Activity 5

Creating the rear wing

PDF Guide

in Schools
Wales

EESW
STEM Cymru

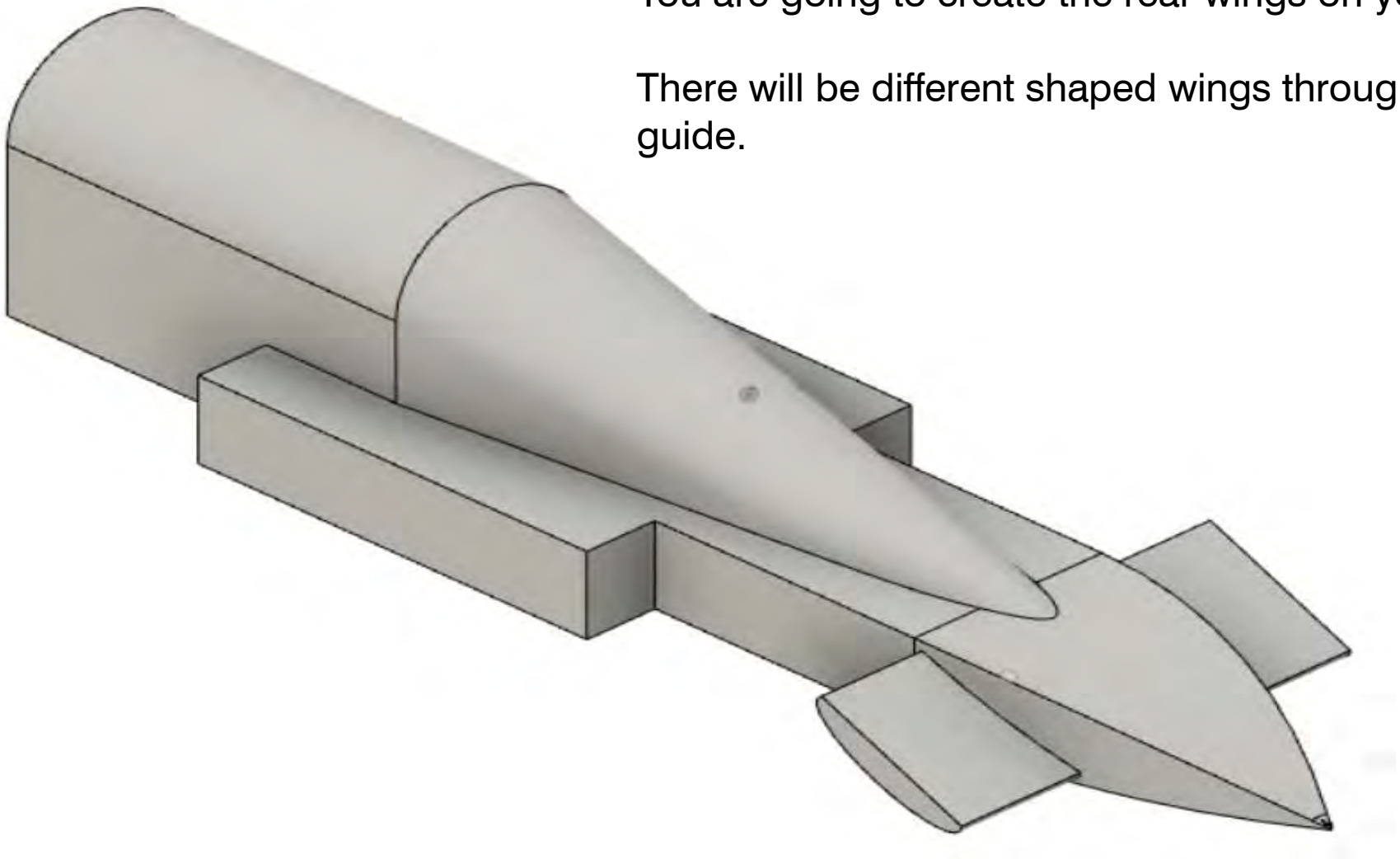
UNDEB EWROPEAIDD
EUROPEAN UNION

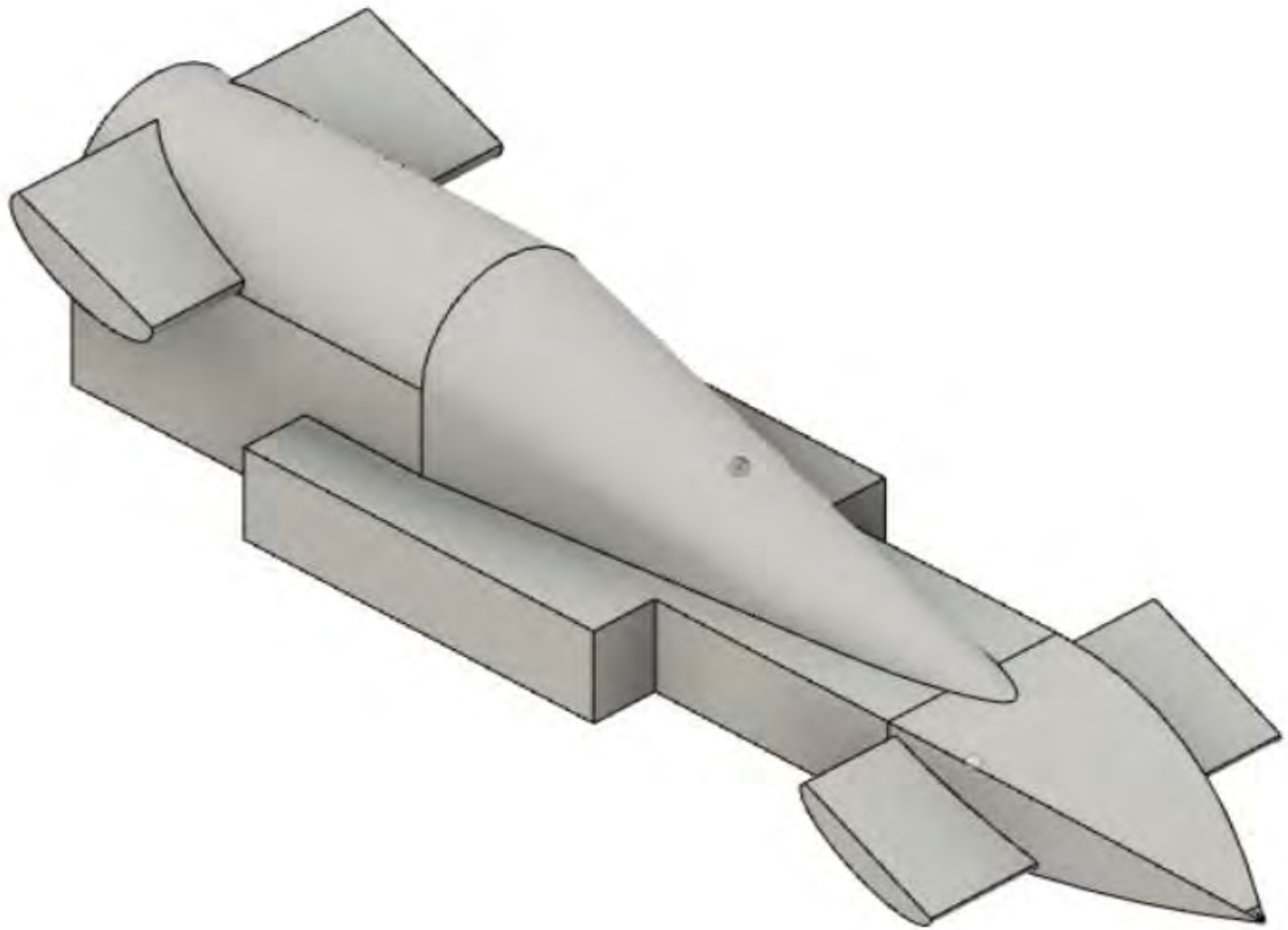
Llywodraeth Cymru
Welsh Government

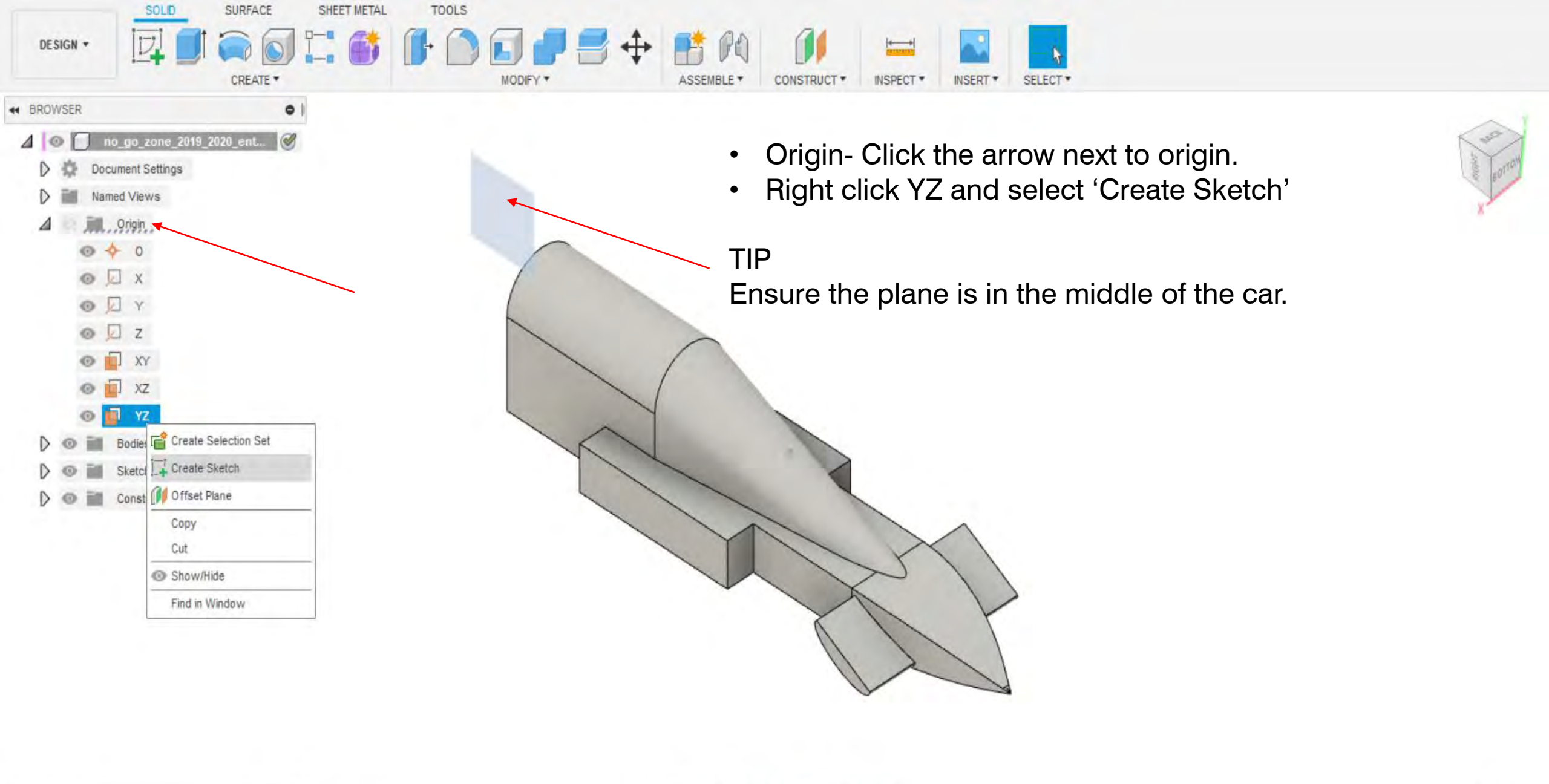
Cronfa Gymdeithasol Ewrop
European Social Fund

You are going to create the rear wings on your car.

There will be different shaped wings throughout this guide.

