Design Intent - Workbook

by

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3-D Parametric Modeling problems with design intent

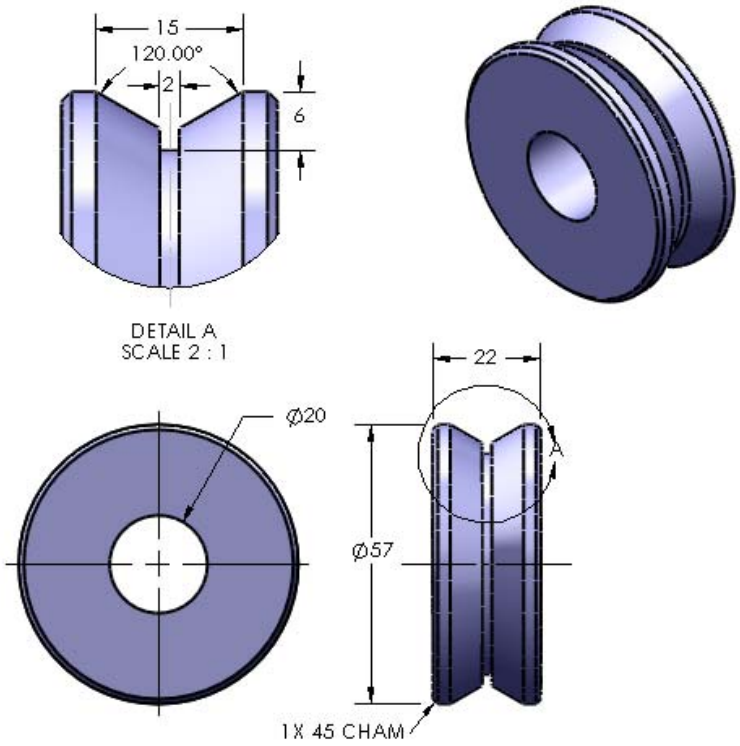


Plate with Hole

Create the following part using the information and dimensions given.
All sketches should be fully defined.

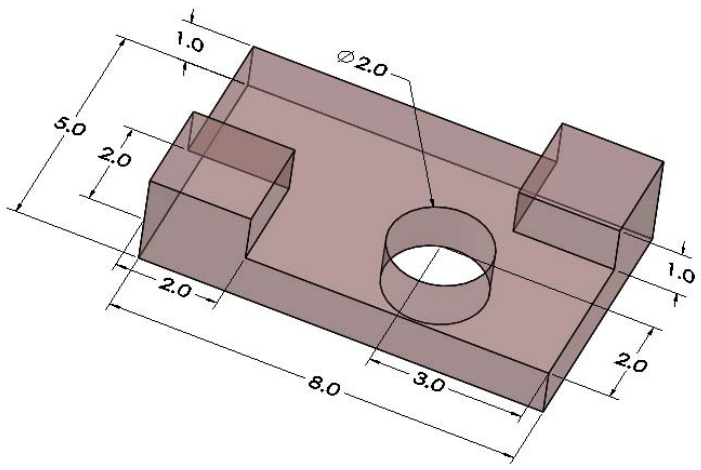
Design Intent

Use the design intent to create the part.

1. The part is not symmetrical.
2. The origin is undefined.
3. The hole is a through hole.
4. The two square features (2.0 X 2.0) are coplanar and are controlled by one sketch.

Dimensions

Use the following graphics with the design intent to create the part.
Dimensions are in inches.



Hint

- Blind Base Extrude
- Through All end condition

Bracket

Create the following part using the information and dimensions given.
All sketches should be fully defined.

