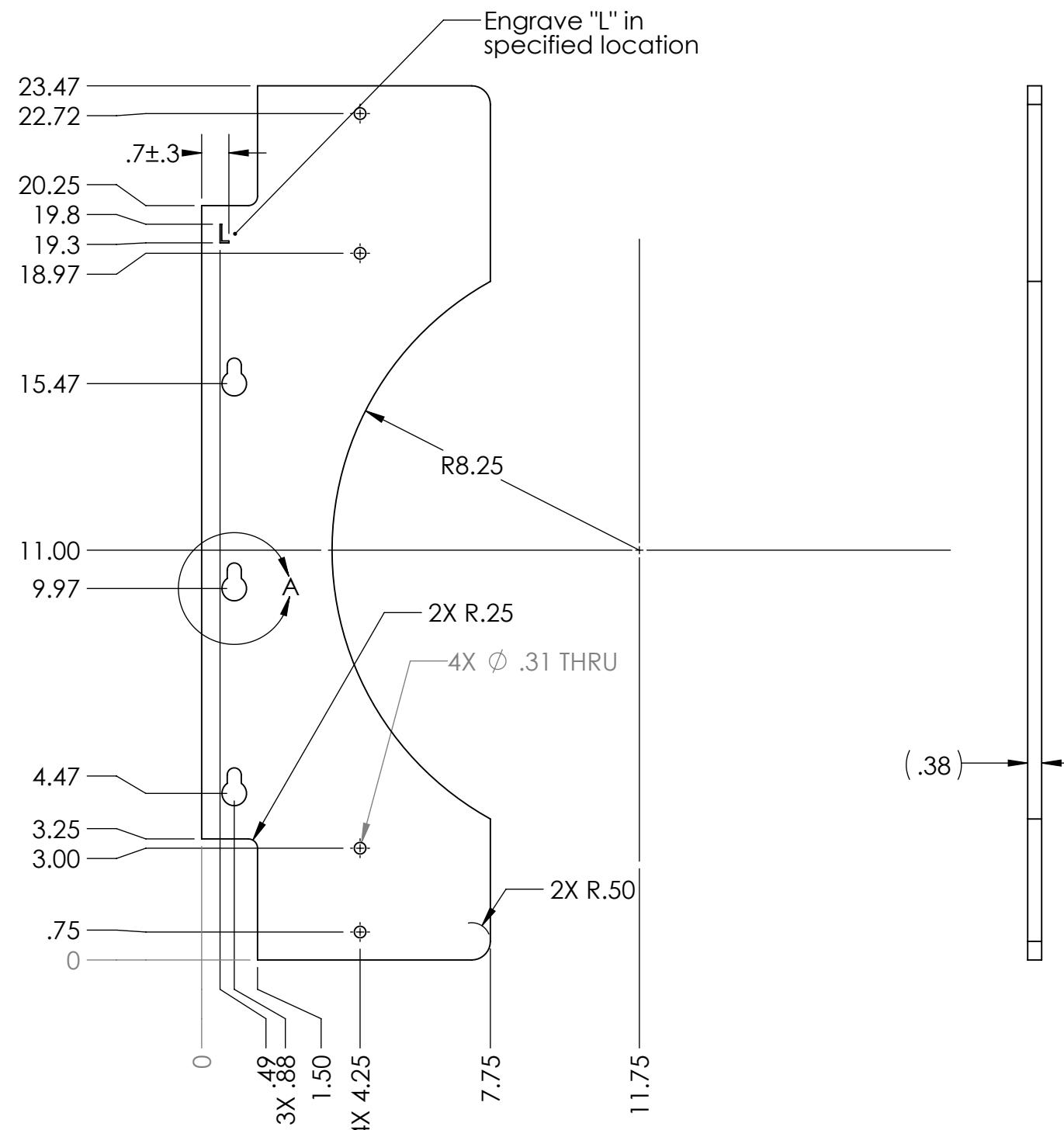
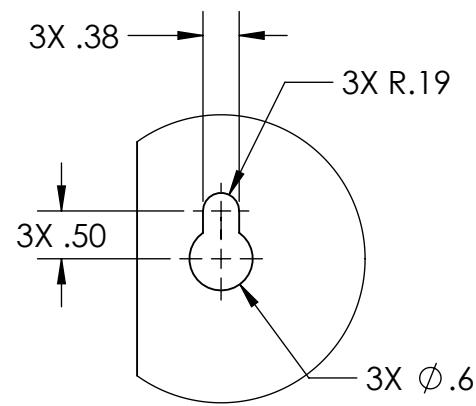
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B

B



Part Number	Color
GE-19210-BLU	BLUE
GE-19210-RED	RED

Note:  
Dimensions are identical to GE-19077  
Material: 3/8" Thick Polycarbonate Sheet Clear  
Finish: Apply red or blue screen print to indicated side  
Tag or Label With Part Number  
Remove sharp edges and burrs

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES:	CHECKED	
		FRACTIONAL ±1/16	ENG APPR.	
		ANGULAR: MACH ±1° BEND ±1°	MFG APPR.	
		TWO PLACE DECIMAL ±.01		
		THREE PLACE DECIMAL ±.001		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.	
		MATERIAL	COMMENTS:	
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE DWG. NO.		REV		
<b>B GE-19210</b>				
SCALE: 1:4		WEIGHT:	SHEET 1 OF 1	

FIRST ROBOTICS COMPETITION  
SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Cargo Ship Panel Plastic Left**

4

3

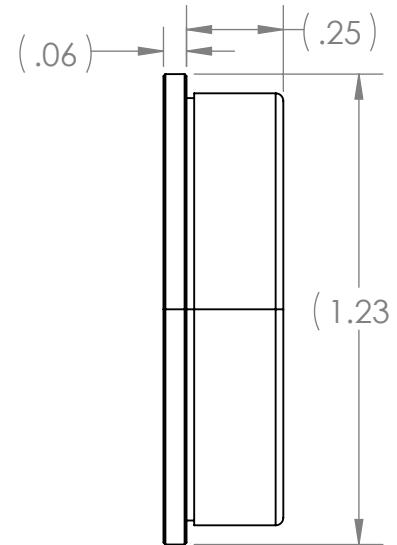
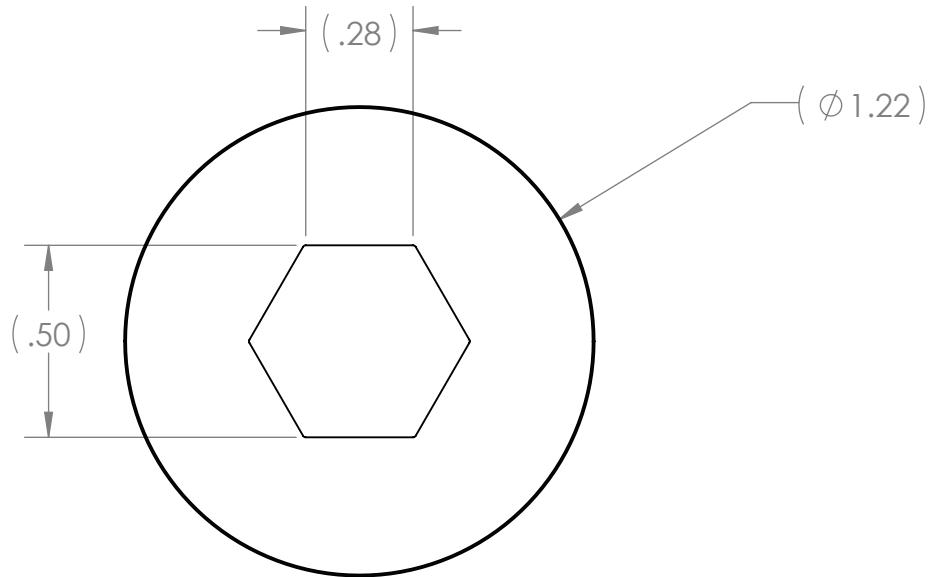
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B



B

**Note:****Part Number:**

1/2 in. Bore Hex Bearing, Flanged, Heavy Duty Inner Race (FR8ZZ-HexHD)

A

A

		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE	TITLE: <b>1/2" Hex Bearing</b>	
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		CHECKED				
		INTERPRET GEOMETRIC TOLERANCING PER:		ENG APPR.				
		MATERIAL		MFG APPR.				
NEXT ASSY		FINISH		Q.A.				
APPLICATION		DO NOT SCALE DRAWING		COMMENTS:				
SIZE	DWG. NO.			REV				
A	GE-19215							
SCALE: 2:1		WEIGHT:		SHEET 1 OF 1				

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2

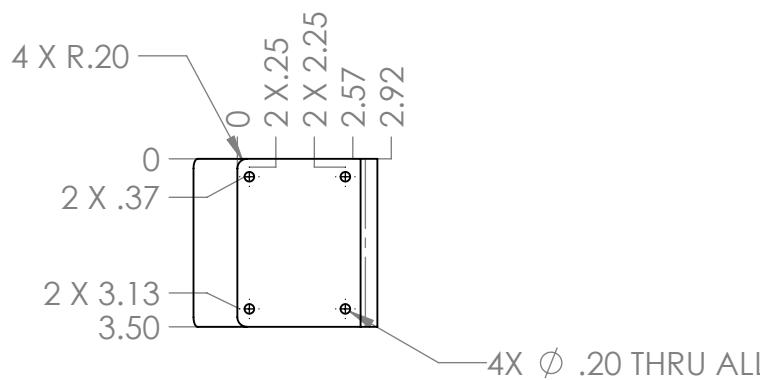
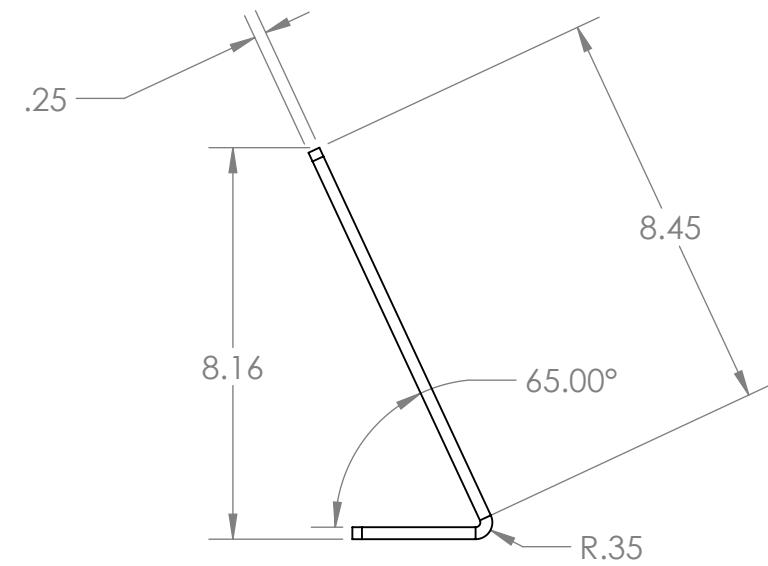
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Notes:  
 1: Material: .25" Clear Polycarbonate  
 2: Remove all burrs and sharp edges  
 3: Label Part with Part Number

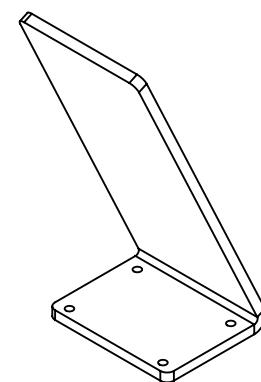
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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES			
		TOLERANCES:			
		FRACTIONAL $\pm 1/16$			
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$			
		TWO PLACE DECIMAL $\pm .01$			
		THREE PLACE DECIMAL $\pm .001$			
		INTERPRET GEOMETRIC			
		TOLERANCING PER:			
		MATERIAL			
	NEXT ASSY	USED ON	FINISH		
	APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
 Modeling Solutions Partner