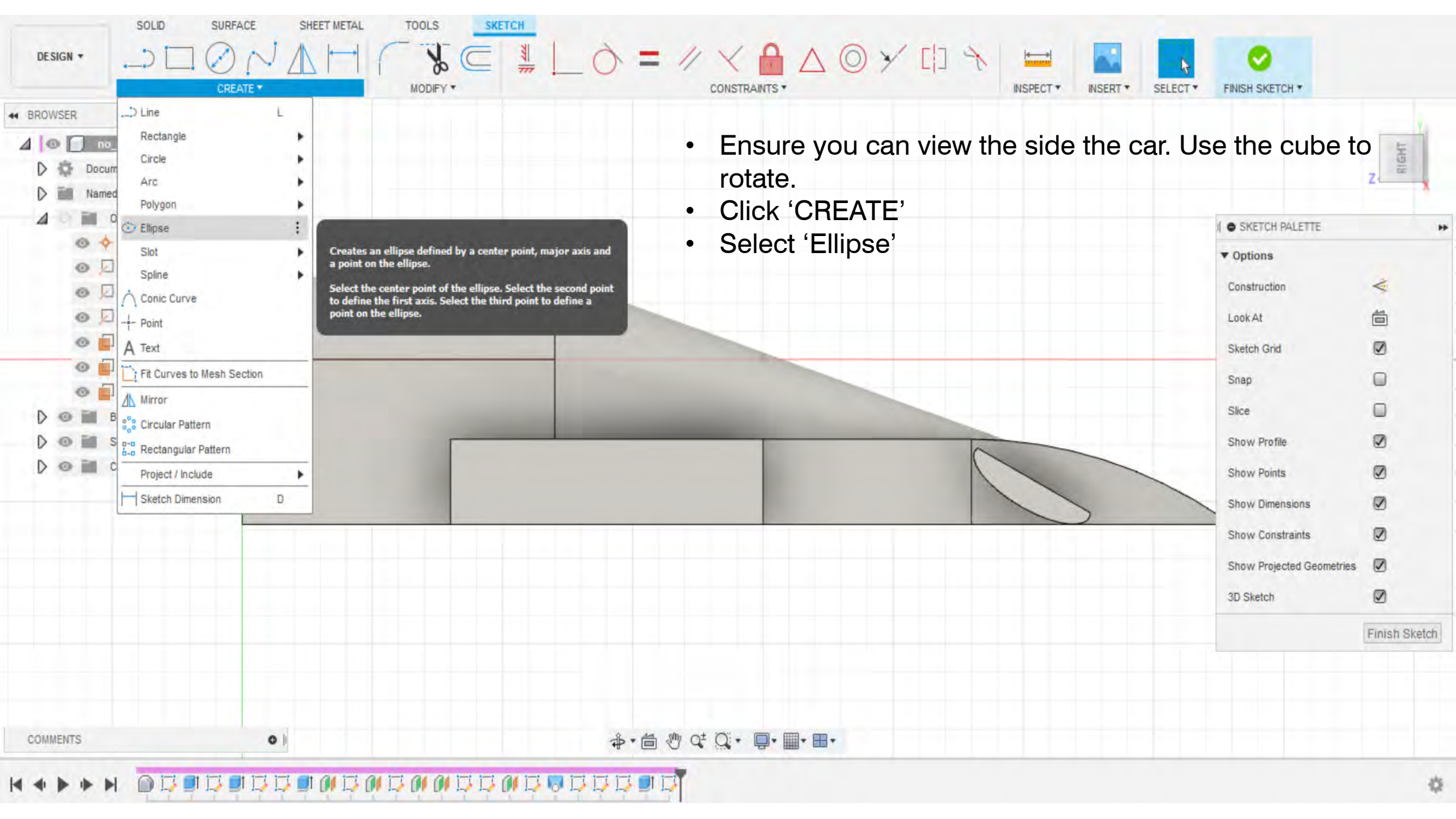




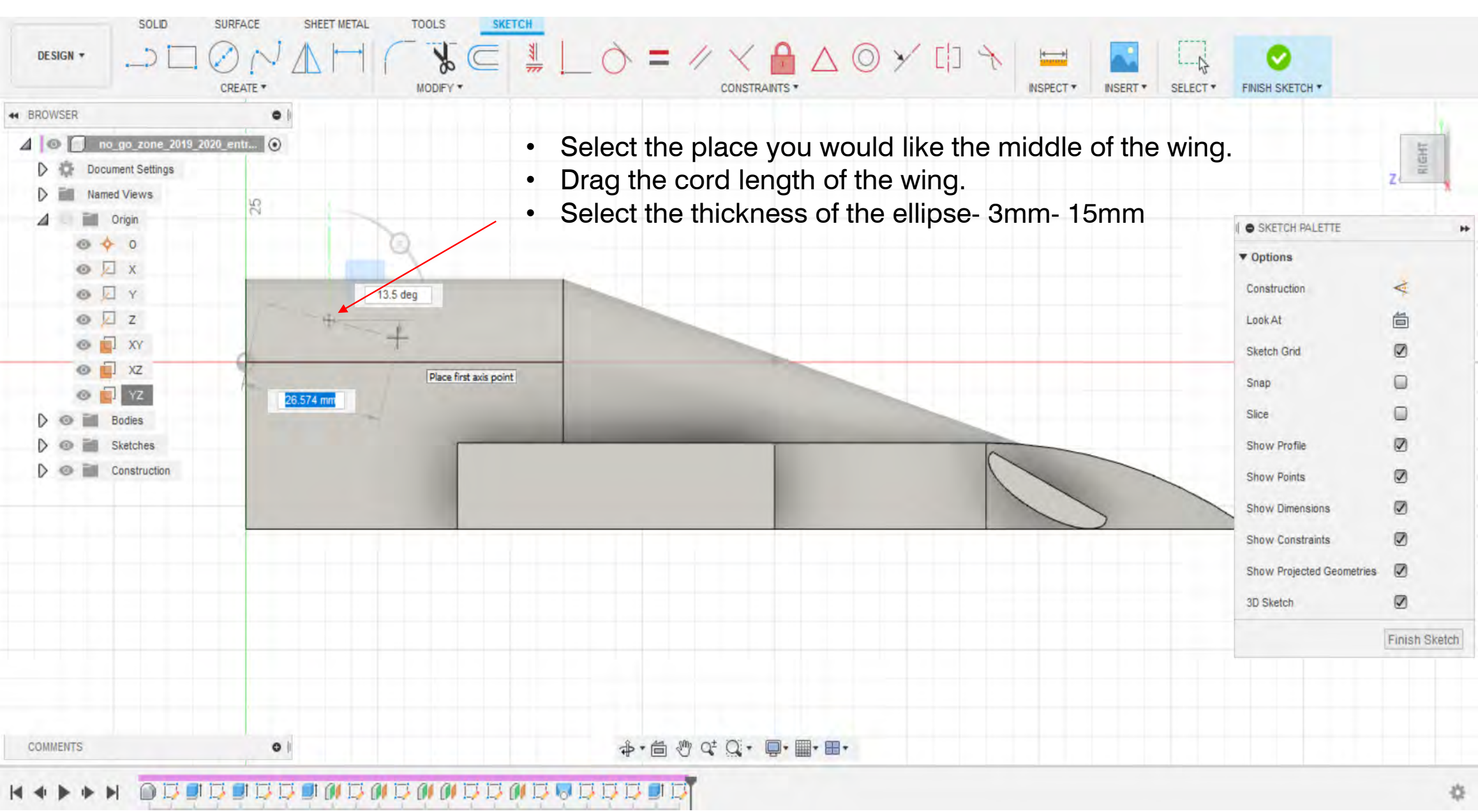


- Origin- Click the arrow next to origin.
- Right click YZ and select ‘Create Sketch’

TIP
Ensure the plane is in the middle of the car.

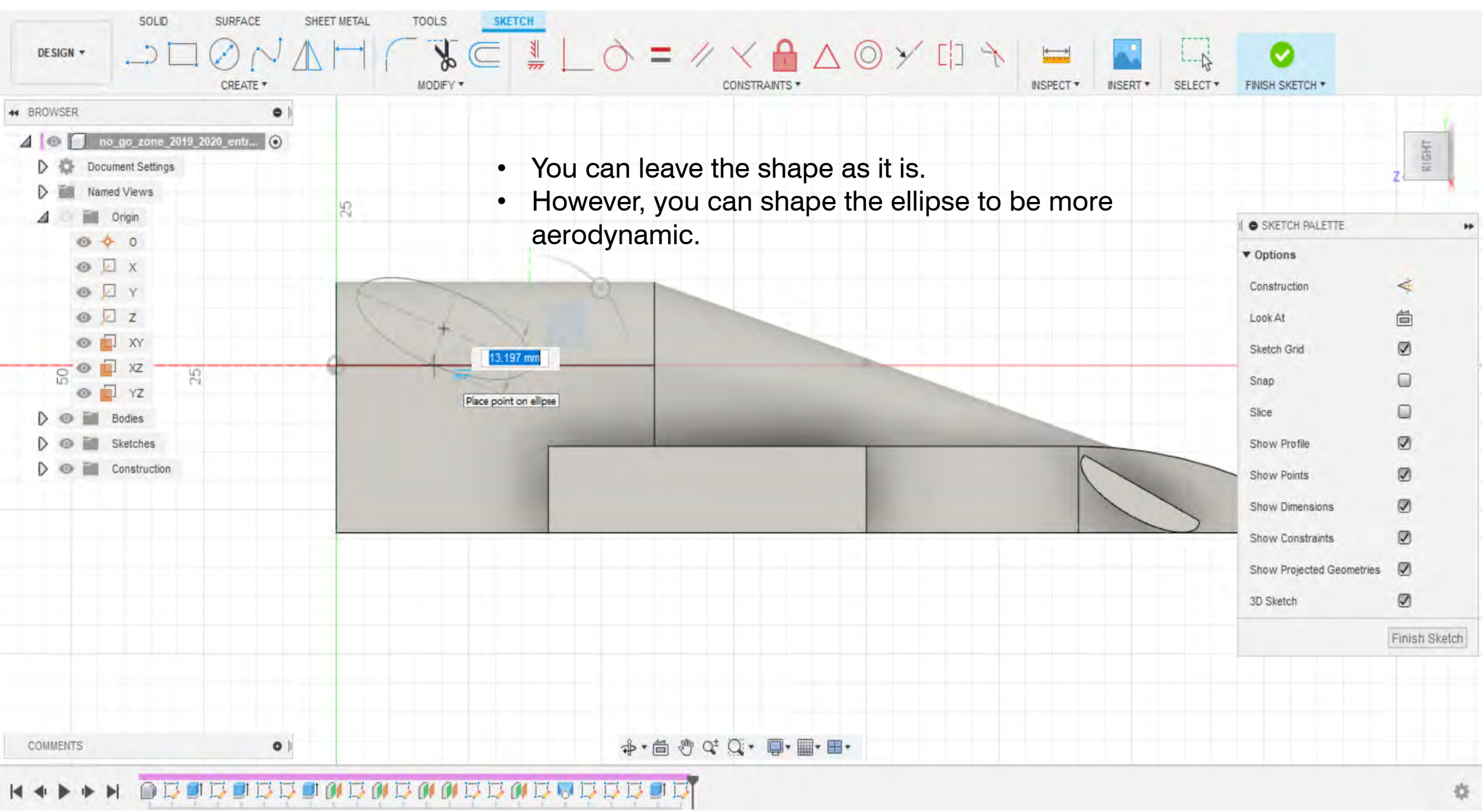


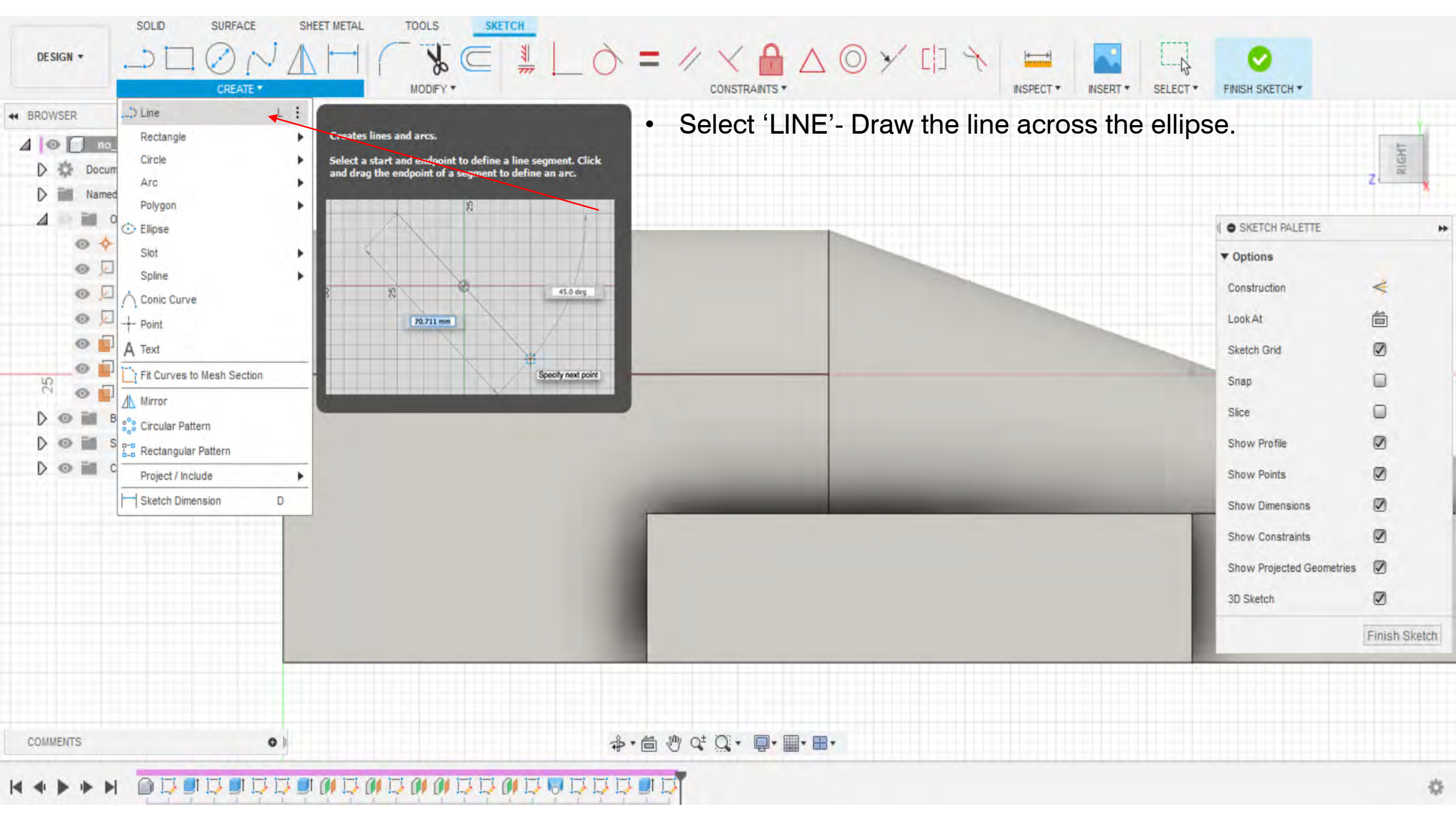
- Ensure you can view the side the car. Use the cube to rotate.
- Click ‘CREATE’
- Select ‘Ellipse’



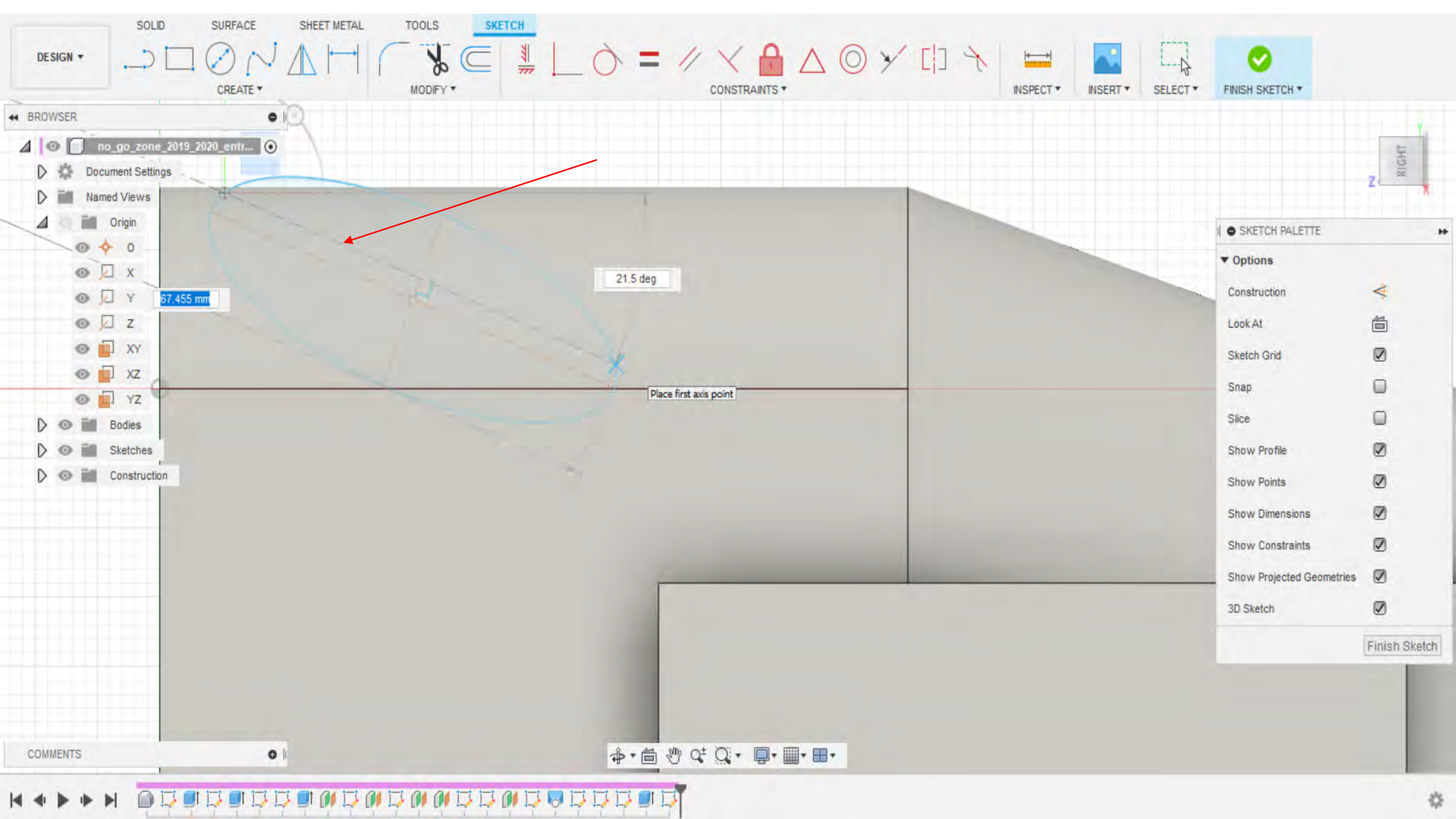
- Select the place you would like the middle of the wing.
- Drag the cord length of the wing.
- Select the thickness of the ellipse- 3mm- 15mm

- You can leave the shape as it is.
- However, you can shape the ellipse to be more aerodynamic.