Design Intent

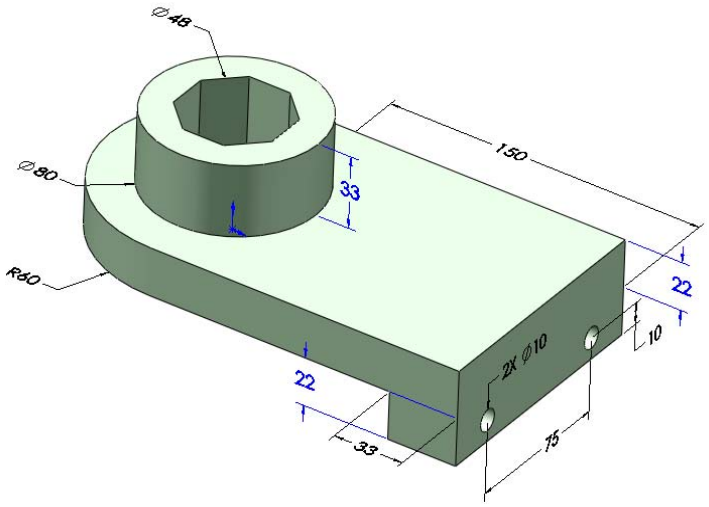
Use the design intent to create the part.

1. Origin is at the center of the rounded end.
2. The boss is centered on the rounded end of the base feature.
3. The octagon is a through all feature and the ⌀48 inscribed circle is concentric to the boss.
4. The two ⌀10 holes are through holes and are symmetrical about the centerline of the part.

Dimensions

Use the following graphics with the design intent to create the part. Dimensions are in millimeters.

The 150 mm dimension is to the center of the rounded end.



Hint

- The use of centerlines (construction line) is required for symmetry relations.

Locator

Create the following part using the information and dimensions given.
All sketches should be fully defined.

Design Intent

Use the design intent to create the part.

1. The origin is at the lower-left front corner.
2. The part is not symmetrical.
3. The holes are through holes.

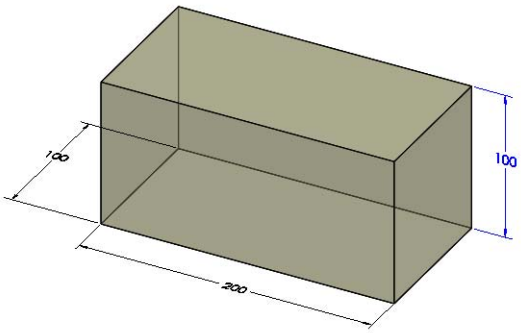
Dimensions

Use the following graphics with the design intent to create the part.
Dimensions are in millimeters.

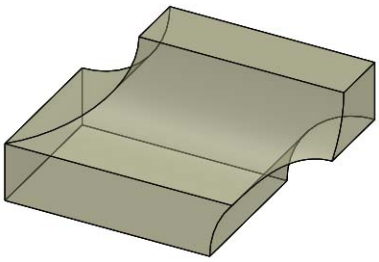
Hint

- Equal relations
- Link Values

Start with a base feature 200 mm X 100 mm X 100 mm (W X D X H)

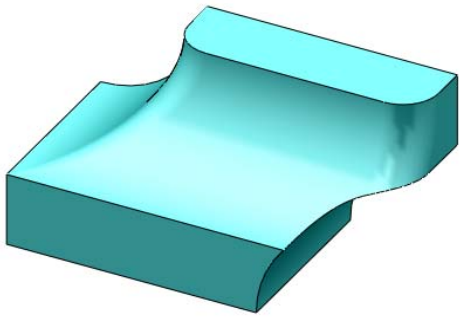


Use three (3), Ø120 cut features centered at the appropriate corners of the block.



Next page

Add a 20 mm radius fillet to the two edges.



Sketching and Design Intent

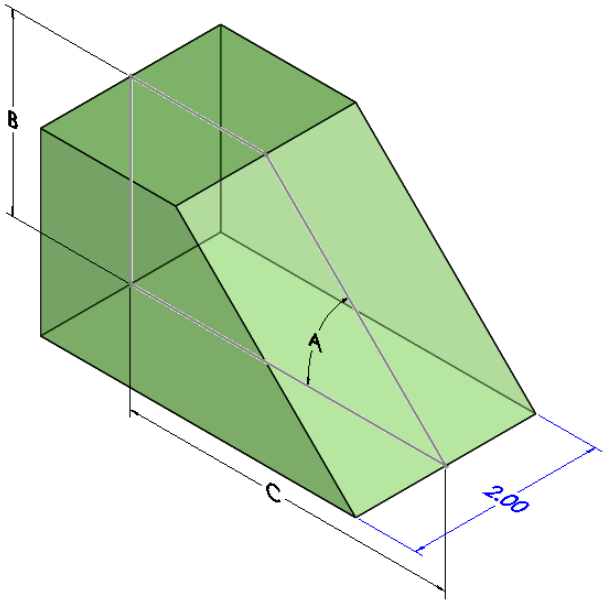
Create this part using the information and dimensions provided.
Sketch and extrude profiles to create the part.
All sketches should be fully defined.