**Title:** Light Mounting Bracket

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19216</b>	
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1



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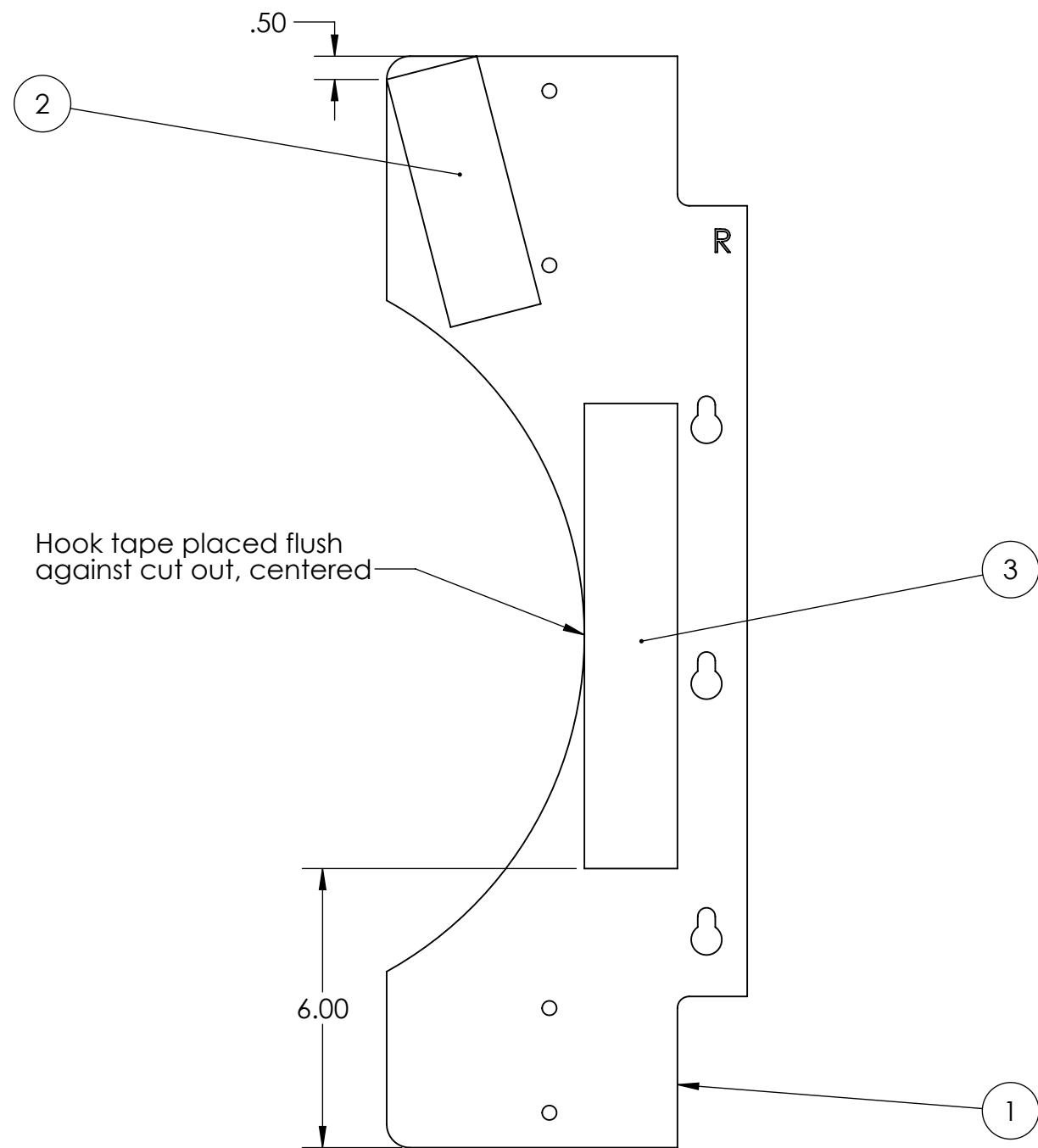
3

2

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B

B



Notes:  
1. Assembly exists in red and blue configurations.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	GE-19077	Cargo Ship Panel Plastic Right	1
2	VisionTape	2" x 5.5" Retroreflective tape	1
3	Hook_2_10	2" x 10" Hook, Adhesive Backed	1

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
		DIMENSIONS ARE IN INCHES		DRAWN	
		TOLERANCES:		CHECKED	
		FRACTIONAL $\pm 1/16$		ENG APPR.	
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$		MFG APPR.	
		TWO PLACE DECIMAL $\pm .01$		Q.A.	
		THREE PLACE DECIMAL $\pm .001$		COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:			
		MATERIAL			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Panel Plastic Half Assembly, Right**

**B** **GE-19217**

SIZE DWG. NO. REV  
SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

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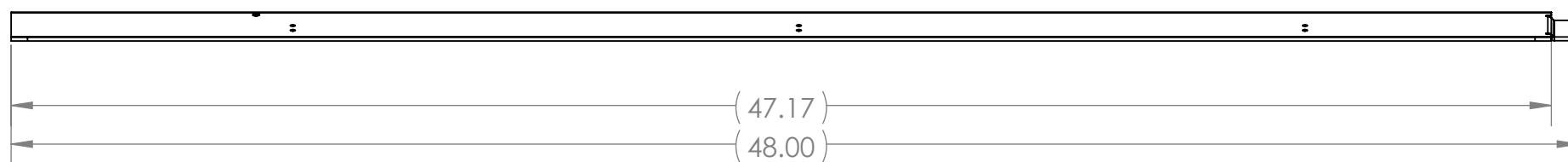
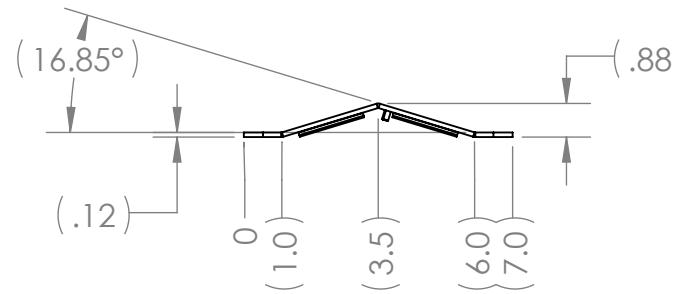
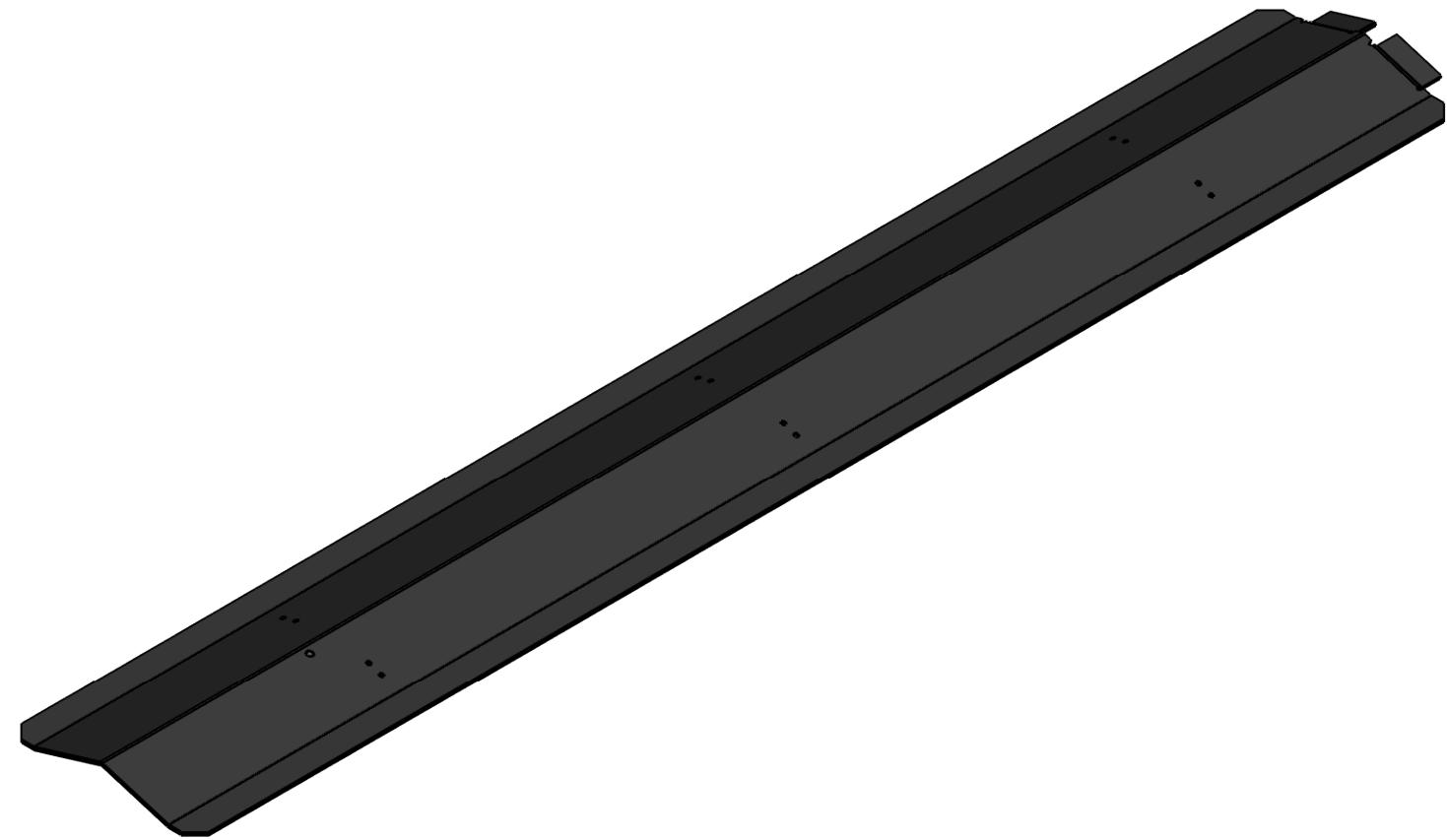
1

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1



Notes:

1. Description: Cable Protector Long Segment
2. Source: VEXpro
3. Item #: 217-6294-001

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE	 <b>FIRST ROBOTICS COMPETITION</b>	<b>TITLE:</b>  <h1>Cable Protector Long Segment</h1>
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	DRAWN				
			CHECKED				
			ENG APPR.				
			MFG APPR.				
			Q.A.				
		INTERPRET GEOMETRIC TOLERANCING PER:	COMMENTS:				
		MATERIAL				<b>SIZE</b> <b>DWG. NO.</b> <b>B</b> <b>GE-19223</b>	<b>REV</b>
NEXT ASSY	USED ON	FINISH					
APPLICATION		DO NOT SCALE DRAWING					
			SCALE: 1:5	WEIGHT:	SHEET 1 OF 1		