- Select ‘LINE’- Draw the line across the ellipse.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Named Views
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Bodies
Sketches
Construction
67.455 mm
21.5 deg
Place first axis point
RIGHT
SKETCH PALETTE
Options
Construction
Look At
Sketch Grid
Snap
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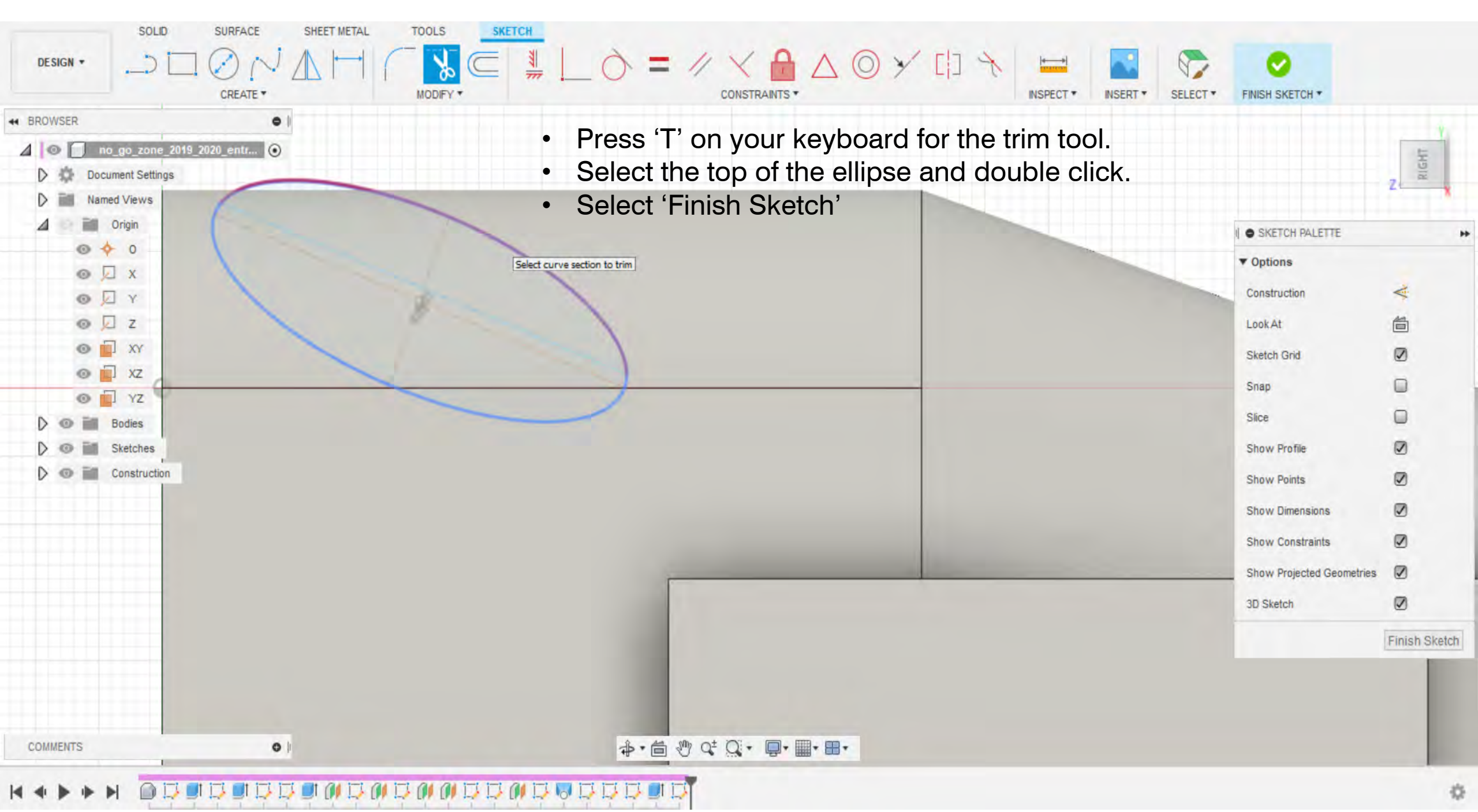
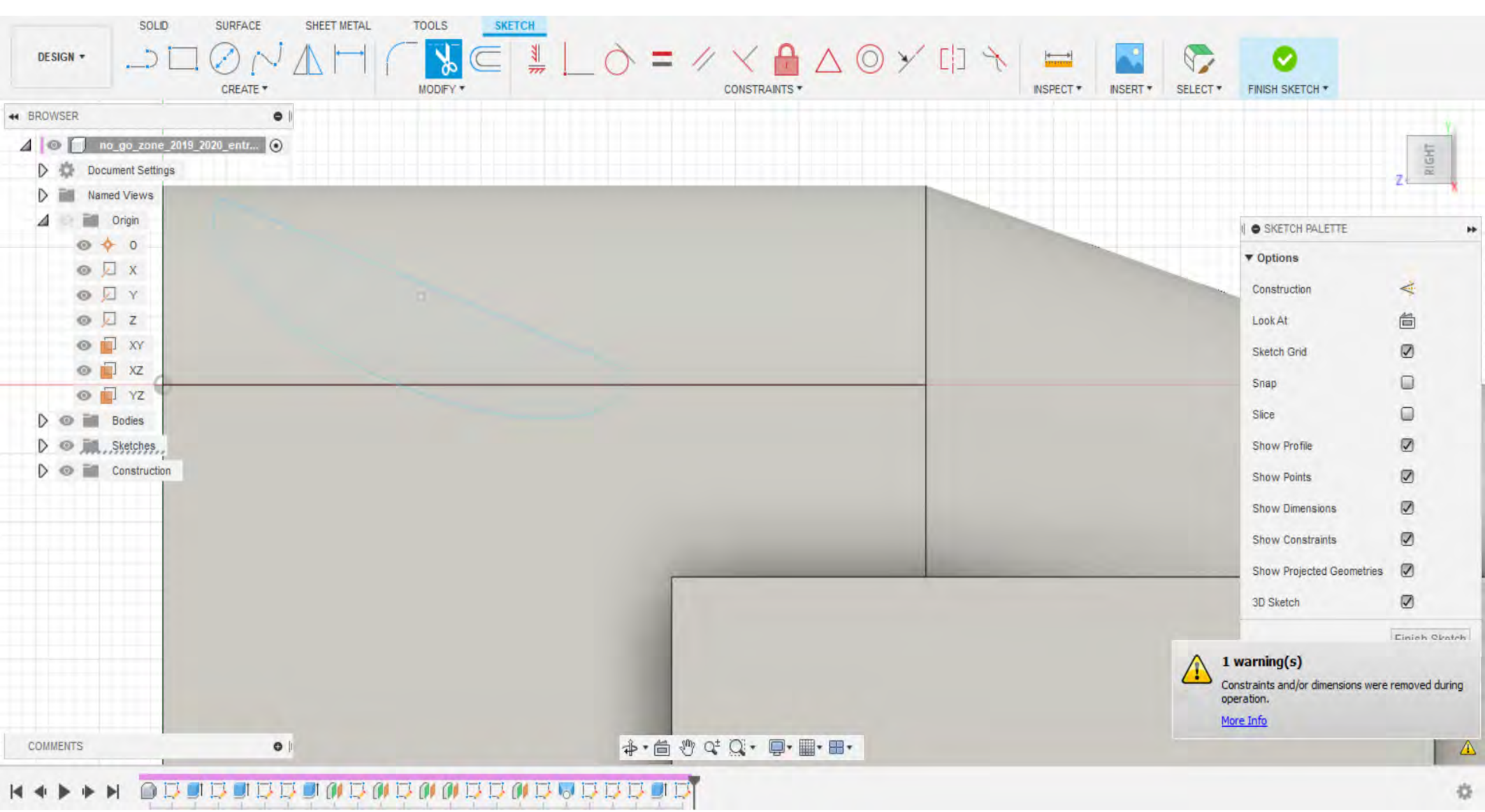
Show Profile
Show Points
Show Dimensions
Show Constraints
Show Projected Geometries
3D Sketch
Finish Sketch
COMMENTS