Design Intent

1. Origin is undefined
2. The part is symmetrical
3. The 45° Angle remains constant as the length (C dimension) of the part increases.

Dimensions

A = 45° B = 2.00 C = 3.50



1. Open a new part using the ANSI_Inch template.
2. Create the base sketch on the Front plane using lines and relations.
3. Dimension to capture the design intent.

Hint

Mid Plane extrude

Step Block

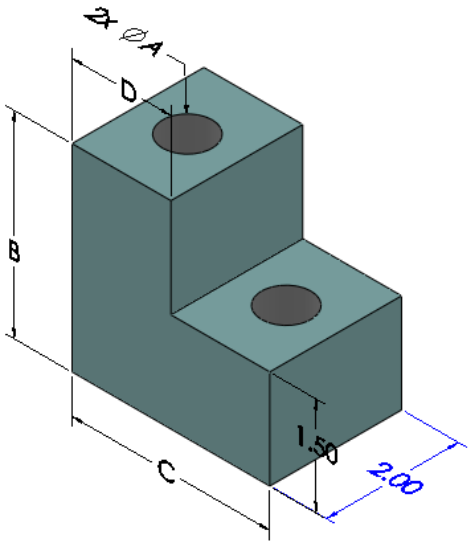
Create this part using the information and dimensions provided.
Sketch and extrude profiles to create the part.
All sketches should be fully defined.

Design Intent

1. Origin is undefined
2. All sketches are full defined
3. The two holes go all the way through (Through All)
4. The two holes are controlled by one dimension. (Equal)
5. As the block increases in depth (2.00 dimension) the two holes remain centered.

Dimensions

A = Ø.75 B = 3.00 C = B D = ½C



1. Open a new part using the ANSI_Inch template.
2. Create the base sketch on the Front plane using lines and relations.
3. Dimension to capture the design intent.

Hint

Construction lines
Midpoint sketch relations
Equal sketch relations

Spacer Plate

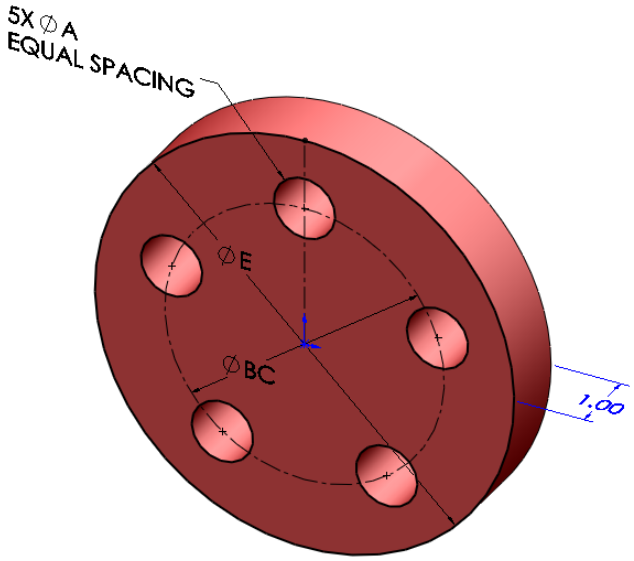
Create this part using the information and dimensions provided.
Sketch and extrude profiles to create the part.
All sketches should be fully defined.

Design Intent

1. Origin is at the center of the part
2. One sketch is used for all features
3. The 5 holes go all the way through and are controlled by a circular pattern.