4

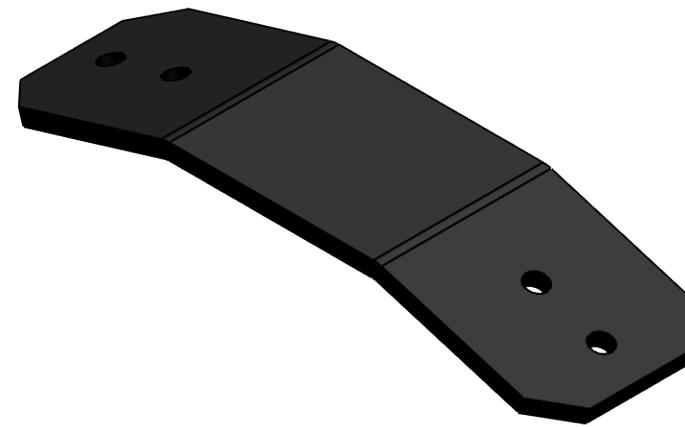
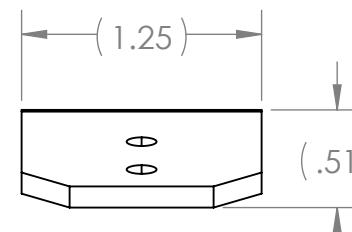
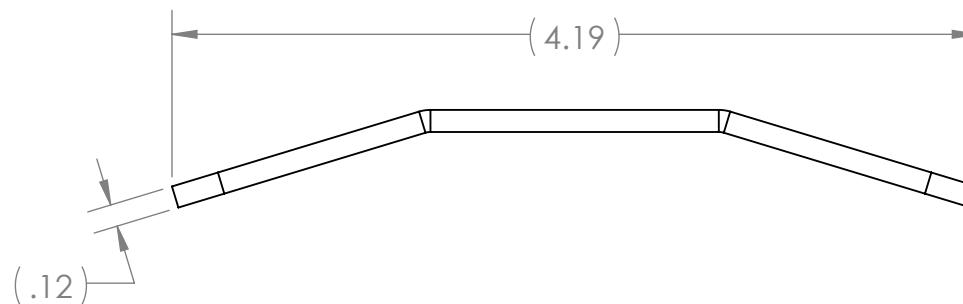
3

2

1

B

B



Notes:

1. Description: Cable Protector Strap
2. Source: VEXpro
3. Item #: 217-6294-003

4

3

2

1

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES				
TOLERANCES:				
FRACTIONAL: ±1/16				
ANGULAR: MACH ±1° BEND ±1°				
TWO PLACE DECIMAL ±.01				
THREE PLACE DECIMAL ±.001				
INTERPRET GEOMETRIC TOLERANCING PER:		Q.A.	COMMENTS:	
MATERIAL				
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST**  
**ROBOTICS**  
**COMPETITION**
  
**Cable Protector**  
**Strap**
  
**B GE-19224**
  
 SIZE DWG. NO. REV  
 SCALE: 1:1 WEIGHT: SHEET 1 OF 1

4

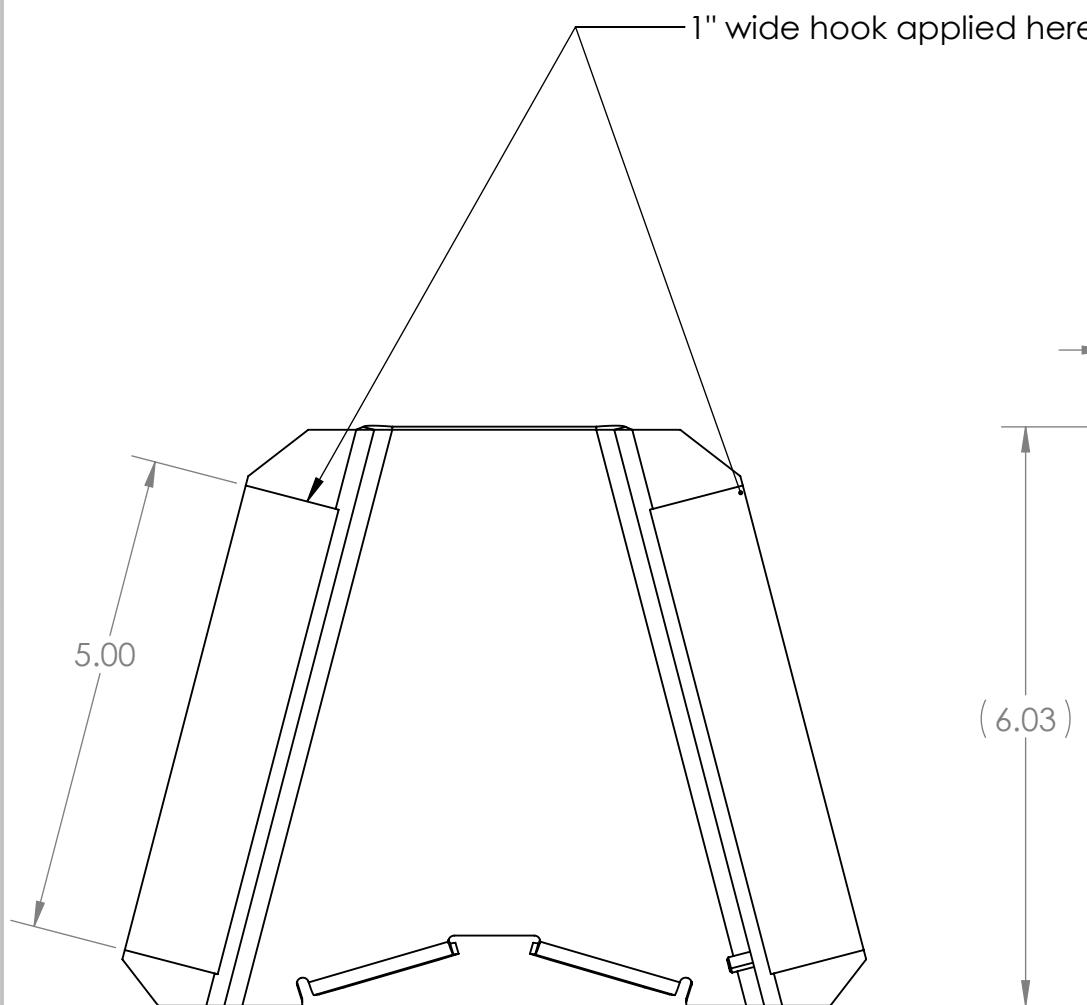
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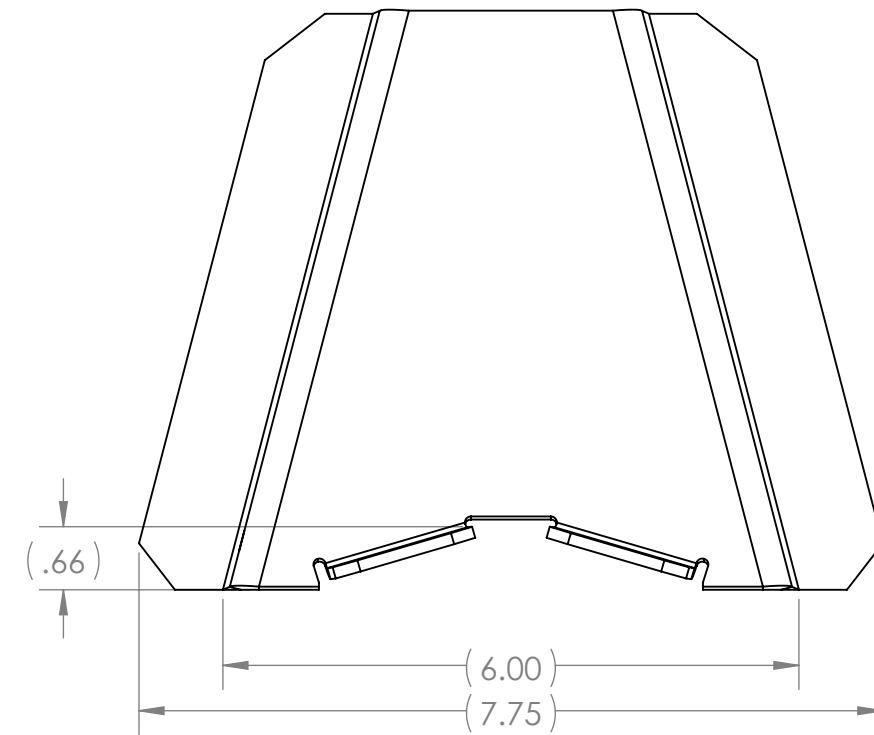
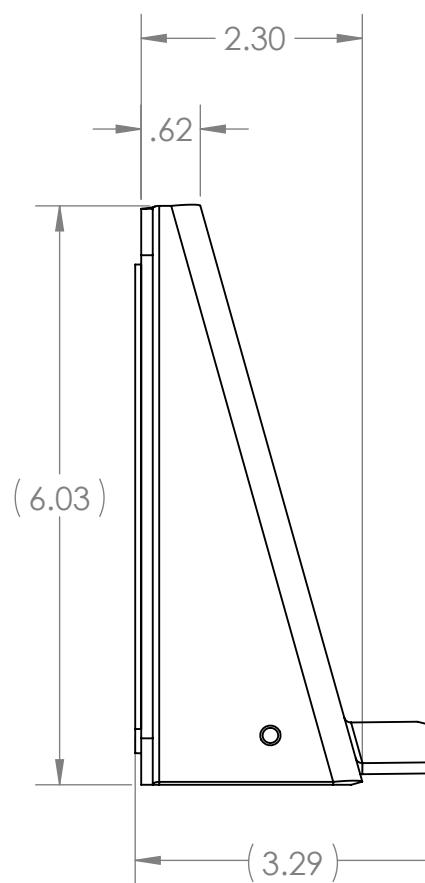
1

B

B



5.00



## Notes:

1. Description: Cable Protector Exit Segment
2. Source: VEXpro
3. Item #: 217-6294-002

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	DRAWN			
	CHECKED			
	ENG APPR.			
	MFG APPR.			
	Q.A.			
	COMMENTS:			
NEXT ASSY	USED ON	FINISH		
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cable Protector  
Exit Segment**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19225</b>	
SCALE: 1:2	WEIGHT:	SHEET 1 OF 1

4

3

2

1

4

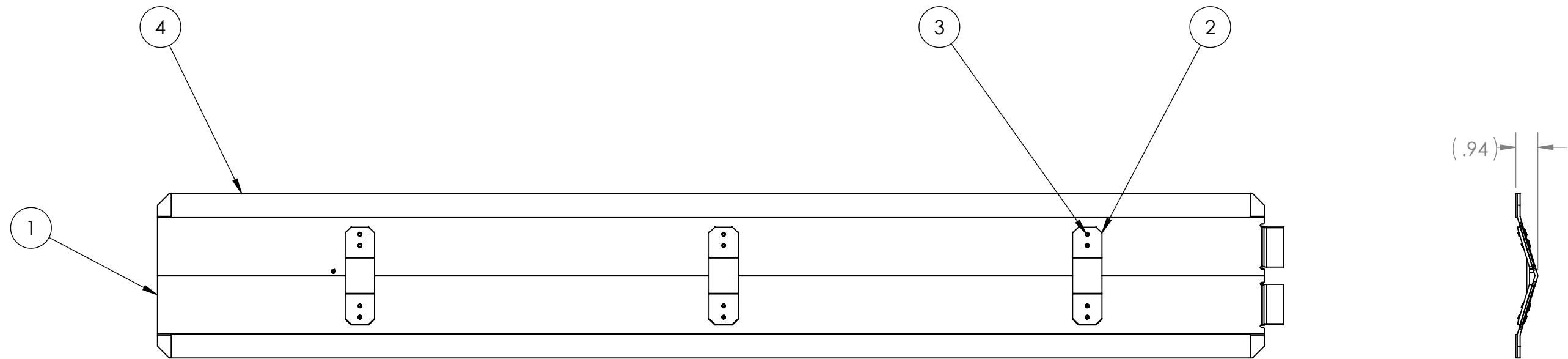
3

2

1

B

B



## Notes:

1. Item 2 (qty. 3) attached to item 1 using Item 3 (qty. 12).
2. Attach item 4 (qty. 2) as shown.

A

A

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19223	Cable Protector Long Segment	1
2	GE-19224	Cable Protector Strap	3
3	rivet_.1563_.1875-.25	5/32" Aluminum Rivet, .1875-.25 Grip Range	12
4	Hook_1_46	1" X 46" Hook Fastener, Adhesive Backed	2

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		FINISH			
	NEXT ASSY	USED ON	APPLICATION	DO NOT SCALE DRAWING	

FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE: **Cable Protector Long Assembly**