- Press ‘T’ on your keyboard for the trim tool.
- Select the top of the ellipse and double click.
- Select ‘Finish Sketch’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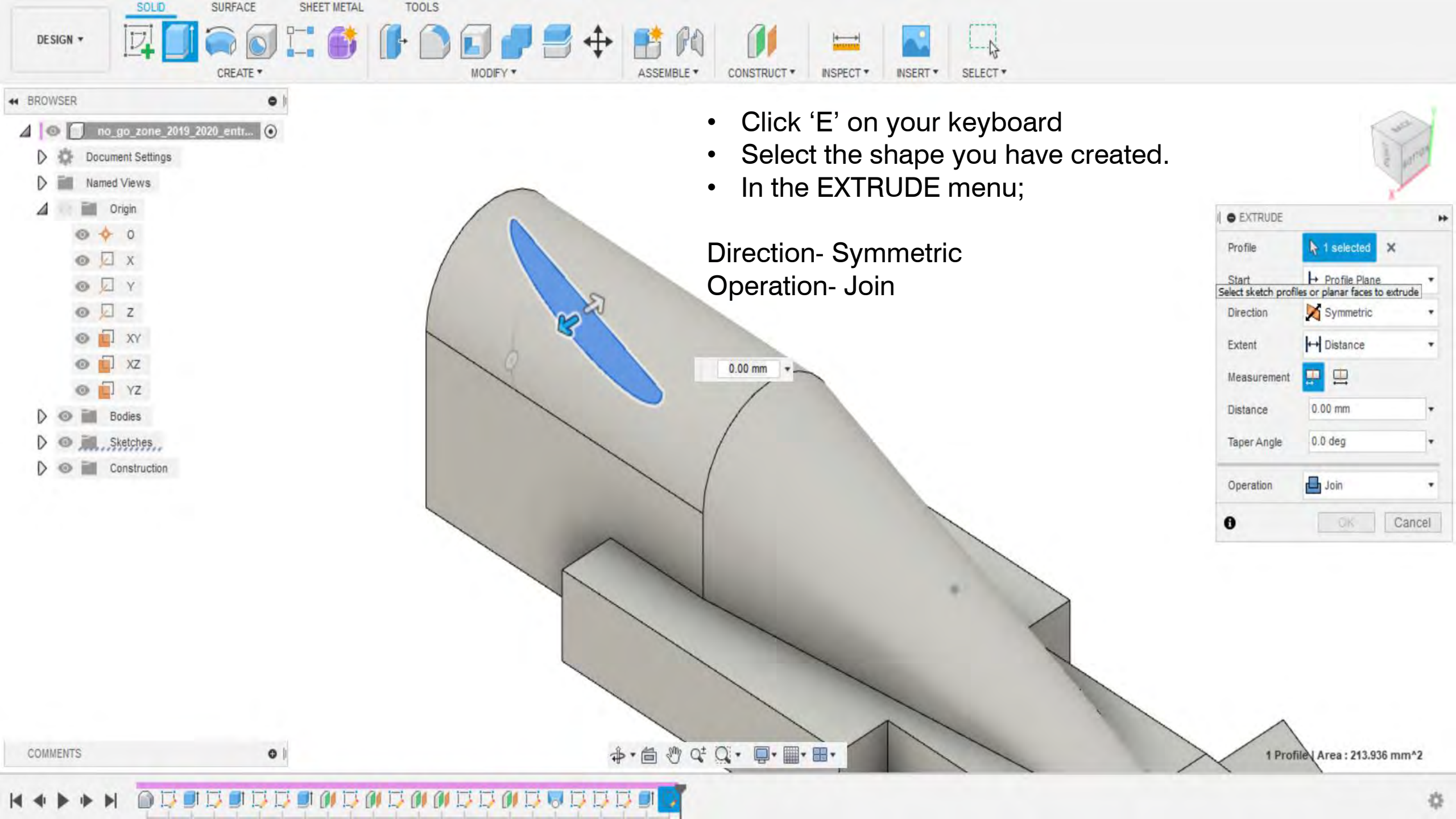
Show Projected Geometries
3D Sketch
1 warning(s)
Constraints and/or dimensions were removed during operation.
More Info
COMMENTS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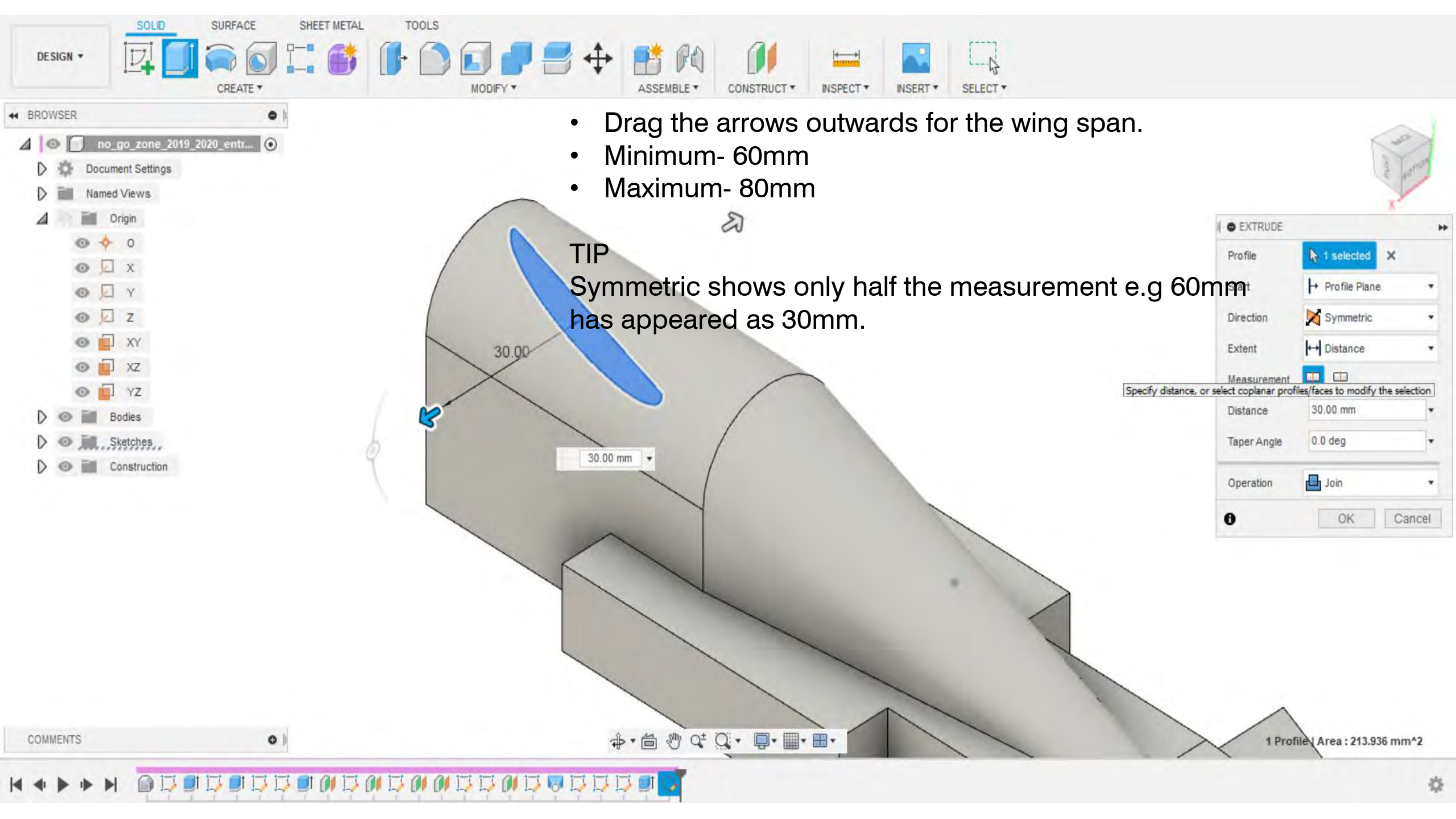
Bodies
Sketches
Construction
COMMENTS
• Click ‘E’ on your keyboard
• Select the shape you have created.
• In the EXTRUDE menu;
Direction- Symmetric
Operation- Join
0.00 mm
EXTRUDE
Profile
1 selected
Start
Profile Plane
Select sketch profiles or planar faces to extrude
Direction
Symmetric
Extent
Distance
Measurement
Distance
0.00 mm
Taper Angle
0.0 deg
Operation
Join
OK
Cancel
1 Profile | Area : 213.936 mm^2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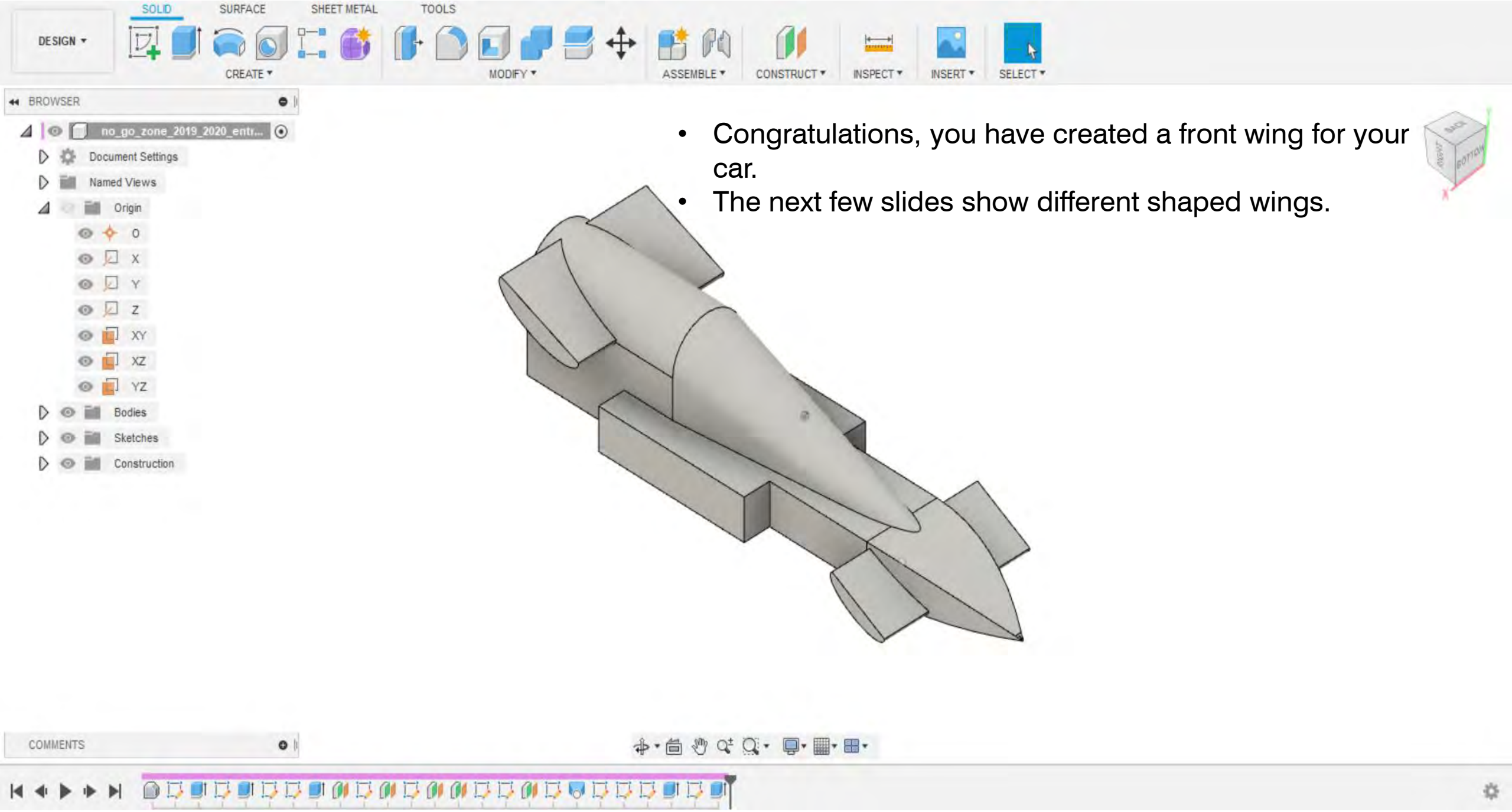
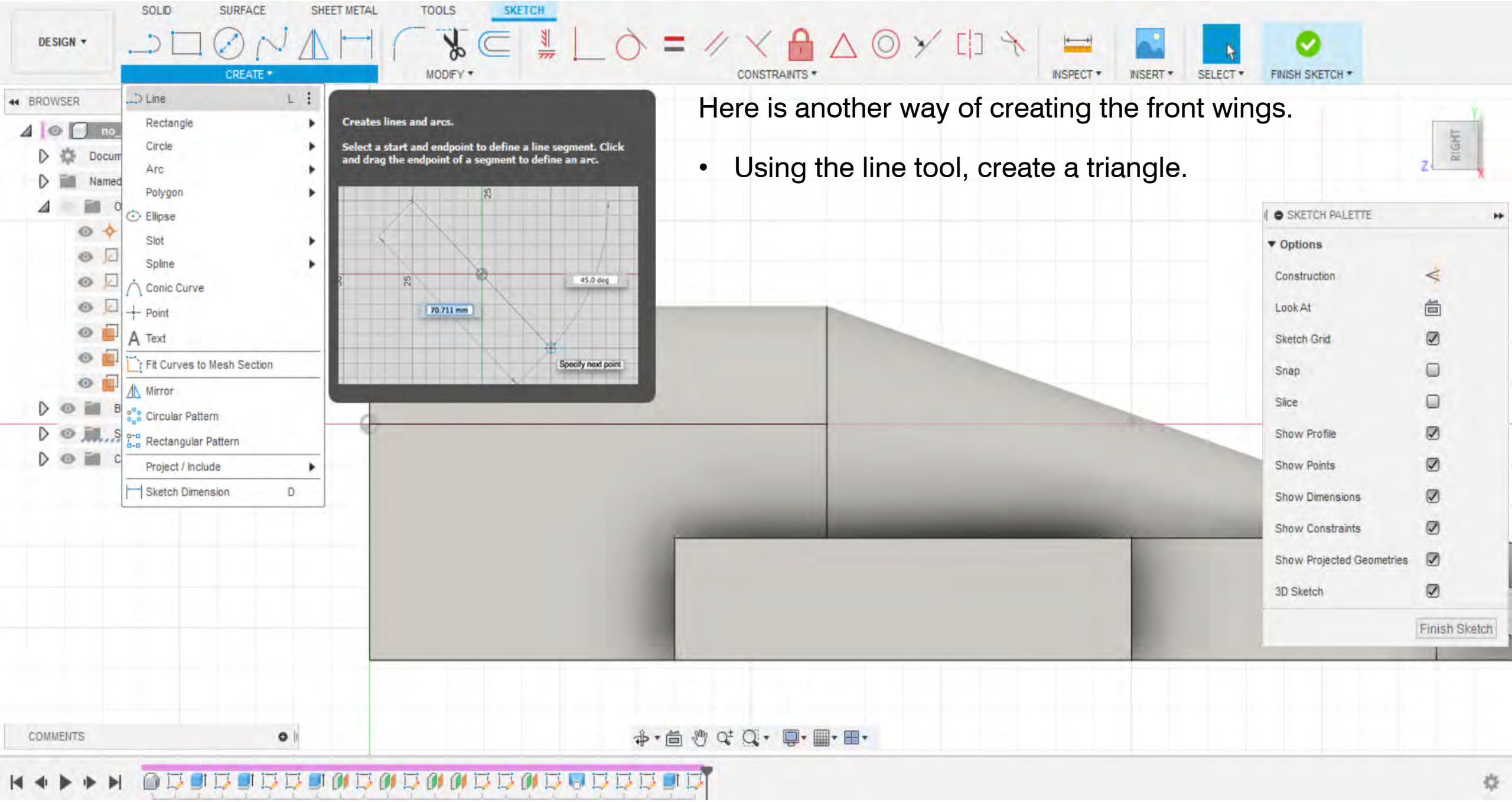
Bodies
Sketches
Construction
COMMENTS
• Drag the arrows outwards for the wing span.
• Minimum- 60mm
• Maximum- 80mm
TIP
Symmetric shows only half the measurement e.g 60mm has appeared as 30mm.
30.00
30.00 mm
EXTRUDE
Profile
1 selected
Profile Plane
Direction
Symmetric
Extent
Distance
Measurement
Specify distance, or select coplanar profiles/faces to modify the selection
Distance
30.00 mm
Taper Angle
0.0 deg
Operation
Join
OK
Cancel
1 Profile | Area : 213.936 mm^2