Dimensions

A = Ø.88 BC = Ø 4.00 E = Ø6.00



1. Open a new part using the ANSI_Inch template.
2. Create the base sketch on the Front plane using lines and relations.
3. Sketch, dimension and add relations to capture the design intent.

Hint

Construction geometry
Circular sketch pattern

Bearing Stock

Create two versions of the given part using the information and dimensions provided. All sketches should be fully defined.

Save as EX04_VerA and EX04_VerB

Design Intent

Version A

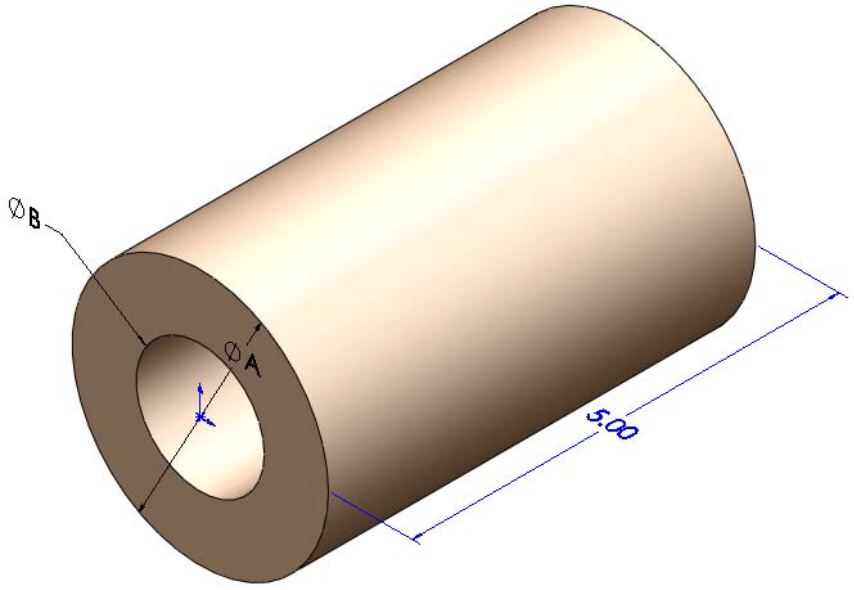
1. Origin is at the center of the part
2. As the outside diameter (A) increases, the inside diameter (B) remains constant.

Version B

1. Origin is at the center of the part.
2. As the outside diameter (A) increases, the inside diameter (B) maintains the original edge clearance.

Dimensions

A = Ø3.00 B = Ø1.50



1. Open a new part using the ANSI_Inch template.
2. Create the base sketch on the Front plane.
3. Sketch, dimension and/or add relations to capture the design intent.

Hint

$$Edge\,distance = \frac{Outside\,Dia - Inside\,Dia}{2}$$

Automatic relations

Spacer

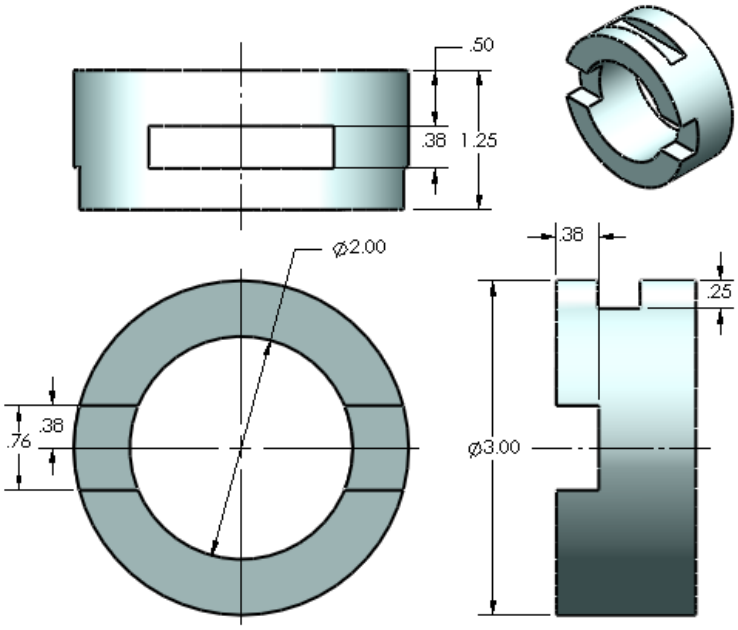
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

Design Intent

1. Origin is at the center of the part.
2. The part is symmetrical.
3. As the outside diameter (OD) increases the inside diameter (ID) remains constant.
4. The .76” horizontal slot remains centered as the OD is increased and the depth remains .38”.
5. The .38” slot feature in the edge of the part remains .50” from the back edge.