SIZE **B** DWG. NO. **GE-19226** REV

SCALE: 1:5 WEIGHT:  SHEET 1 OF 1

4

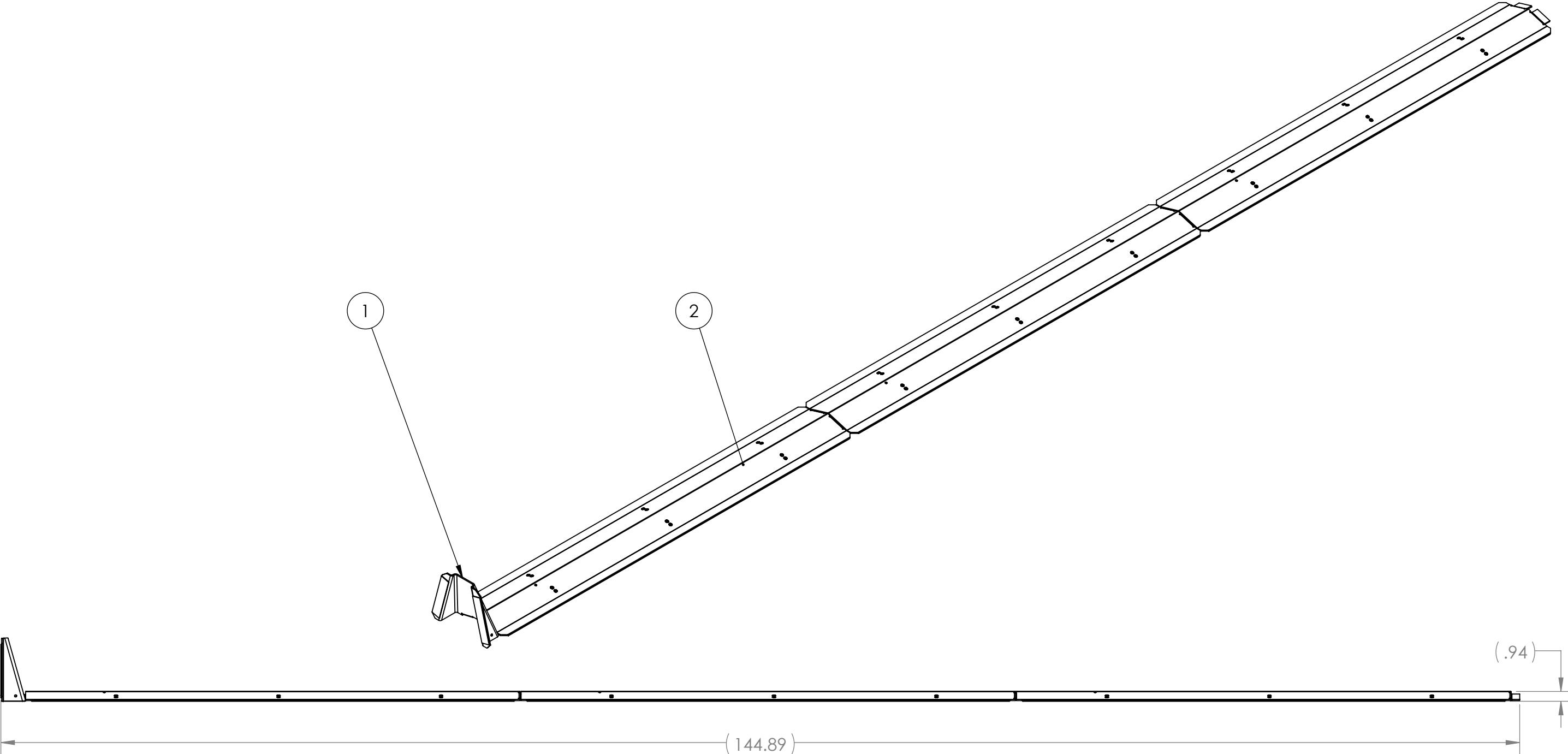
3

2

1

B

B



## Notes:

1. Place item 1 onto the side border of the field, centered, scoring table side.
2. Place item 2 on top of the tabs of item 1.
3. Place each of the remaining item 2 pieces on top of the tabs of the previous part as shown.

ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19225	Cable Protector Exit Segment	1
2	GE-19226	Cable Protector Long Assembly	3

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		DRAWN			
		CHECKED			
		ENG APPR.			
		MFG APPR.			
		Q.A.			
		COMMENTS:			
		MATERIAL			
		INTERPRET GEOMETRIC TOLERANCING PER:			
		NEXT ASSY	USED ON	FINISH	
		APPLICATION		DO NOT SCALE DRAWING	

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Cable Protector Assembly**

SIZE DWG. NO. REV  
**B** **GE-19227**

SCALE: 1:10 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

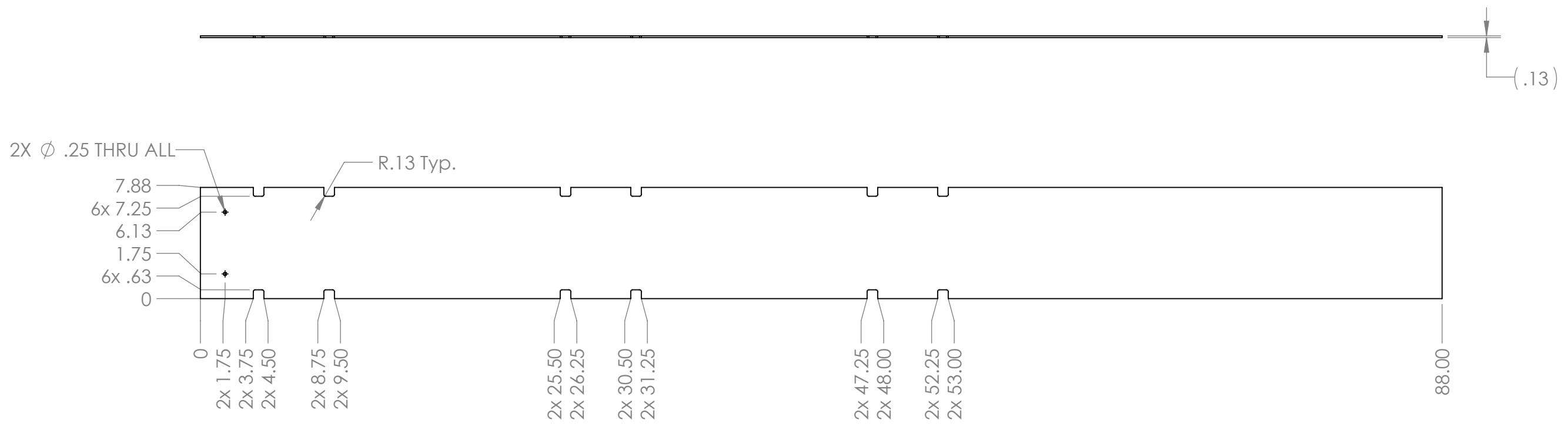
3

2

1

B

B



A

A

## Notes:

1. Remove burrs and sharp edges.
2. Material: 1/8" thk., clear polycarbonate
3. Tag or label with part number.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV		
<b>B</b>	<b>GE-19228</b>	<b>A</b>		
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1		

4

3

2

1

4

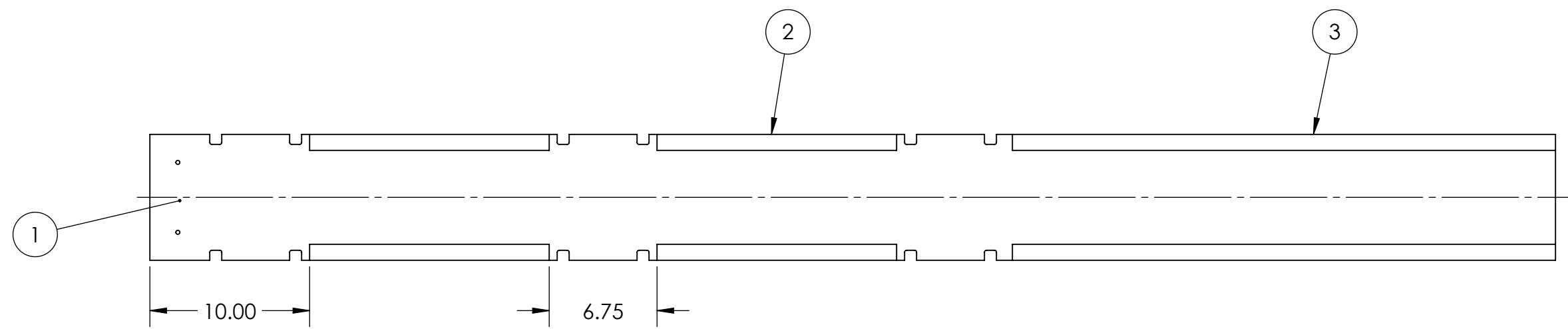
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY
1	GE-19228	Cargo Ship Bumper Plastic Side	1
2	Loop_1_15	1" Adhesive-Backed Loop, 15" Long	4
3	Loop_1_34	1" x 34" Loop, Adhesive Backed	2

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
	APPLICATION	DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**TITLE:** GE-19228, with Loop

**SIZE** DWG. NO. **REV**  
**B** GE-19228-Assembly

SCALE: 1:12 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

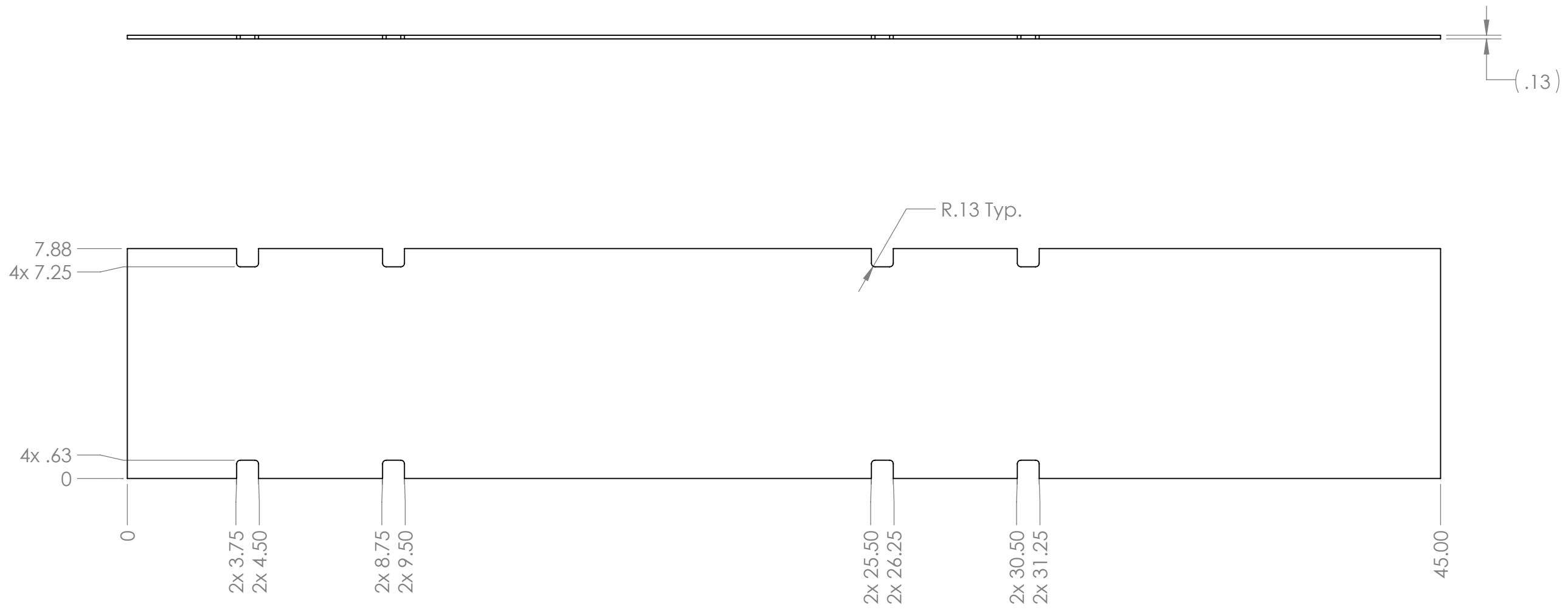
3

2

1

B

B



A

A

## Notes:

1. Remove all burrs and sharp edges.
2. Material: 1/8" thk., clear polycarbonate
3. Tag or label with part number.

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.			REV
<b>B</b>	<b>GE-19229</b>			<b>A</b>
SCALE: 1:4	WEIGHT:			SHEET 1 OF 1