- Congratulations, you have created a front wing for your car.
- The next few slides show different shaped wings.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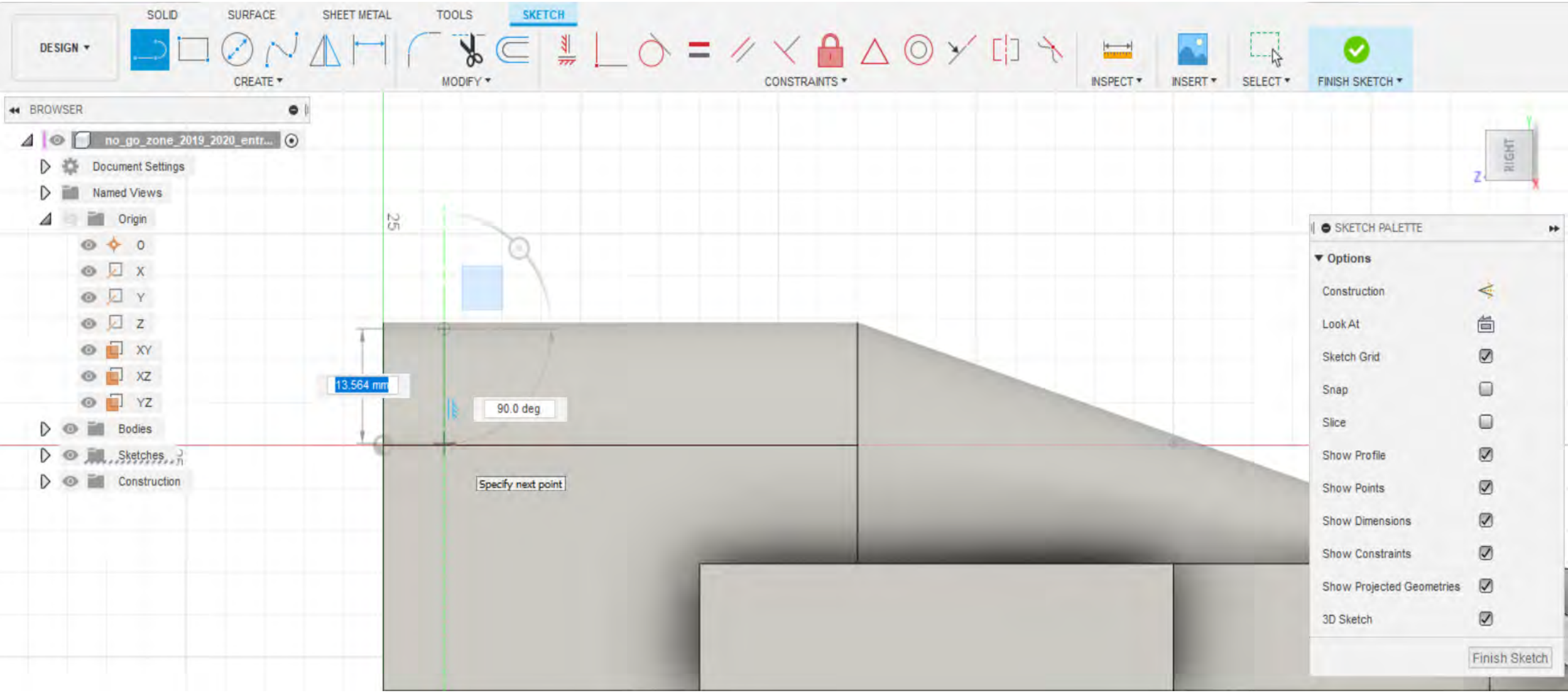
Polygon
Ellipse
Slot
Spline
Conic Curve
Point
Text
Fit Curves to Mesh Section
Mirror
Circular Pattern
Rectangular Pattern
Project / Include
Sketch Dimension D
Creates lines and arcs.
Select a start and endpoint to define a line segment. Click and drag the endpoint of a segment to define an arc.
45.0 deg
70.711 mm
Specify next point
Here is another way of creating the front wings.
• Using the line tool, create a triangle.
RIGHT
SKETCH PALETTE
Options
Construction
Look At
Sketch Grid
Snap
Slice
Show Profile
Show Points
Show Dimensions
Show Constraints
Show Projected Geometries
3D Sketch
Finish Sketch
COMMENTS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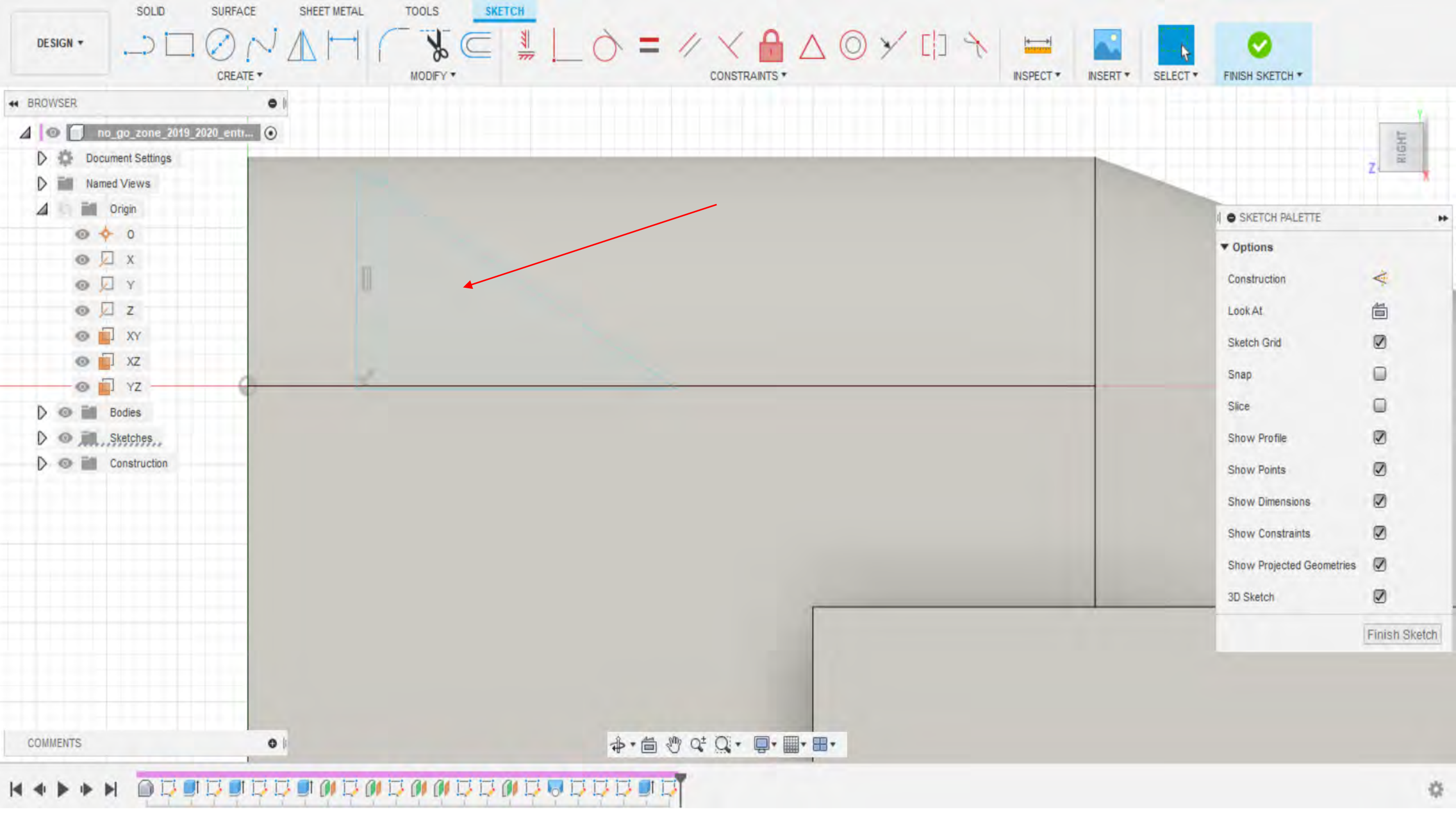
Bodies
Sketches
Construction
13.564 mm
90.0 deg
Specify next point
RIGHT
SKETCH PALETTE
Options
Construction
Look At
Sketch Grid
Snap
Slice
Show Profile
Show Points
Show Dimensions
Show Constraints
Show Projected Geometries
3D Sketch
Finish Sketch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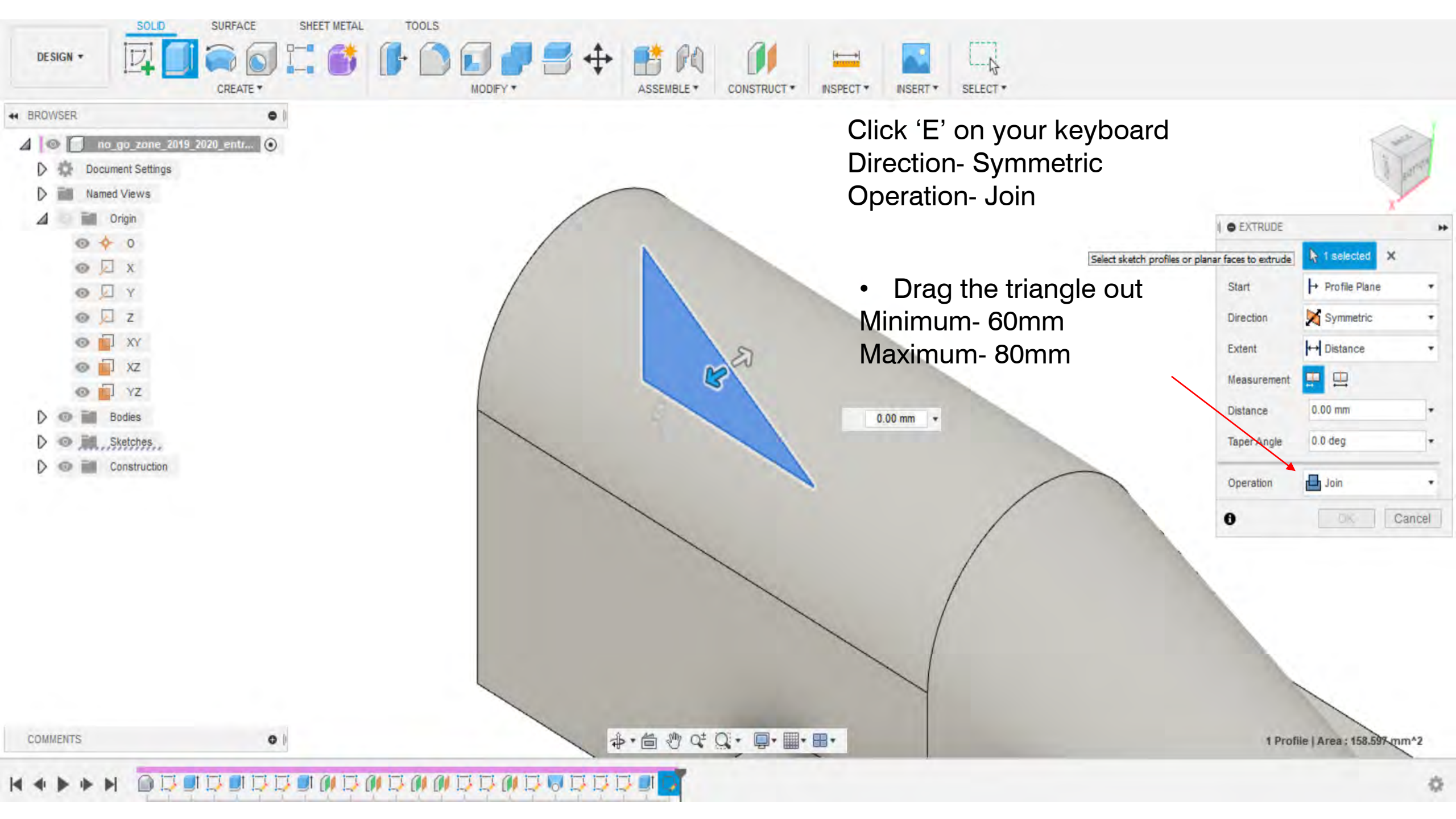
Show Constraints
Show Projected Geometries