Dimensions

Use the drawing below and the required design intent to create the spacer.



1. Open a new part using the ANSI_Inch template.
2. Create the base sketch on the Front plane using lines and relations.
3. Sketch, dimension and add relations to capture the design intent.

Hint

- Construction geometry
- Offset Entities

Wedge

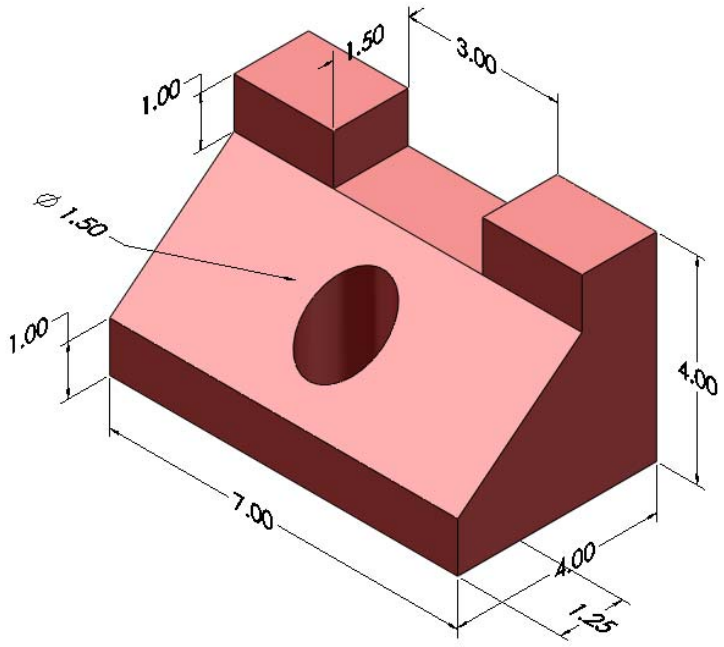
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

Design Intent

1. Origin is at the center of the part.
2. The part is symmetrical with respect to its mid plane
3. This part is built with one base feature and two cut features.
4. The Ø1.50 hole is perpendicular to the bottom of the wedge and remains centered on the part.

Dimensions

Use the drawing below and the required design intent to create the wedge.



Note: The 1.25 dimension is to the center of the circular cut feature.

Hint

Mid Plane end condition

Link

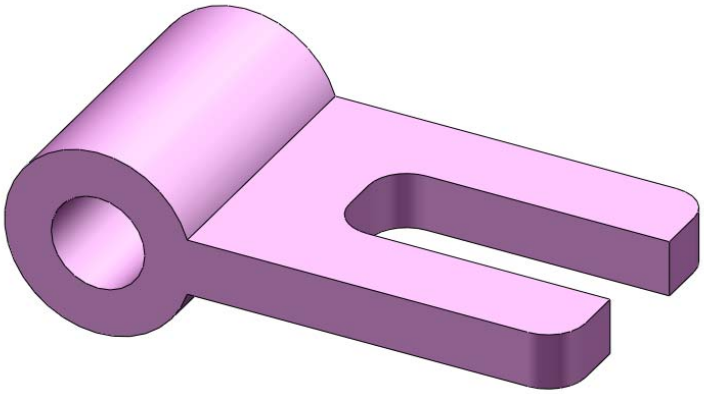
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

Design Intent

1. The part is symmetrical
2. Plate thickness is centered on circular end.
3. All fillets are equal in radius.
4. All holes are through holes.
5. As the length of the cylindrical feature increases the slot feature remains centered and remains the same width.