4

3

2

1

4

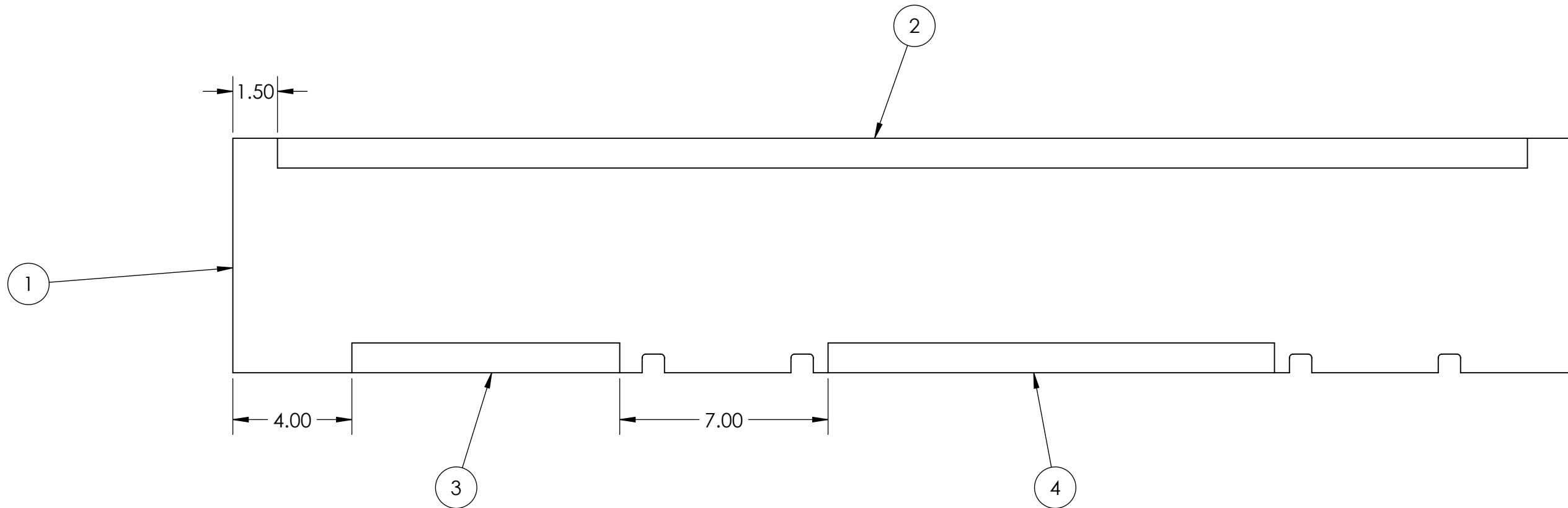
3

2

1

B

B



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19229	Cargo Ship Bumper Plastic Front	1
2	Loop_1_42	1" x 42" Loop, Adhesive Backed	1
3	Loop_1_9	1" x 9" Loop, Adhesive Backed	1
4	Loop_1_15	1" Adhesive-Backed Loop, 15" Long	1

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		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			
SIZE	DWG. NO.	REV		
<b>B</b>	GE-19229-Assembly			
SCALE: 1:8	WEIGHT:	SHEET 1 OF 1		

**FIRST**  
**ROBOTICS**  
**COMPETITION**

**SOLIDWORKS**  
Modeling Solutions Partner

TITLE:  
**GE-19229, with  
loop**

SIZE DWG. NO. REV  
**B** GE-19229-Assembly

SCALE: 1:8 WEIGHT: SHEET 1 OF 1

4

3

2

1

4

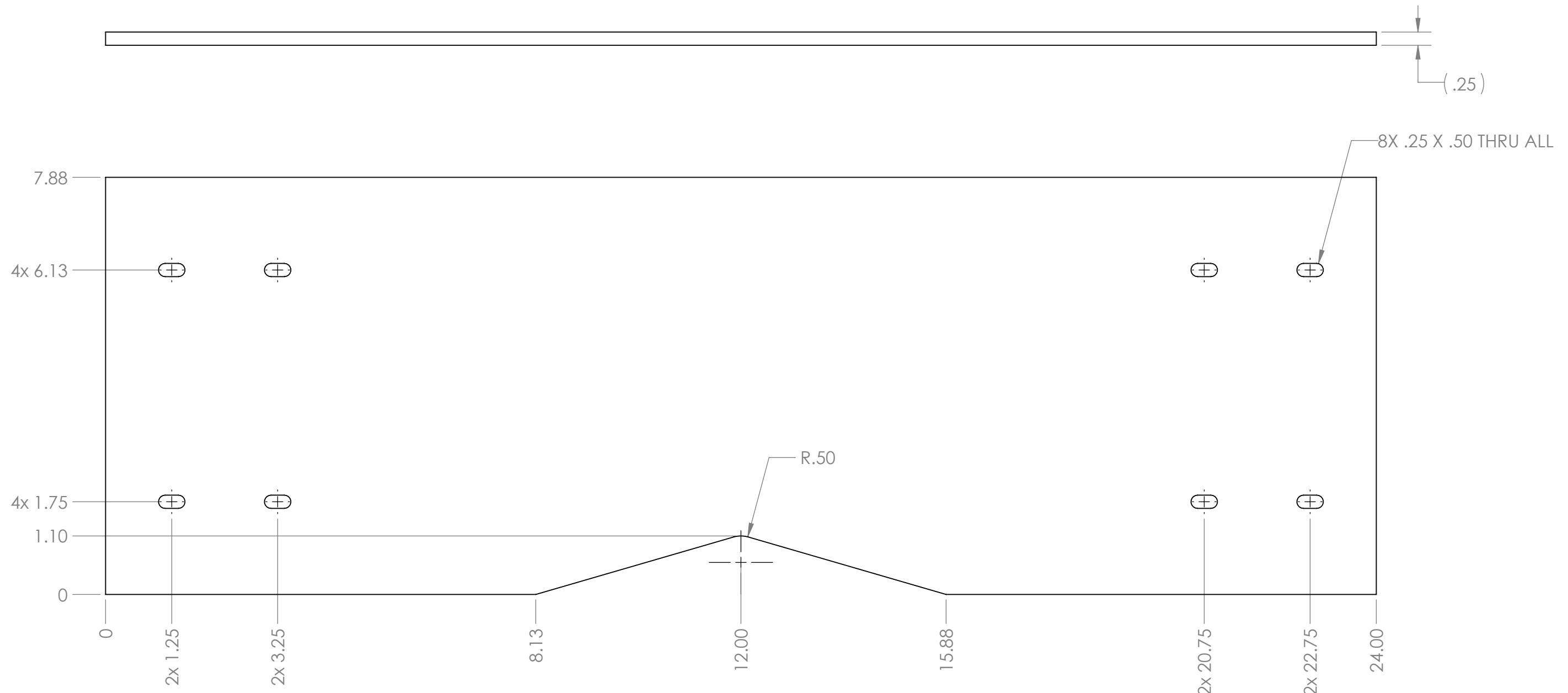
3

2

1

B

B



## Notes:

1. Remove all burrs and sharp edges.
2. Material: 1/4" thk., clear polycarbonate
3. Tag or label with part number

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		UNLESS OTHERWISE SPECIFIED:		NAME	DATE
DIMENSIONS ARE IN INCHES				DRAWN	
TOLERANCES:				CHECKED	
FRACTIONAL: ±1/16				ENG APPR.	
ANGULAR: MACH ±1° BEND ±1°				MFG APPR.	
TWO PLACE DECIMAL: ±.01				Q.A.	
THREE PLACE DECIMAL: ±.001				COMMENTS:	
		INTERPRET GEOMETRIC TOLERANCING PER:		MATERIAL	
				FINISH	
NEXT ASSY	USED ON	APPLICATION		DO NOT SCALE DRAWING	
					REV
<b>B</b>		<b>GE-19230</b>		SCALE: 1:2	WEIGHT:
					SHEET 1 OF 1