3D Sketch
Finish Sketch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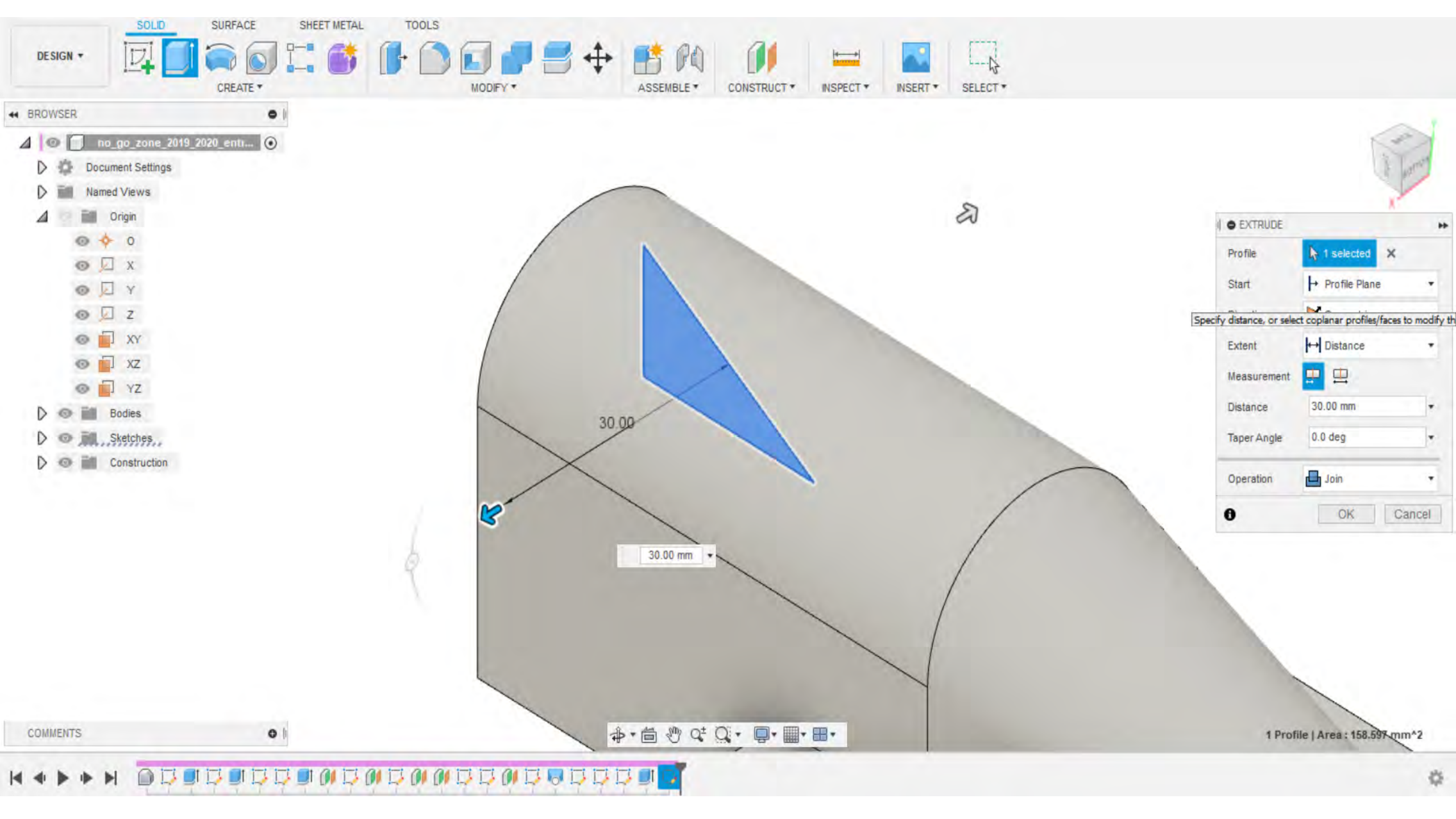
Bodies
Sketches
Construction
COMMENTS
Click ‘E’ on your keyboard
Direction- Symmetric
Operation- Join
• Drag the triangle out
Minimum- 60mm
Maximum- 80mm
0.00 mm
EXTRUDE
Select sketch profiles or planar faces to extrude
1 selected
Start
Profile Plane
Direction
Symmetric
Extent
Distance
Measurement
Distance
0.00 mm
Taper Angle
0.0 deg
Operation
Join
OK
Cancel
1 Profile | Area : 158.597 mm^2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Bodies
Sketches
Construction
30.00
30.00 mm
EXTRUDE
Profile
1 selected
Start
Profile Plane
Specify distance, or select coplanar profiles/faces to modify th
Extent
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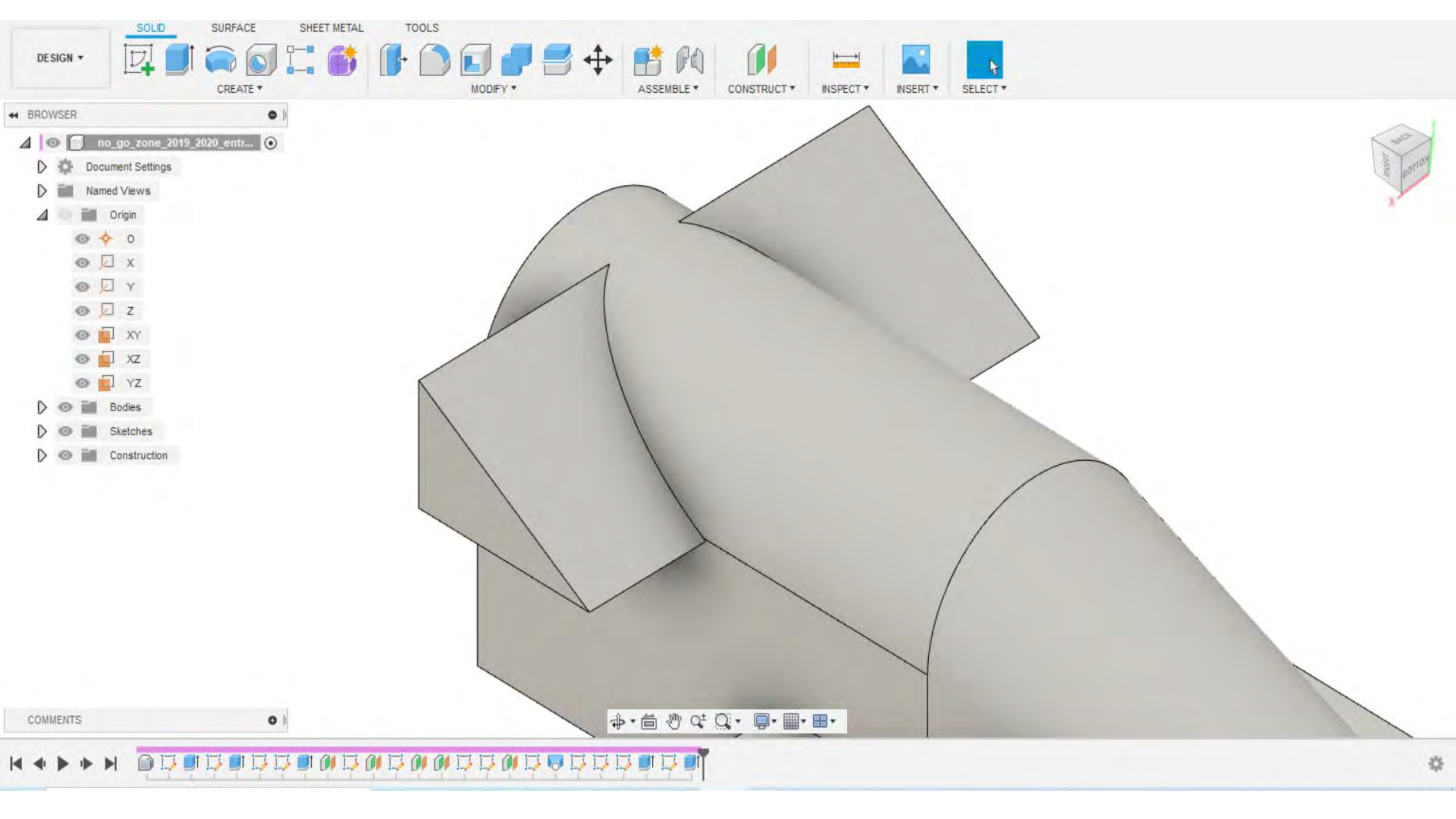
30.00 mm
Taper Angle
0.0 deg
Operation
Join
OK
Cancel
COMMENTS
1 Profile | Area : 158.597 mm^2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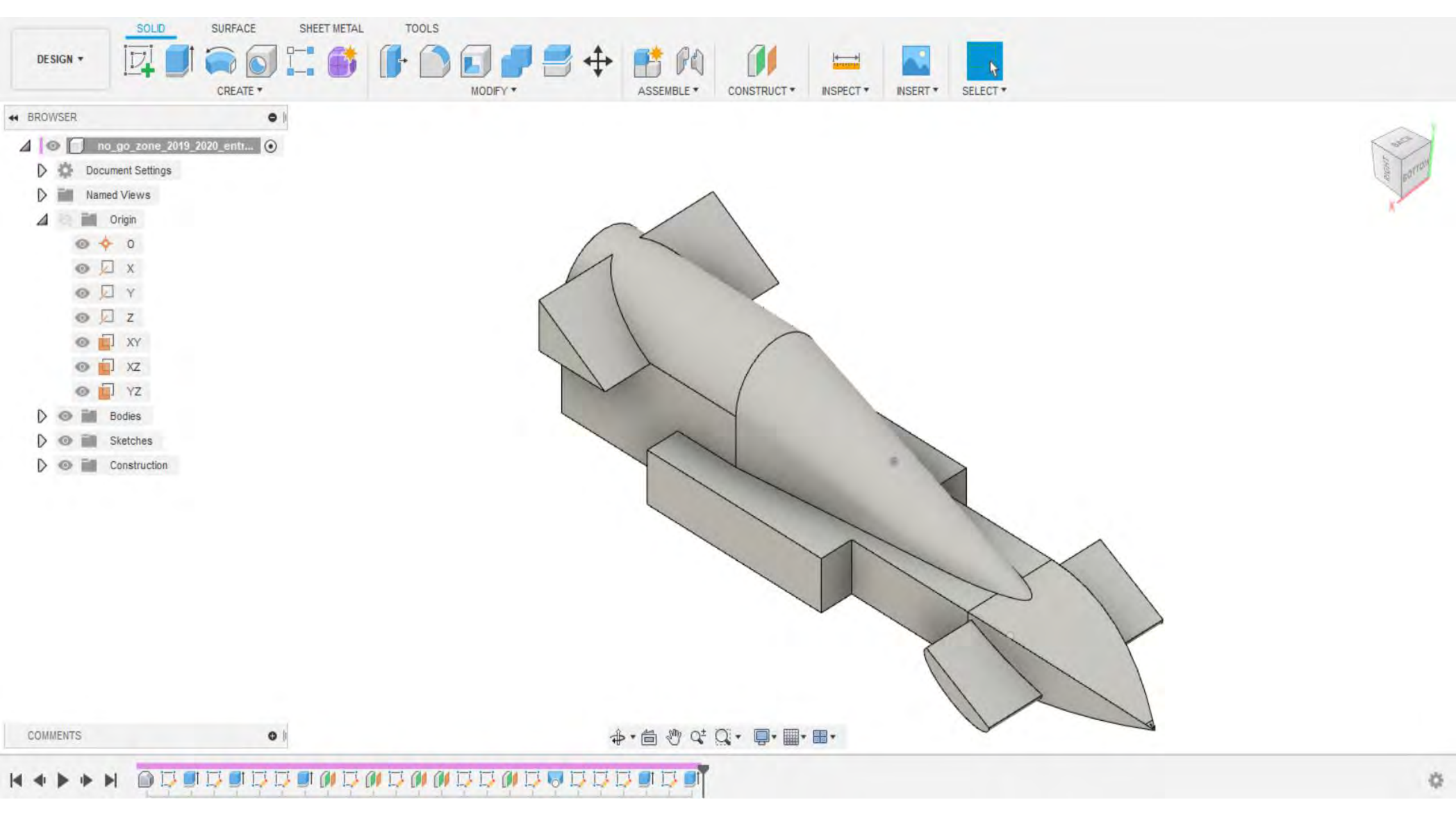
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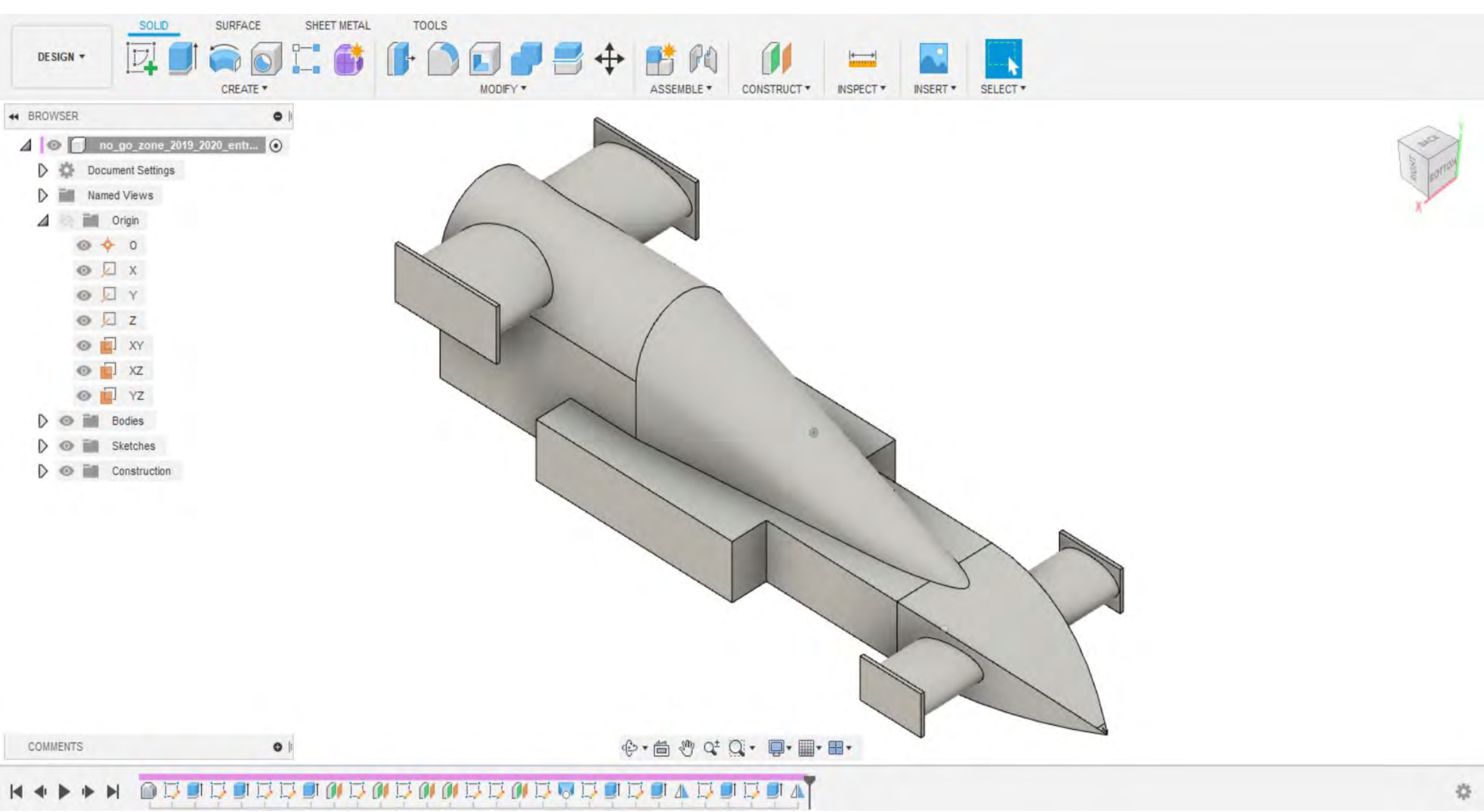
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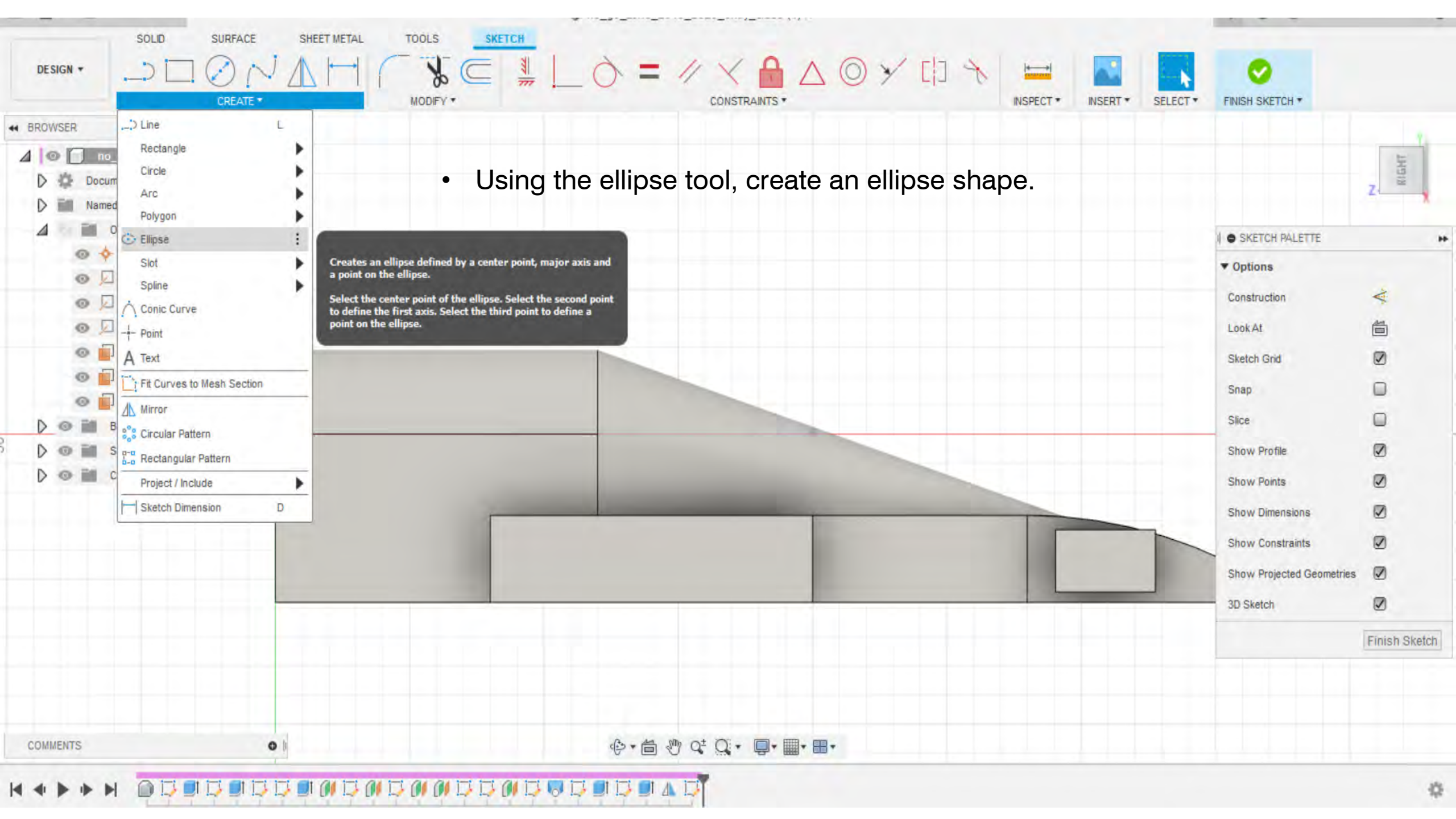
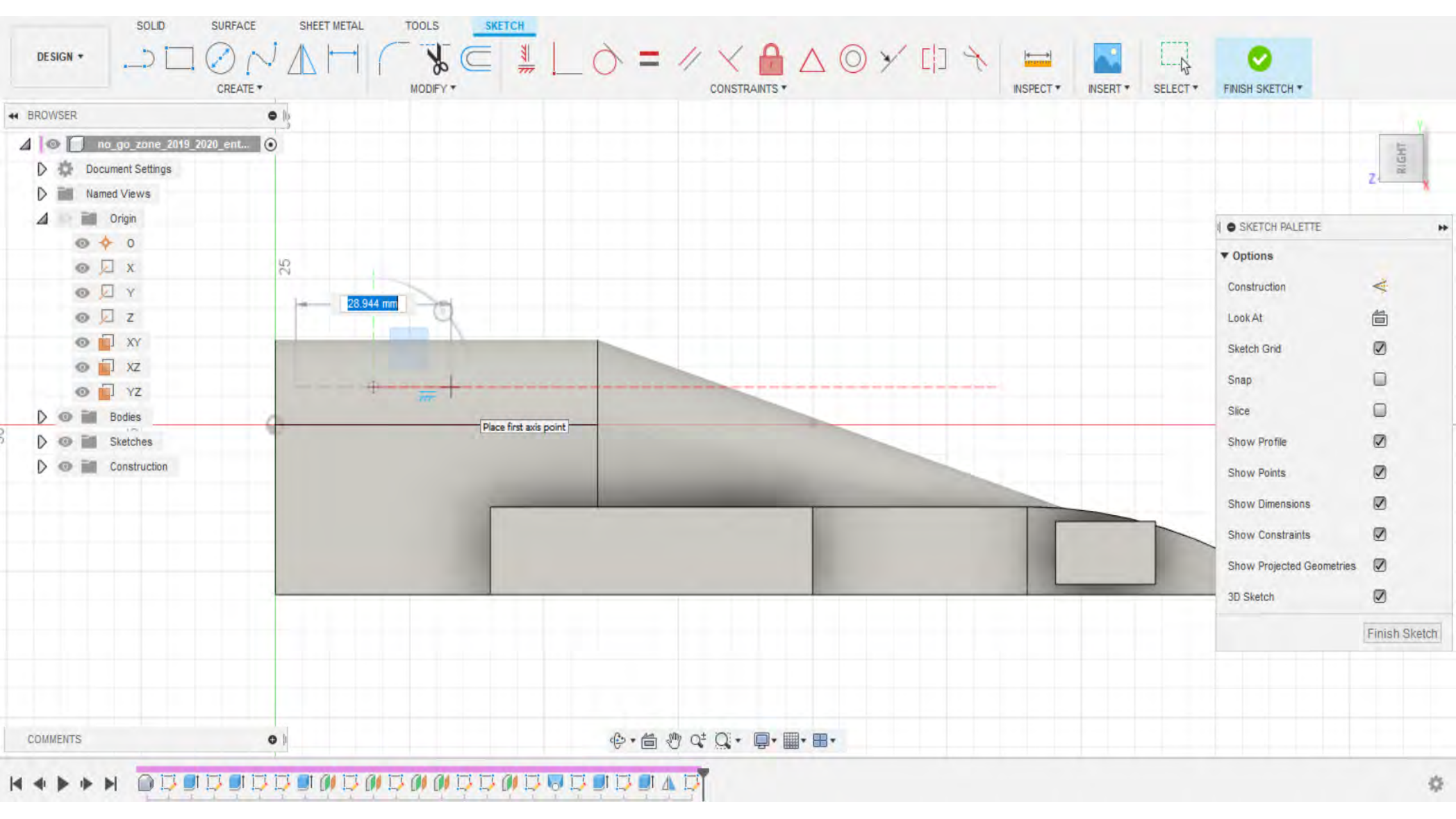
Bodies
Sketches
Construction
COMMENTS