Dimensions

Use the drawing below and the required design intent to create the spacer.



1. This part has no dimensions given. Model this part on shape and proportion only.

Hint

Origin location and Mid Plane extrude

Guide Roller

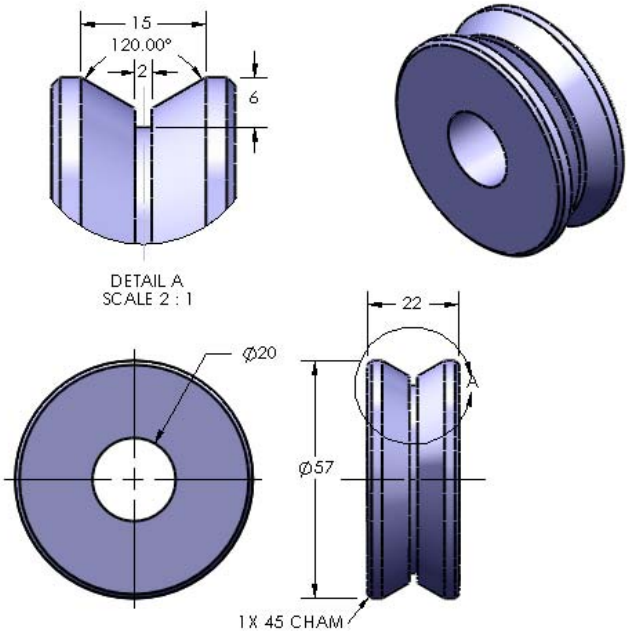
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

Design Intent

1. Origin is at the center of the part.
2. The hole is a through hole.
3. As the Ø57 increases the 120˚ angle is maintained.

Dimensions

Use the drawing below and the required design intent to create the spacer.



Hint

Mid Plane extrude
Revolve Cut

Adjustable Link

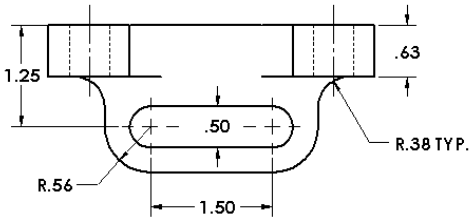
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

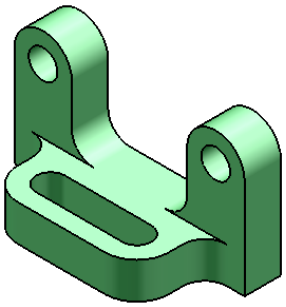
Design Intent

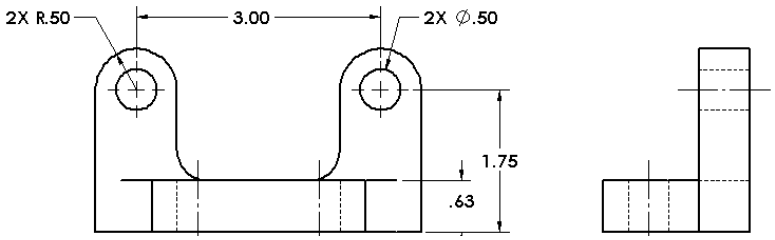
1. Origin is at the center of the part.
2. The part is symmetrical.
3. As the 3.00 center-to-center hole dimension is increased the part remains symmetrical and the slot increases proportionally.

Dimensions

Use the drawing below and the required design intent to create the spacer.