TITLE: Cargo Ship Bumper Bridge

SIZE DWG. NO. **B** GE-19230 REV

SCALE: 1:2 WEIGHT: SHEET 1 OF 1

4

3

2

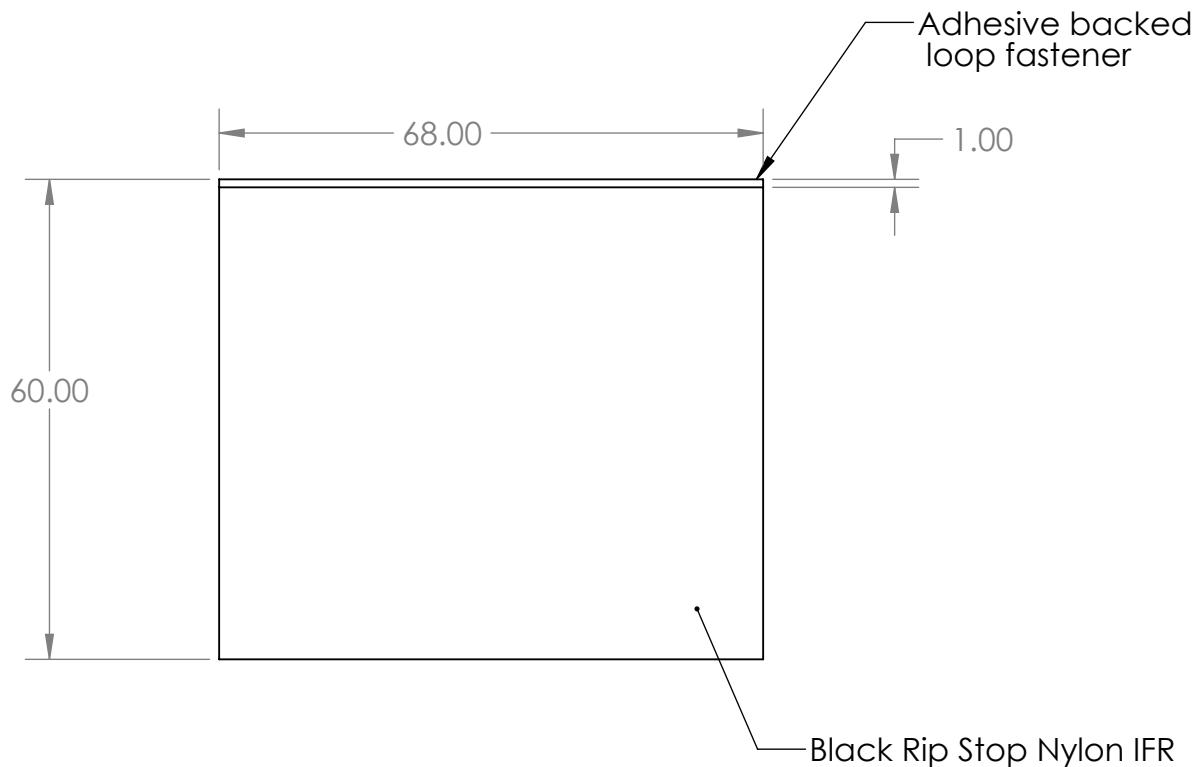
1

2

1

B

B



Note: Cut Edges need to be hemmed

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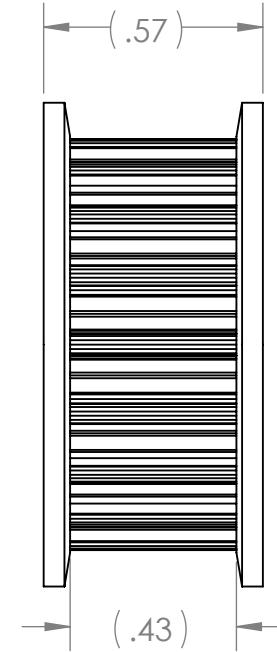
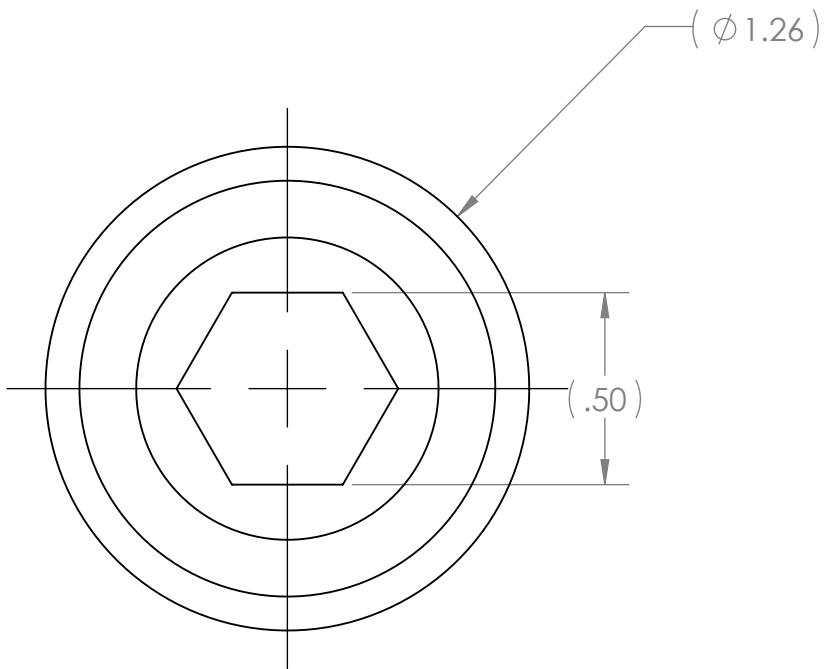
		UNLESS OTHERWISE SPECIFIED:			NAME	DATE	 <b>FIRST</b> <b>ROBOTICS</b> <b>COMPETITION</b>	<b>SOLIDWORKS</b> <small>Modeling Solutions Partner</small>	
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$		DRAWN					
		INTERPRET GEOMETRIC TOLERANCING PER:		CHECKED					
		MATERIAL		ENG APPR.					
		NEXT ASSY		MFG APPR.					
		USED ON		Q.A.					
		FINISH		COMMENTS:					
		APPLICATION		DO NOT SCALE DRAWING			SIZE		
							DWG. NO.		
							<b>A</b> GE-19231		
							REV		
							SCALE: 1:24		
							WEIGHT:		
							SHEET 1 OF 1		

2

1

2

1



## Note:

1. Description: HD Timing Pulley 18 Tooth
2. Source: VEXpro
3. Item# 217-3225
4. Equivalent Substitutions allowed

		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$				
		INTERPRET GEOMETRIC TOLERANCING PER:		CHECKED		
		MATERIAL		ENG APPR.		
		NEXT ASSY		MFG APPR.		
		USED ON		Q.A.		
		FINISH		COMMENTS:		
		APPLICATION		DO NOT SCALE DRAWING		

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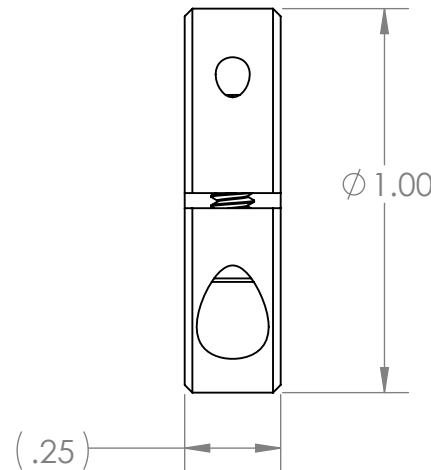
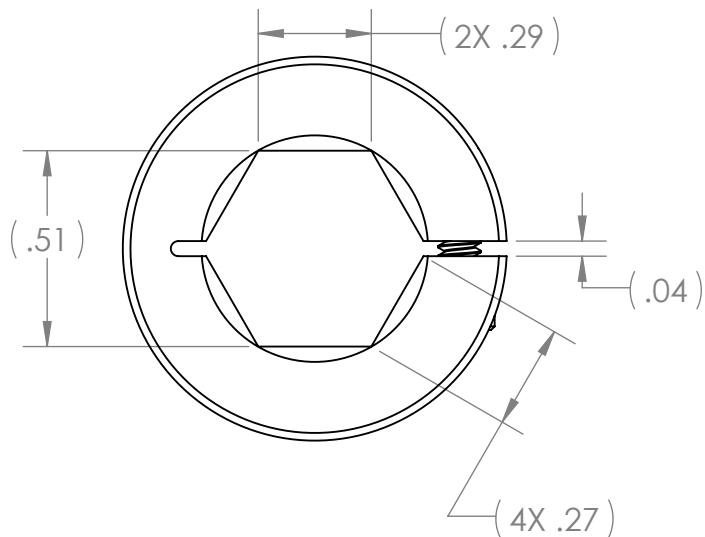
TITLE:

# HTD Timing Pulley, 18 Tooth

SIZE	DWG. NO.	REV
A	GE-19235	
SCALE: 2:1	WEIGHT:	SHEET 1 OF 1

2

1



#### Notes:

1. Description: Clamping Shaft Collar - 1/2" Hex ID
2. Source: Vex Pro
3. Item# 217-2737
4. Equivalent Substitutions allowed

		UNLESS OTHERWISE SPECIFIED:		DRAWN	NAME	DATE
		DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	CHECKED			
		INTERPRET GEOMETRIC TOLERANCING PER:	MATERIAL	ENG APPR.		
				MFG APPR.		
				Q.A.		
		COMMENTS:				
NEXT ASSY	USED ON	FINISH				
APPLICATION		DO NOT SCALE DRAWING				


FIRST  
ROBOTICS  
COMPETITION

SOLIDWORKS  
Modeling Solutions Partner

TITLE: **Hex Shaft Collar**

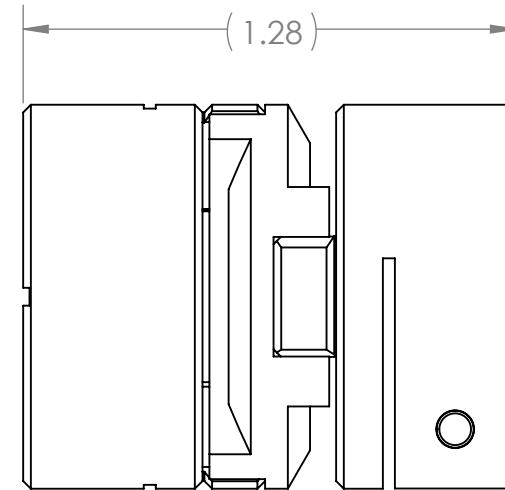
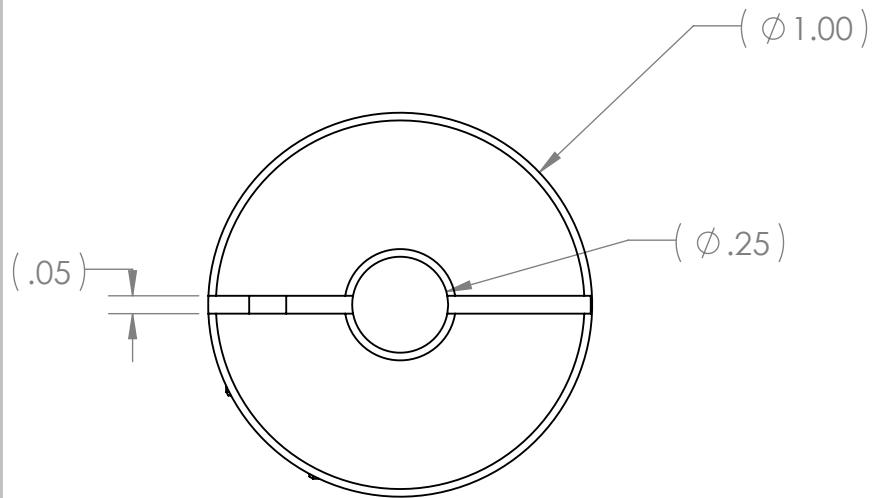
SIZE	DWG. NO.	REV
<b>A</b>	<b>GE-19237</b>	
SCALE: 2:1		WEIGHT:
SHEET 1 OF 1		

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2

1

B



B

**Notes:**

1. Description: Oldham Coupler Assembly
2. Source: Ruland
3. Item: Ruland OCT16-4-A and OD16/25-AT
4. Equivalent Substitutions allowed

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		DIMENSIONS ARE IN INCHES	TOLERANCES:				
		FRACTIONAL $\pm 1/16$	ANGULAR: MACH $\pm 1^\circ$	BEND $\pm 1^\circ$	CHECKED		
		THREE PLACE DECIMAL $\pm .01$	TWO PLACE DECIMAL $\pm .01$	INTERPRET GEOMETRIC TOLERANCING PER:	ENG APPR.		
		THREE PLACE DECIMAL $\pm .001$	MATERIAL		MFG APPR.		
					Q.A.		
				COMMENTS:			
NEXT ASSY	USED ON						
		FINISH					
		APPLICATION		DO NOT SCALE DRAWING			

2

1



TITLE:

# Coupler Assembly

SIZE	DWG. NO.	REV
A	GE-19243	
SCALE: 2:1	WEIGHT:	SHEET 1 OF 1

A

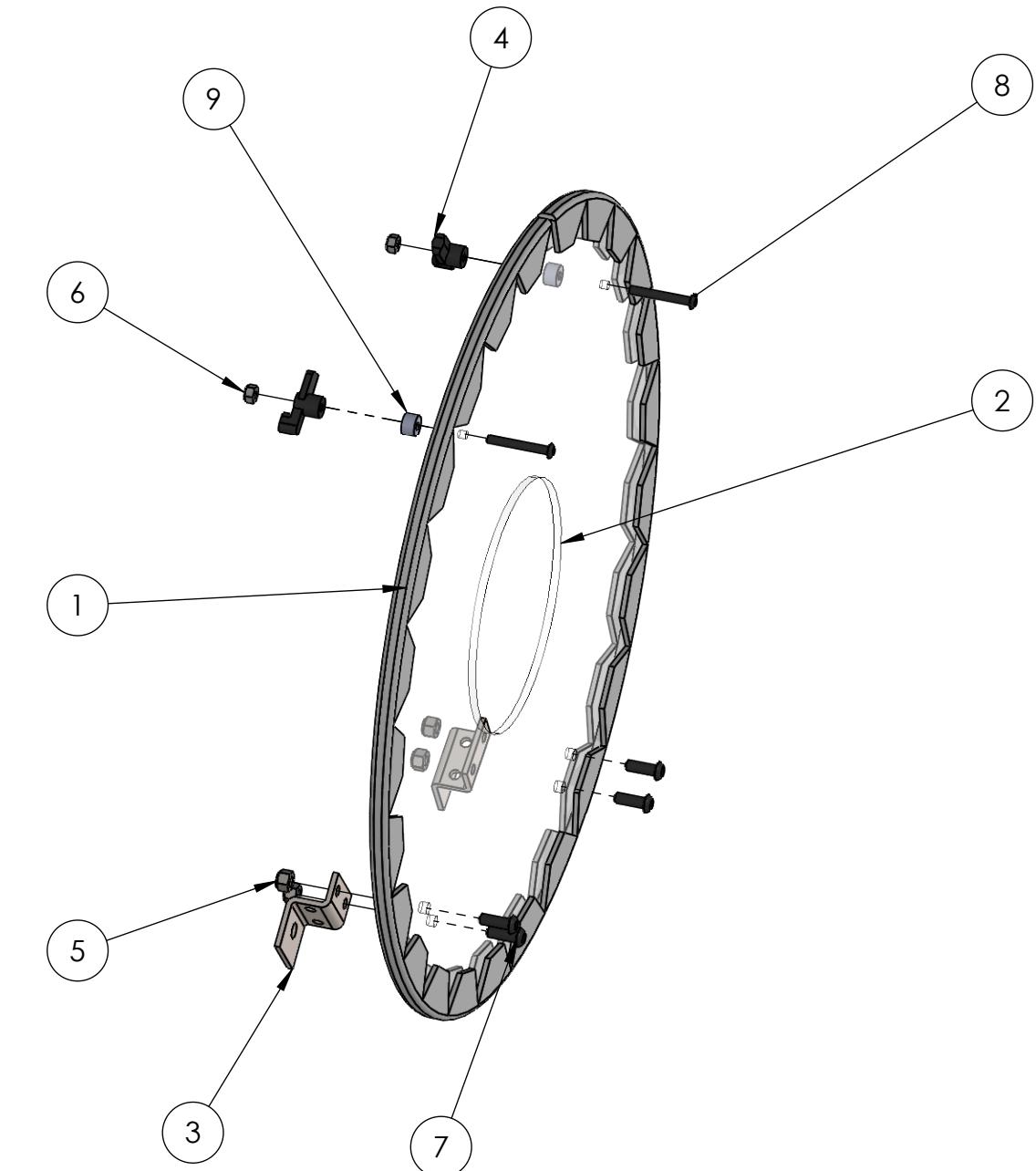
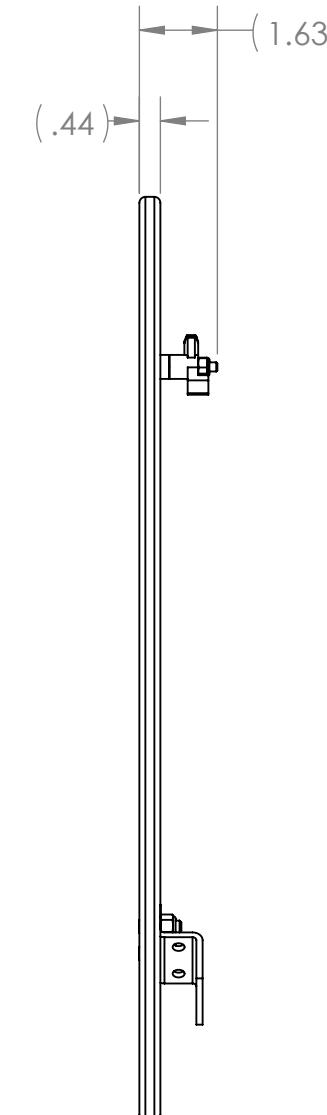
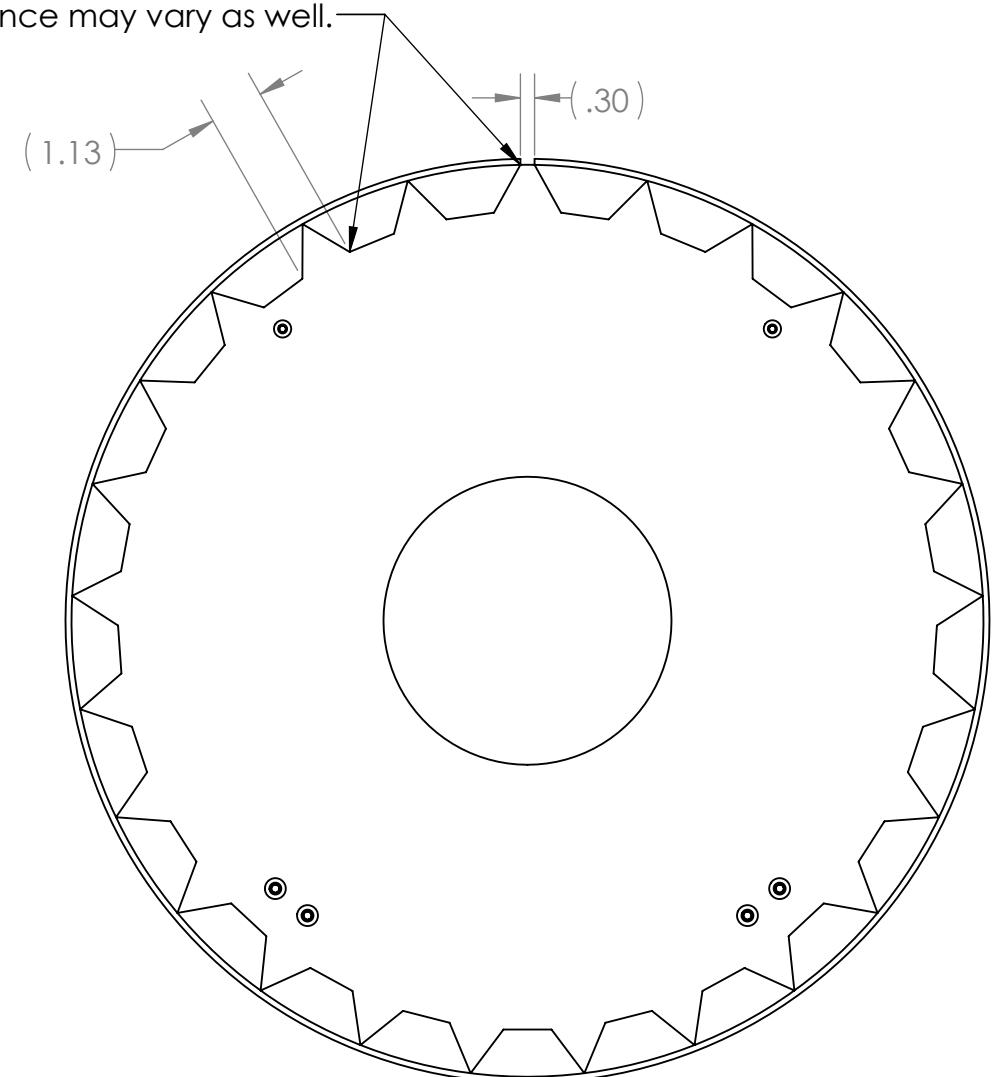
4

3

2

1

Gap sizes are approximate and may vary. Location on the circumference may vary as well.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	GE-19153	Loop, Panel	1
2	GE-19245	Null Panel, Polycarbonate	1
3	GE-19246	Null Offset Bracket	2
4	GE-19247	Null Knob	2
5	nylock_.25_20	Steel Nylon-Insert Locknut, 1/4"-20	4
6	nylock_10_32	Low-Strength Steel Nylon-Insert Locknut, Zinc-Plated, 10-32 Thread Size	2
7	round_hex_.25_20_.75	Steel Button Head Hex Drive Screw, 1/4"-20 x 3/4" long, fully threaded	4
8	round_hex_10_32_1.5	Steel Button Head Hex Screw, 10-32 x 1.5" long, partially threaded	2
9	spacer_.192_.5_.3125	Spacer, .192" ID, .5" OD, .3125" thk	2

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
		DIMENSIONS ARE IN INCHES	DRAWN	
		TOLERANCES:	CHECKED	
		FRACTIONAL: ±1/16	ENG APPR.	
		ANGULAR: MACH ±1° BEND ±1°	MFG APPR.	
		TWO PLACE DECIMAL: ±.01		
		THREE PLACE DECIMAL: ±.001		
		INTERPRET GEOMETRIC TOLERANCING PER:	Q.A.	
		MATERIAL	COMMENTS:	
		NEXT ASSY	USED ON	FINISH
		APPLICATION	DO NOT SCALE DRAWING	
SIZE	DWG. NO.	REV		
B	GE-19244			
SCALE: 1:4	WEIGHT:	SHEET 1 OF 1		

 FIRST  
ROBOTICS  
COMPETITION  SOLIDWORKS  
Modeling Solutions Partner

## Null Panel Assembly

4

3

2

1

4

3

2

1

B

B

A

A

2X  $\phi$  .20 THRU ALL

2x 5.10

 $\phi$  19.00

(.19)

2x 6.08

 $\phi$  6.00

2x 5.58

2x 6.14

4X  $\phi$  .27 THRU ALL

2x 5.25

2x 4.58

## Note:

1. Material: 3/16 Polycarbonate, Clear
2. Remove all burrs and sharp edges.
3. Screen print applied to both faces.

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		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
APPLICATION	DO NOT SCALE DRAWING			

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Null Panel,  
Polycarbonate**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19245</b>	
SCALE: 1:3	WEIGHT:	SHEET 1 OF 1

4

3

2

1

4

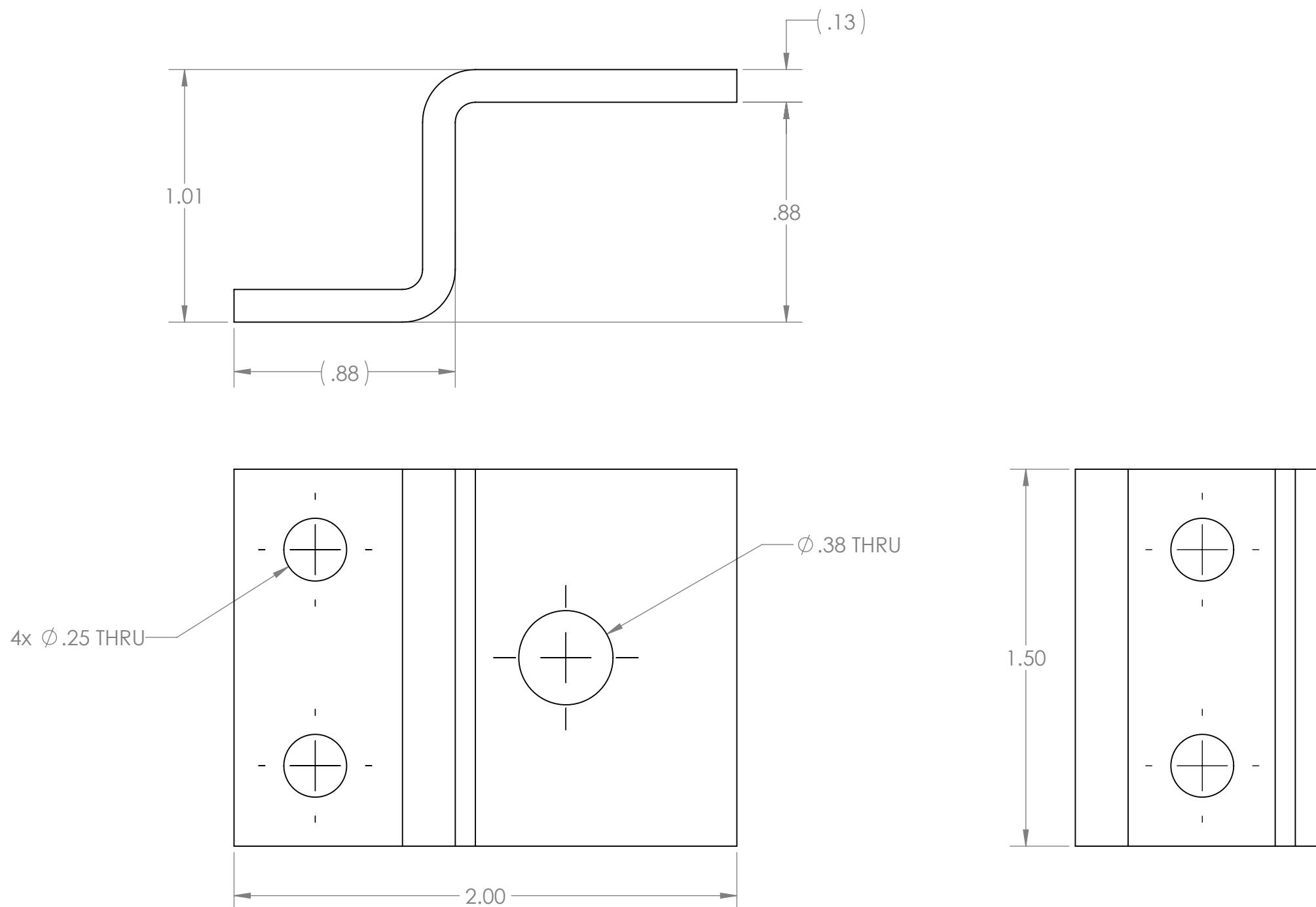
3

2

1

B

B



- Notes:
1. Description: Offset-Surface Bracket, 3/4" x 1-1/4" x 1-1/2"
  2. Source: McMaster-Carr
  3. Item #: 1030A11
  4. Equivalent substitutions allowed