- Using the ellipse tool, create an ellipse shape.




SOLID
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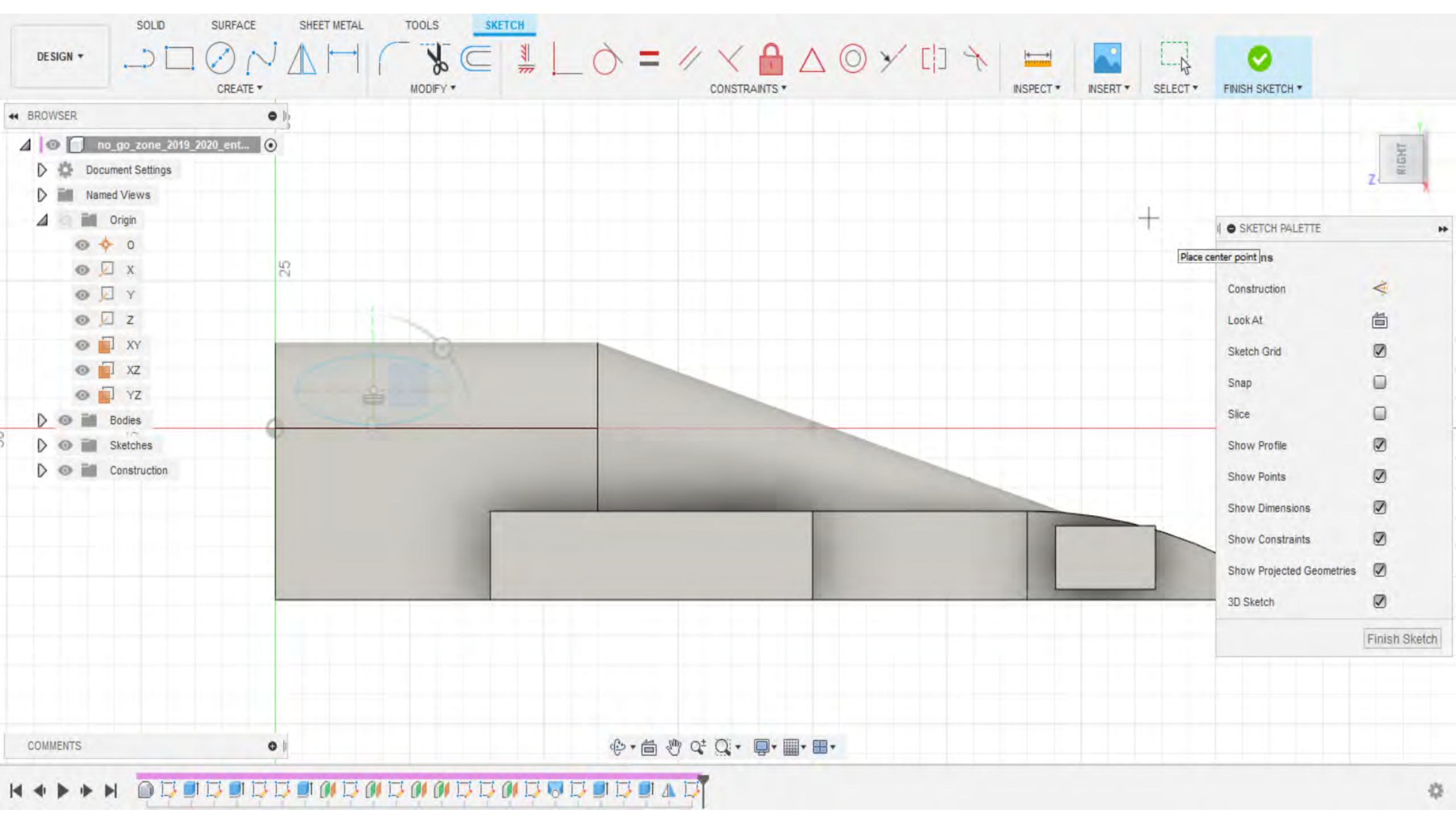
Bodies
Sketches
Construction
25
28.944 mm
Place first axis point
RIGHT
SKETCH PALETTE
Options
Construction
Look At
Sketch Grid
Snap
Slice
Show Profile
Show Points
Show Dimensions
Show Constraints
Show Projected Geometries
3D Sketch
Finish Sketch
COMMENTS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SKETCH PALETTE
Place center point
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Look At
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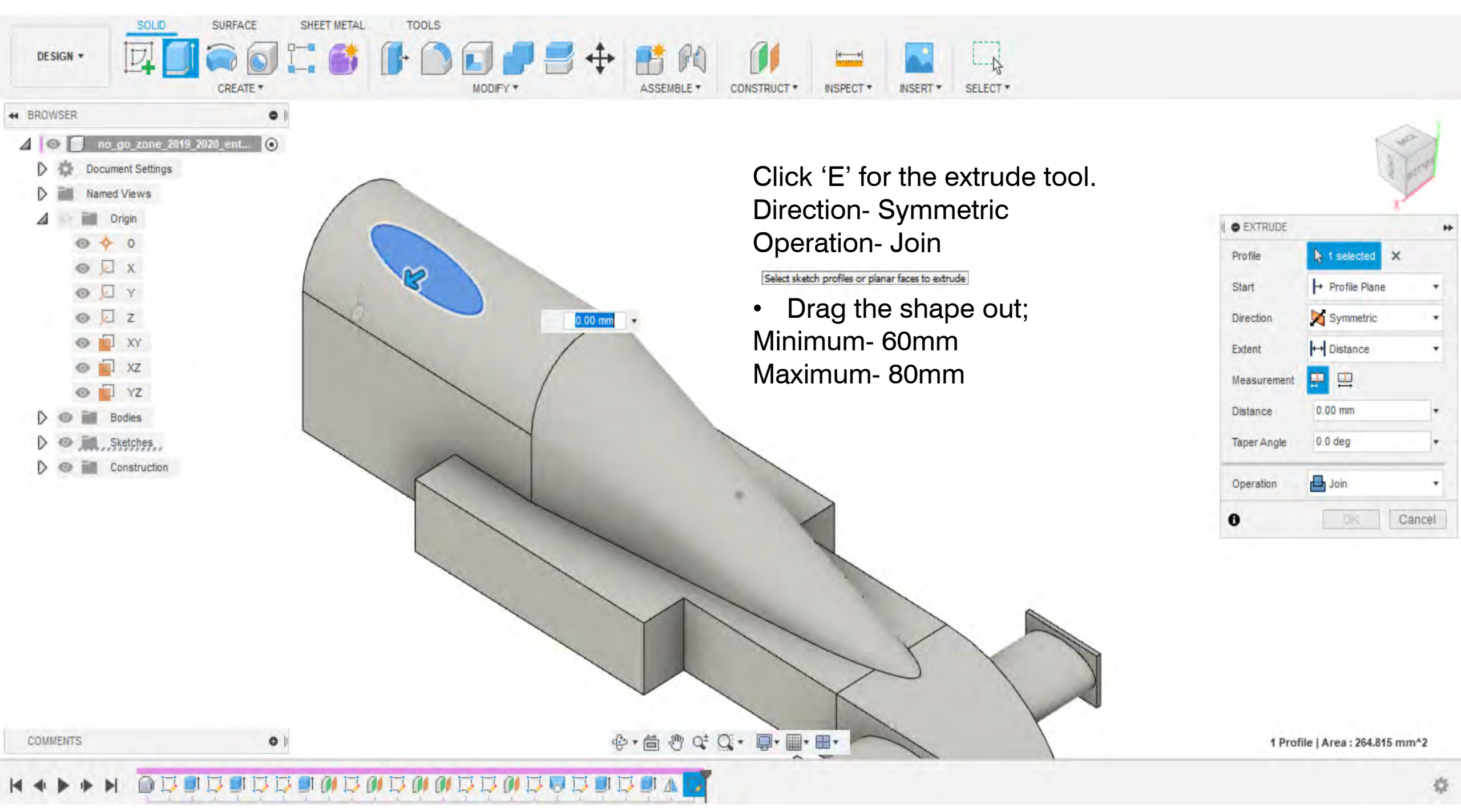
3D Sketch
Finish Sketch
COMMENTS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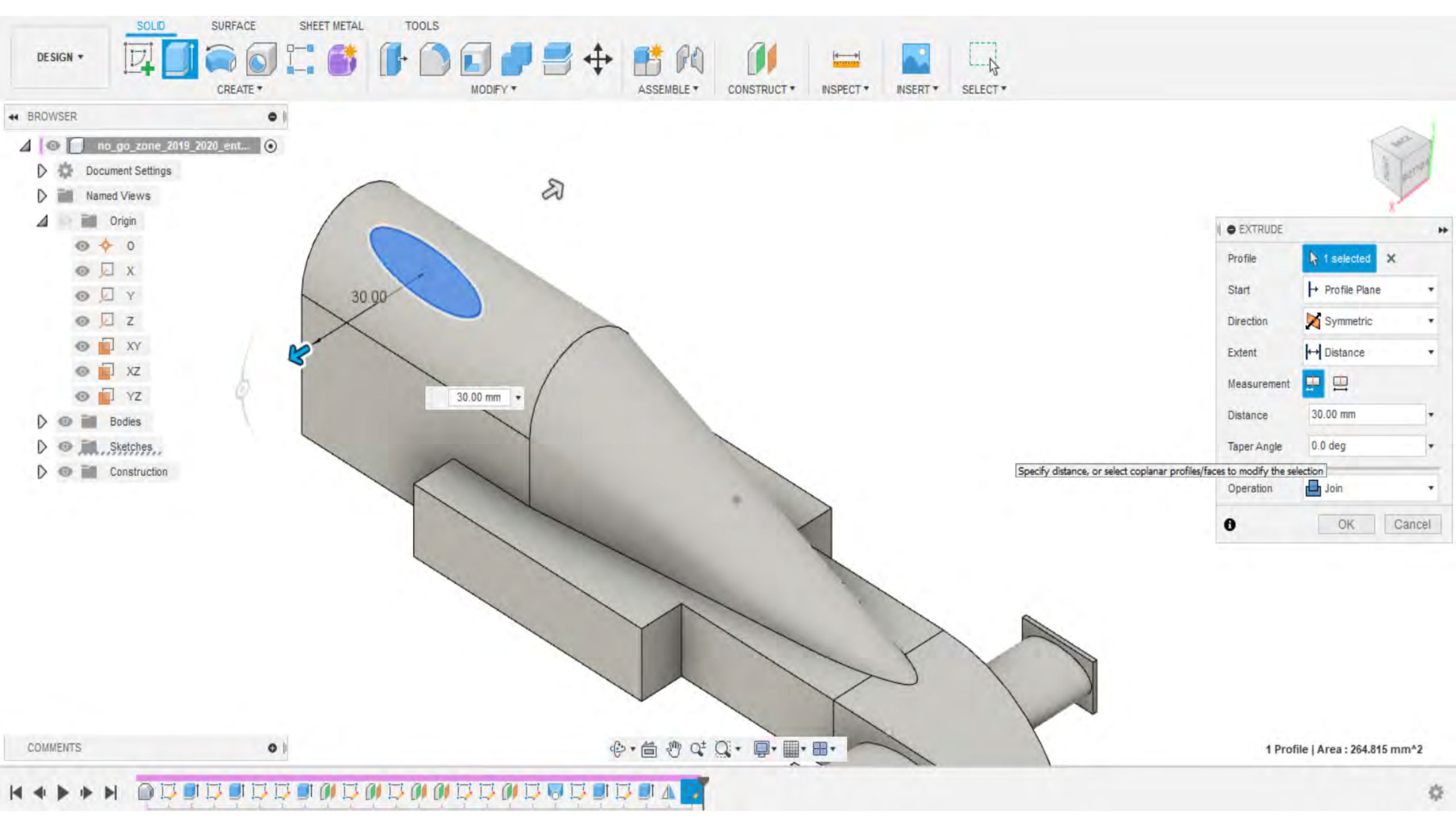
Construction
0.00 mm
Click ‘E’ for the extrude tool.
Direction- Symmetric
Operation- Join
Select sketch profiles or planar faces to extrude
• Drag the shape out;
Minimum- 60mm
Maximum- 80mm
EXTRUDE
Profile
1 selected
Start
Profile Plane
Direction
Symmetric
Extent
Distance
Measurement
Distance
0.00 mm
Taper Angle
0.0 deg
Operation
Join
OK
Cancel
COMMENTS
1 Profile | Area : 264.815 mm^2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Construction
30.00
30.00 mm
EXTRUDE
Profile
1 selected
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Profile Plane
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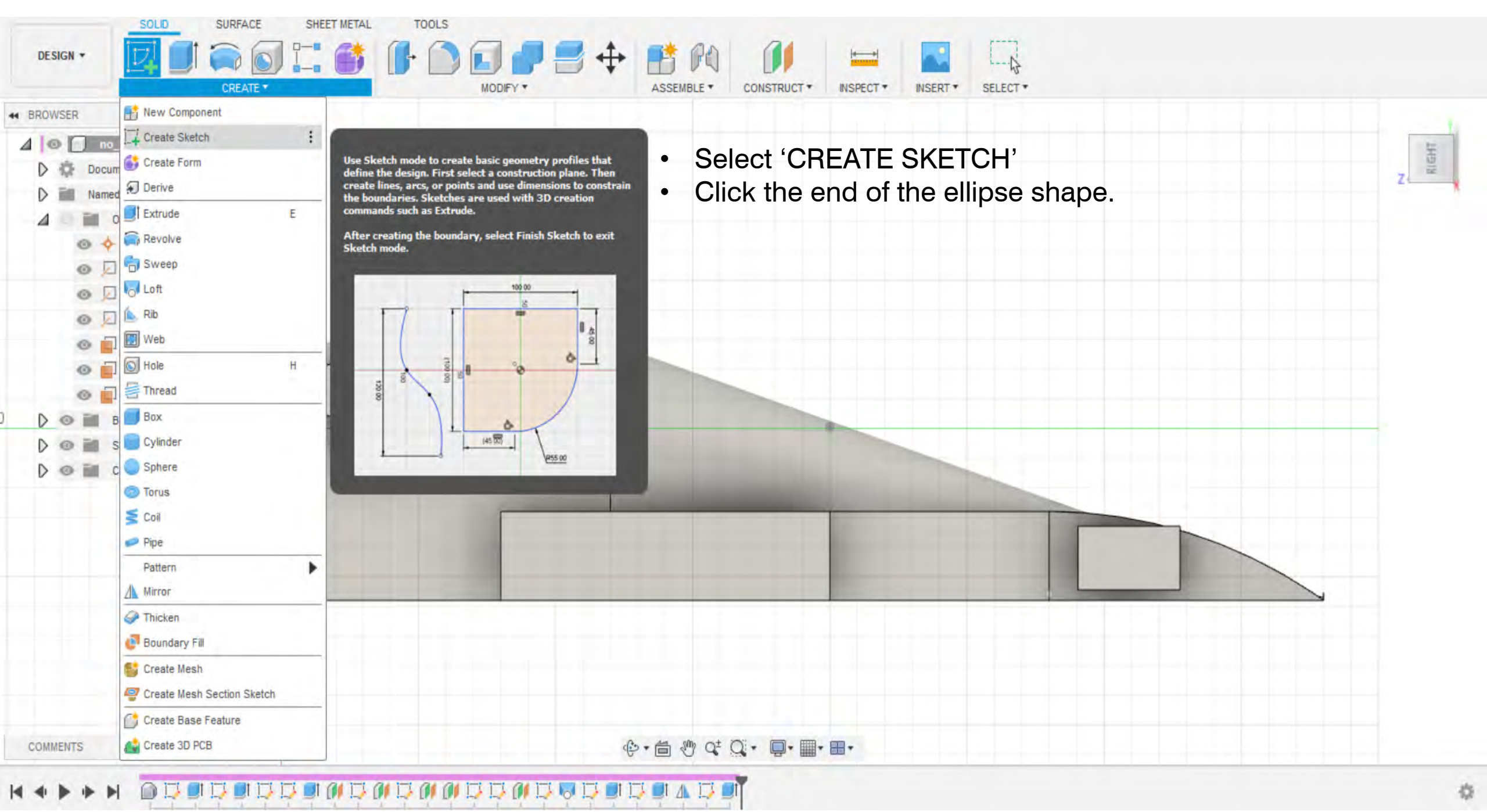
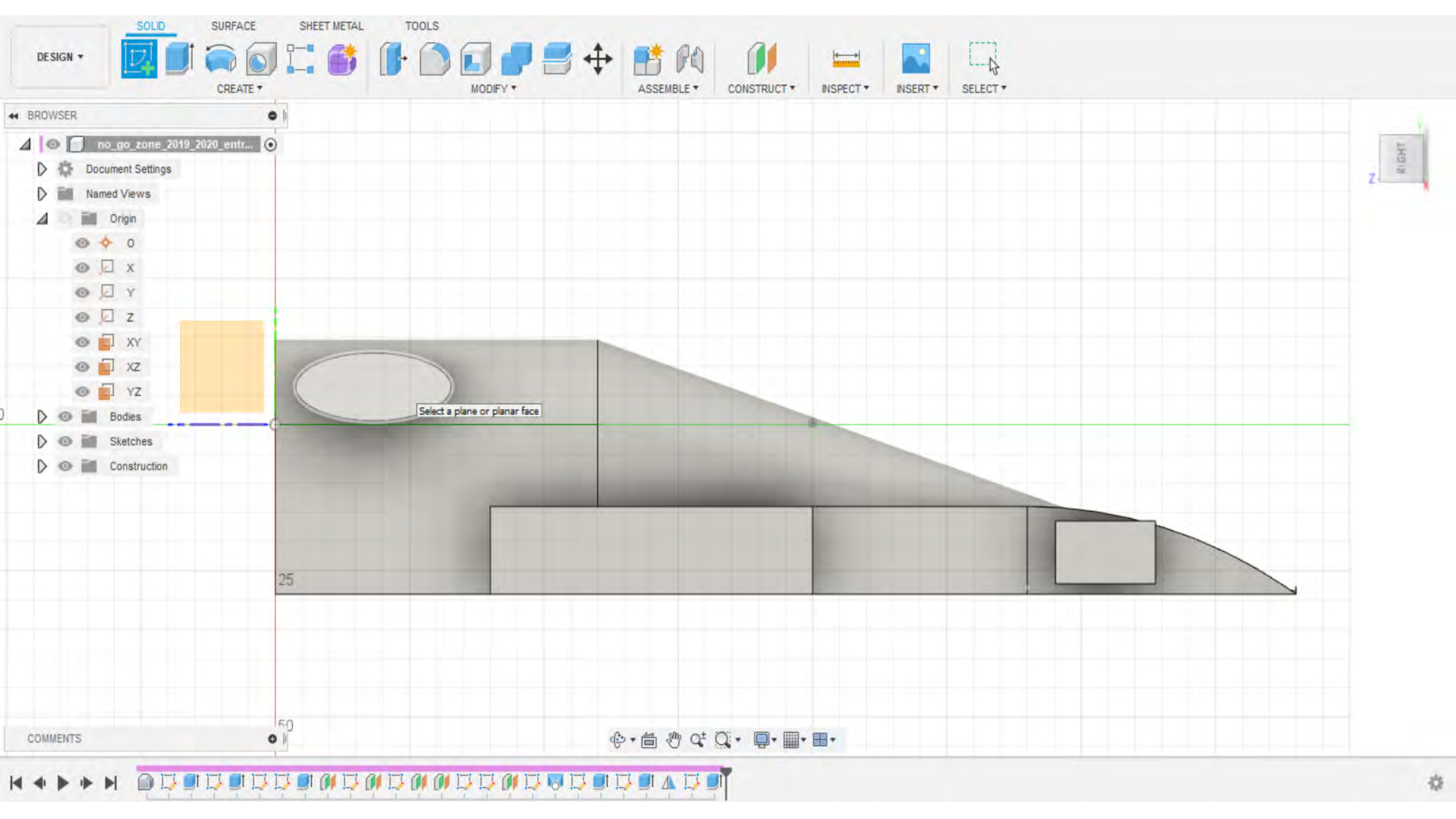
Distance
30.00 mm
Taper Angle
0.0 deg
Specify distance, or select coplanar profiles/faces to modify the selection
Operation
Join
OK
Cancel
COMMENTS
1 Profile | Area : 264.815 mm^2