1. Directions

Hint

Mid Plane extrude

Locating Block

9.11.1.b

Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

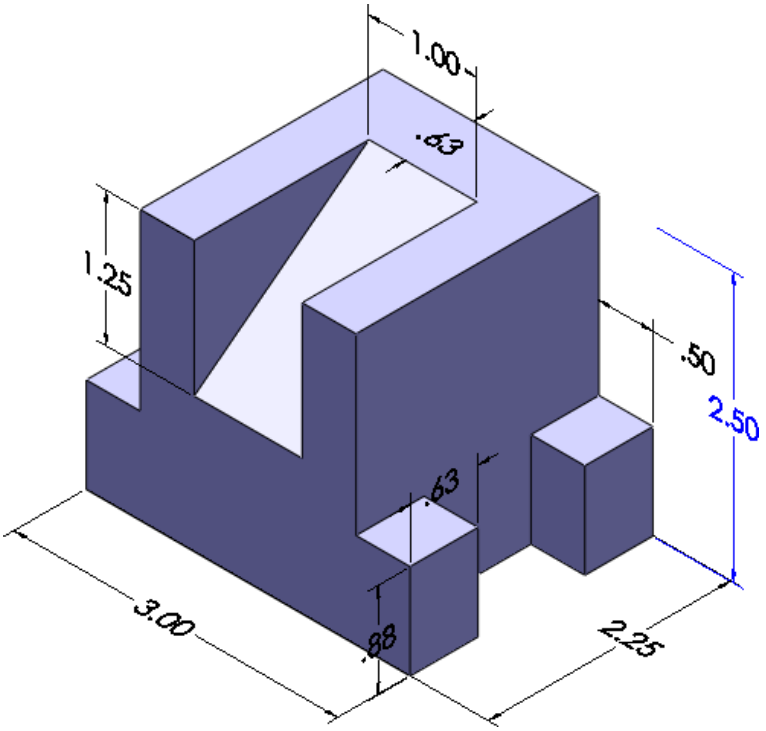
Design Intent

1. Origin is at the front-center of the part.
2. The part is symmetrical.
3. As the height (2.50”) increases, the bottom edge of the sloped surface remains 1.25” from the top surface.

Dimensions

Use the drawing below and the required design intent to create the spacer.

1. The four lugs are .88 X .63 X .50



1. The base feature is sketched on the top plane.
2. Mirror feature can be used to capture design intent for the 4 lugs.

Hint

Extrusion at angle to sketch
Reference sketch

Spacer

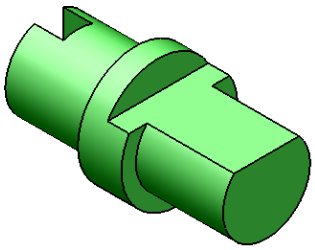
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

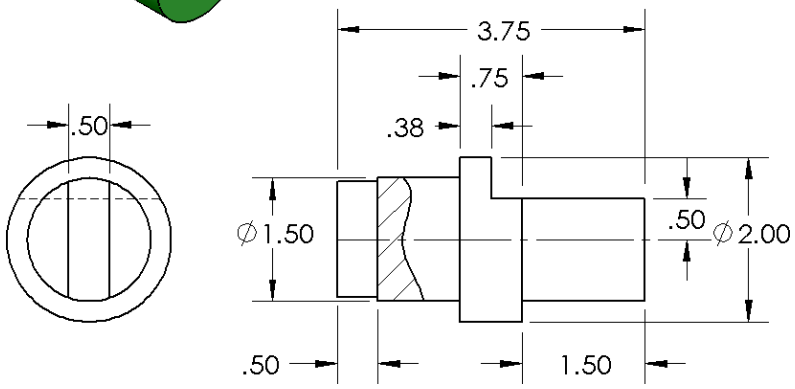
Design Intent

1. Origin is at the center of the part.
2. As the Ø2.00 feature increases in size the Ø1.50 feature increases proportionally. Create an equation controlling the relationship between the two features.

Dimensions

Use the drawing below and the required design intent to create the spacer.