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		UNLESS OTHERWISE SPECIFIED:	NAME	DATE
DIMENSIONS ARE IN INCHES		DRAWN		
TOLERANCES:		CHECKED		
FRACTIONAL: ±1/16		ENG APPR.		
ANGULAR: MACH ±1° BEND ±1°		MFG APPR.		
TWO PLACE DECIMAL: ±.01		Q.A.		
THREE PLACE DECIMAL: ±.001		COMMENTS:		
		INTERPRET GEOMETRIC TOLERANCING PER:		
		MATERIAL		
NEXT ASSY	USED ON	FINISH		
APPLICATION		DO NOT SCALE DRAWING		

**FIRST ROBOTICS COMPETITION** **SOLIDWORKS**  
Modeling Solutions Partner

**Null Offset Bracket**

SIZE	DWG. NO.	REV
<b>B</b>	<b>GE-19246</b>	
SCALE: 2:1	WEIGHT:	SHEET 1 OF 1

4

3

2

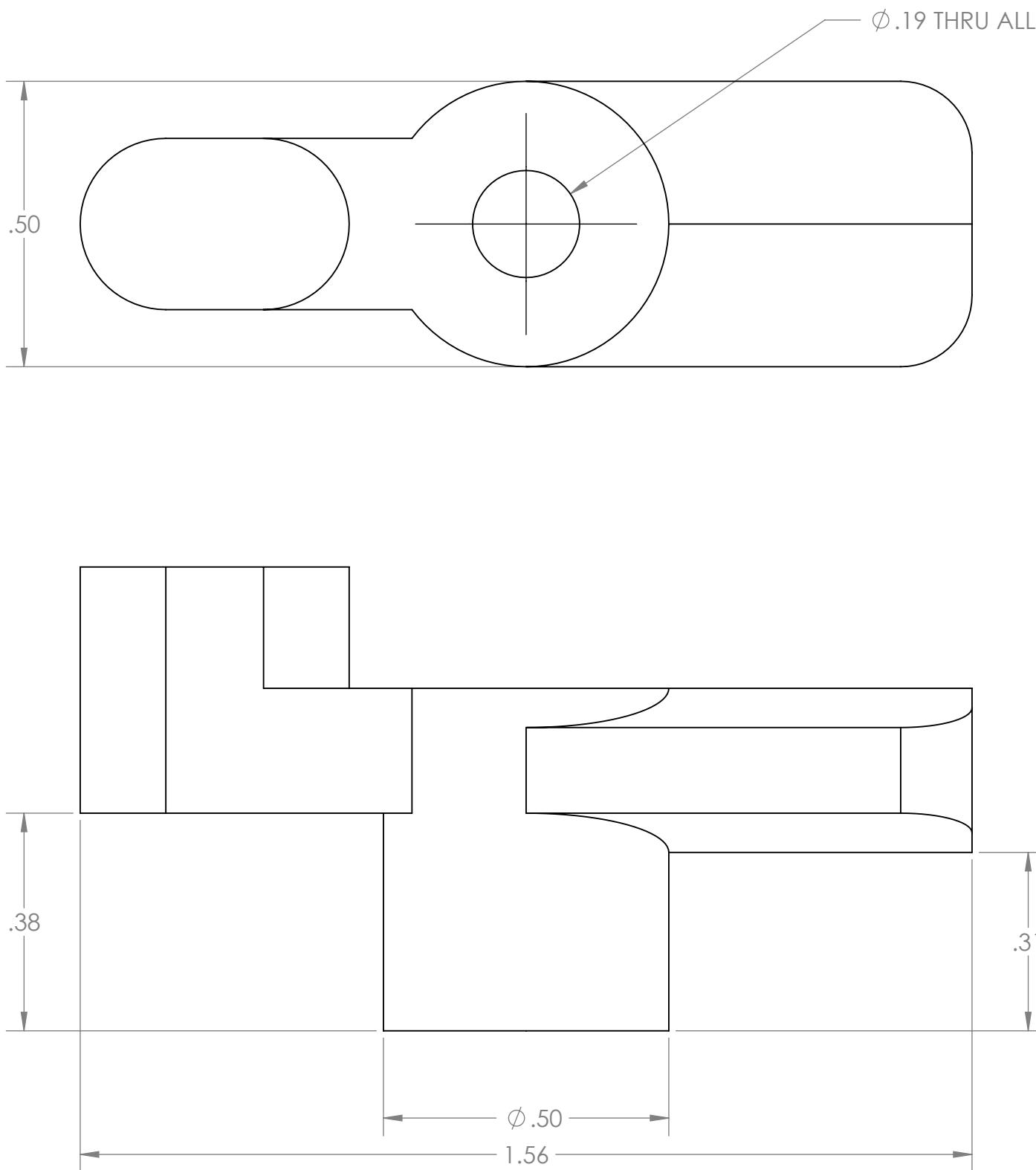
1

4

3

2

1



- Notes:
1. Description: Black Plastic Turn Latch, 1-9/16" Long Arm
  2. Source: McMaster-Carr
  3. Item #: 1579N11
  4. Equivalent substitutions allowed

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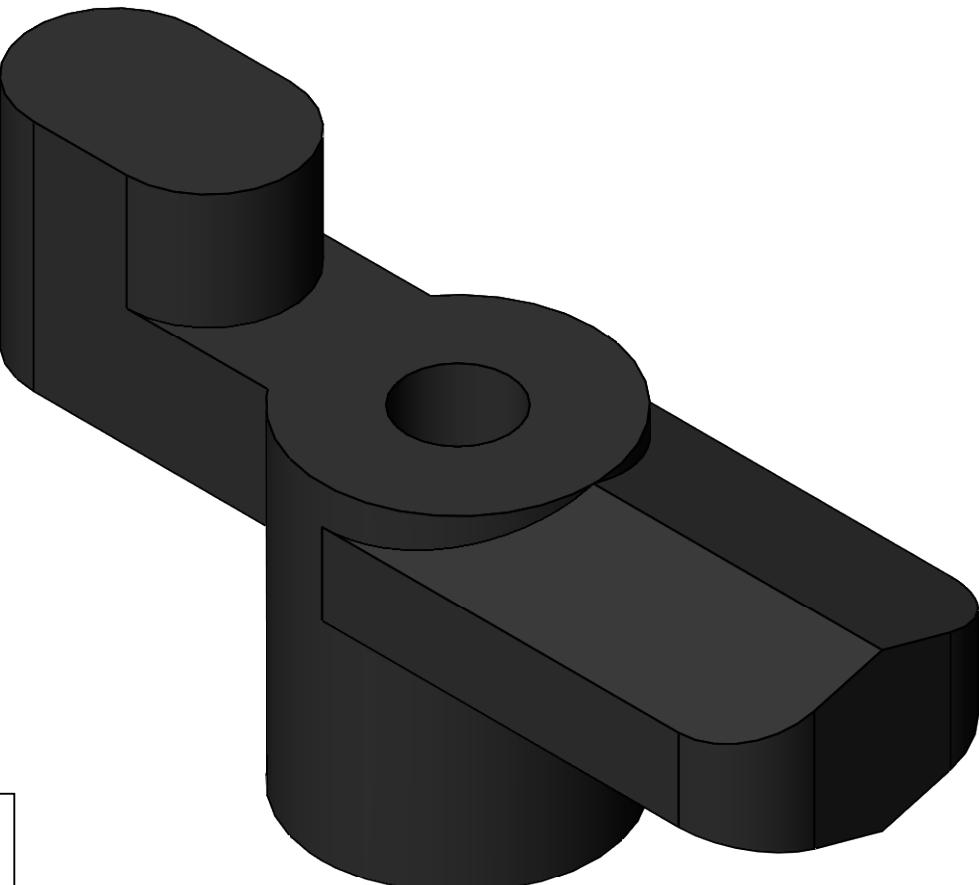
		UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/16$ ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$ TWO PLACE DECIMAL $\pm .01$ THREE PLACE DECIMAL $\pm .001$	NAME	DATE
		DRAWN		
		CHECKED		
		ENG APPR.		
		MFG APPR.		
		Q.A.		
		COMMENTS:		
		MATERIAL		
		FINISH		
NEXT ASSY	USED ON			
		APPLICATION	DO NOT SCALE DRAWING	
		SCALE: 4:1	WEIGHT:	
		SHEET 1 OF 1		

 FIRST  
ROBOTICS  
COMPETITION  SOLIDWORKS  
Modeling Solutions Partner

TITLE:  
**Null Knob**

SIZE DWG. NO. REV  
**B GE-19247**

SCALE: 4:1 WEIGHT: SHEET 1 OF 1



4

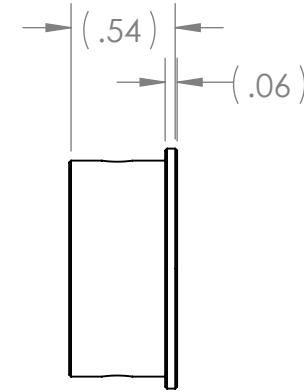
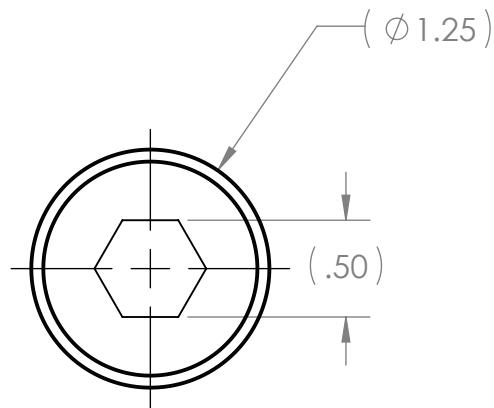
3

2

1

B

B



## Note:

1. Description: Versa Hub
2. Source: VEXpro
3. Item#: 217-5895
4. Equivalent Substitutions Allowed



TITLE:

Versa Hub

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		UNLESS OTHERWISE SPECIFIED:				NAME	DATE
		DIMENSIONS ARE IN INCHES			DRAWN		
		TOLERANCES:			CHECKED		
		FRACTIONAL $\pm 1/16$			ENG APPR.		
		ANGULAR: MACH $\pm 1^\circ$ BEND $\pm 1^\circ$			MFG APPR.		
		TWO PLACE DECIMAL $\pm .01$			Q.A.		
		THREE PLACE DECIMAL $\pm .001$			COMMENTS:		
		INTERPRET GEOMETRIC					
		TOLERANCING PER:					
		MATERIAL					
NEXT ASSY	USED ON	FINISH					
APPLICATION		DO NOT SCALE DRAWING					

SIZE	DWG. NO.	REV
A	GE-19248	
SCALE: 1:1	WEIGHT:	SHEET 1 OF 1