1. Use Revolved Feature
2. Dimensioning from visible lines to the centerline in a sketch gives diameter dimensions.

Link Arm

14.3.5

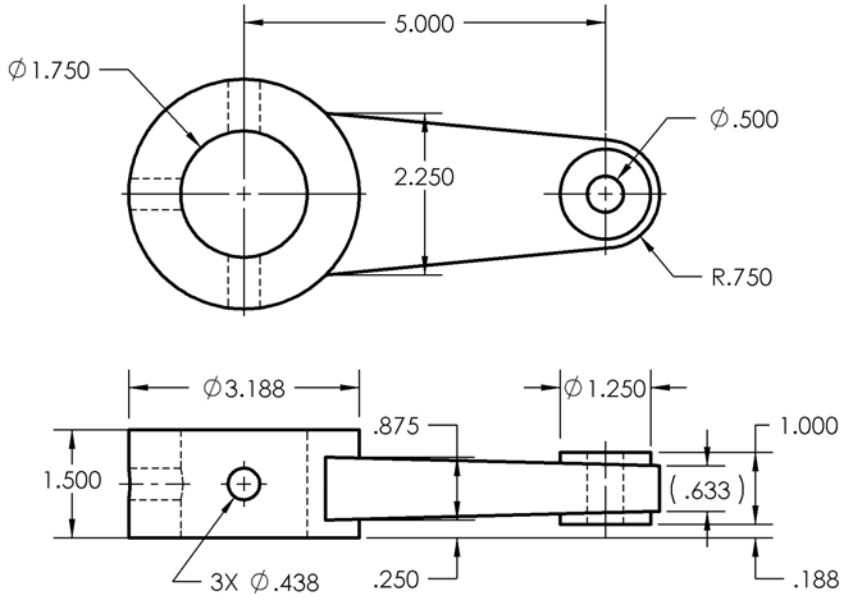
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined.

Design Intent

1. Origin is at the center of the Ø3.188 boss.
2. The part is not symmetrical.
3. As the Ø1.500 boss depth increases the Ø.438 hole feature remains fixed in the original location.

Dimensions

Use the drawing below and the required design intent to create the Link Arm.



1. Use multibody bridging to join the two bosses with a center web feature.
2. Apply *draft* to the center feature.

Hint

Multibody solids
Draft (neutral plane)
Reference planes
Offset sketch from plane

Bracket-4

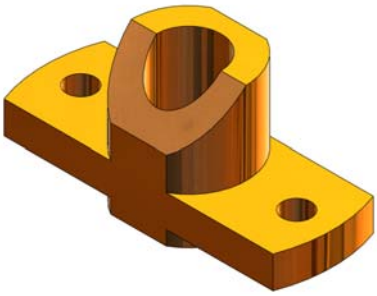
Create this part using the information and dimensions provided. Sketch and extrude profiles to create the part. All sketches should be fully defined. Use your inch part template to begin.

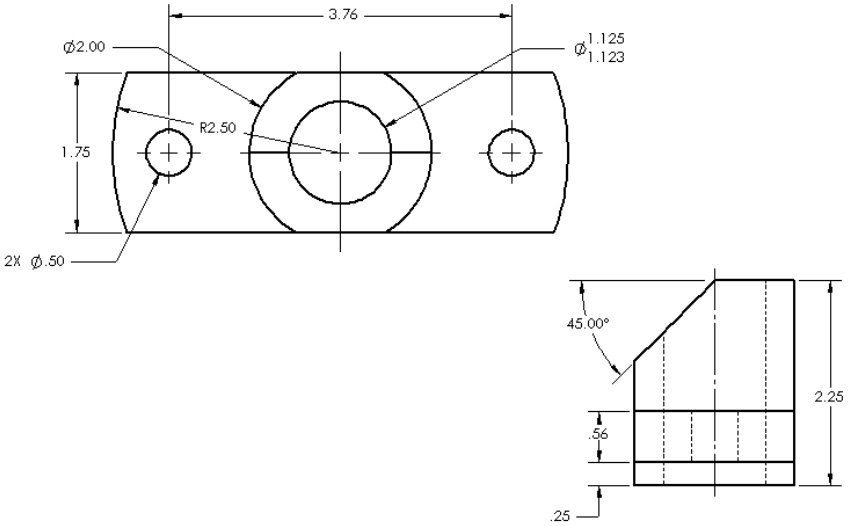
Design Intent

1. Origin is at the center of the part.
2. The part is symmetrical.
3. Material: Brass
4. The holes are centered and always go completely through the part.

Dimensions

Use the drawing below and the required design intent to create the Bracket-4.





- Check that the standard orthographic views appear the same as in the figure.
- Make a B size decimal dimensioned drawing

Hint

Possibly helpful tools are: Mirror, Convert Entities, Offset Entities, Trim.