- Select ‘CREATE SKETCH’
- Click the end of the ellipse shape.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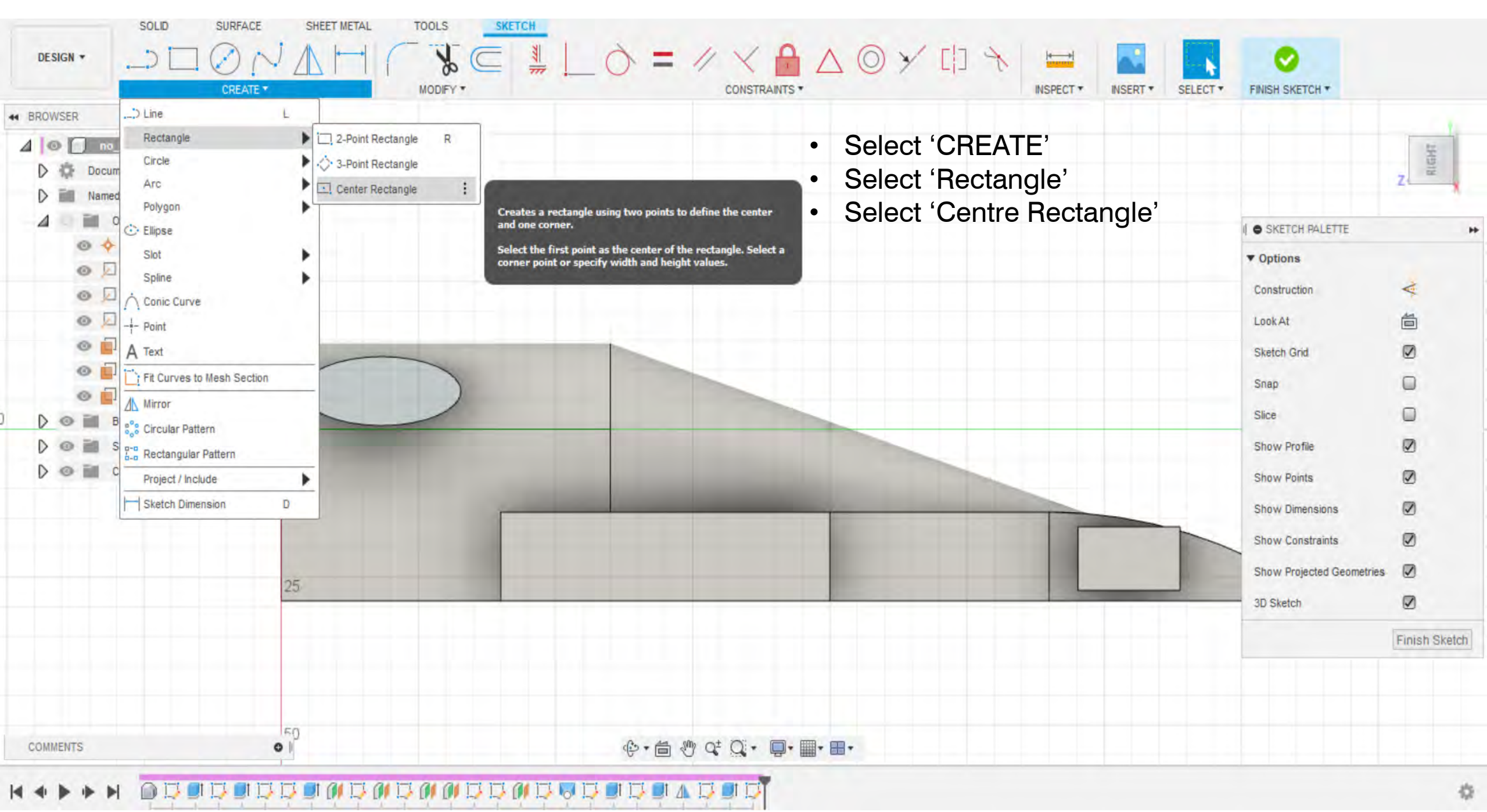
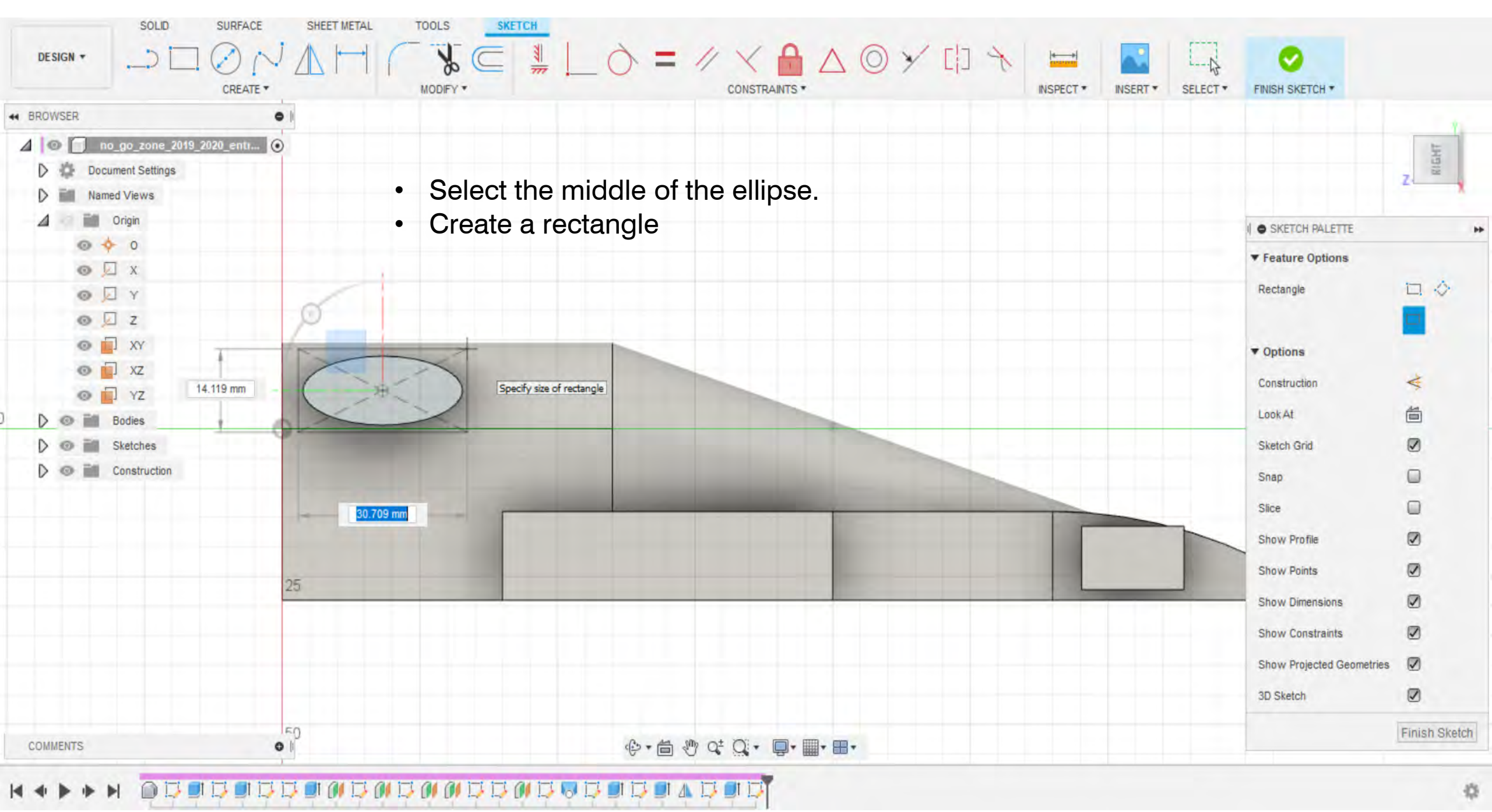
Construction
Select a plane or planar face
25
50
COMMENTS
RIGHT
Z



- Select ‘CREATE’
- Select ‘Rectangle’
- Select ‘Centre Rectangle’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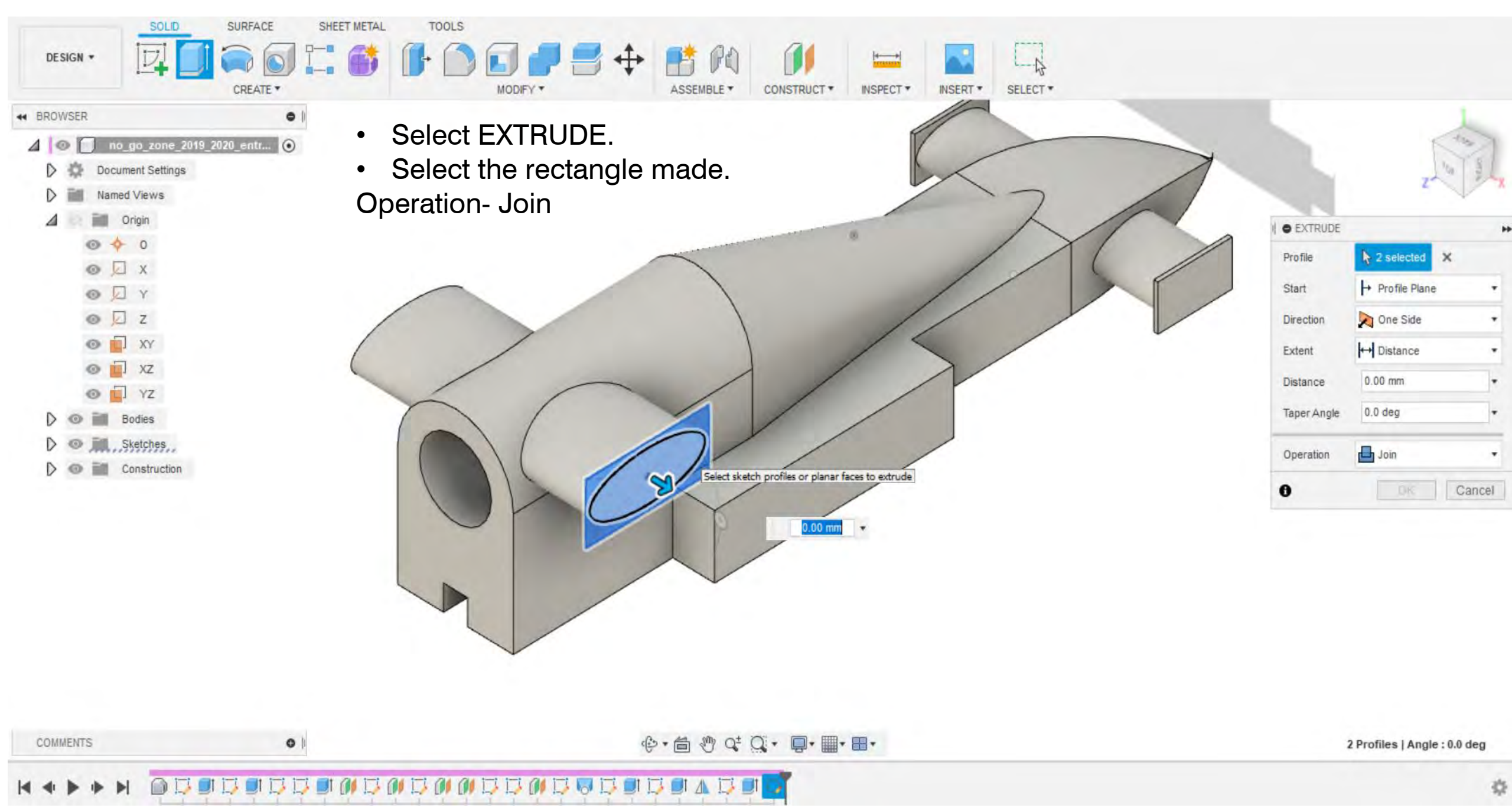
Construction
COMMENTS
• Select the middle of the ellipse.
• Create a rectangle
14.119 mm
Specify size of rectangle
30.709 mm
25
50
RIGHT
SKETCH PALETTE
Feature Options
Rectangle
Options
Construction
Look At
Sketch Grid
Snap
Slice
Show Profile
Show Points
Show Dimensions
Show Constraints
Show Projected Geometries
3D Sketch
Finish Sketch

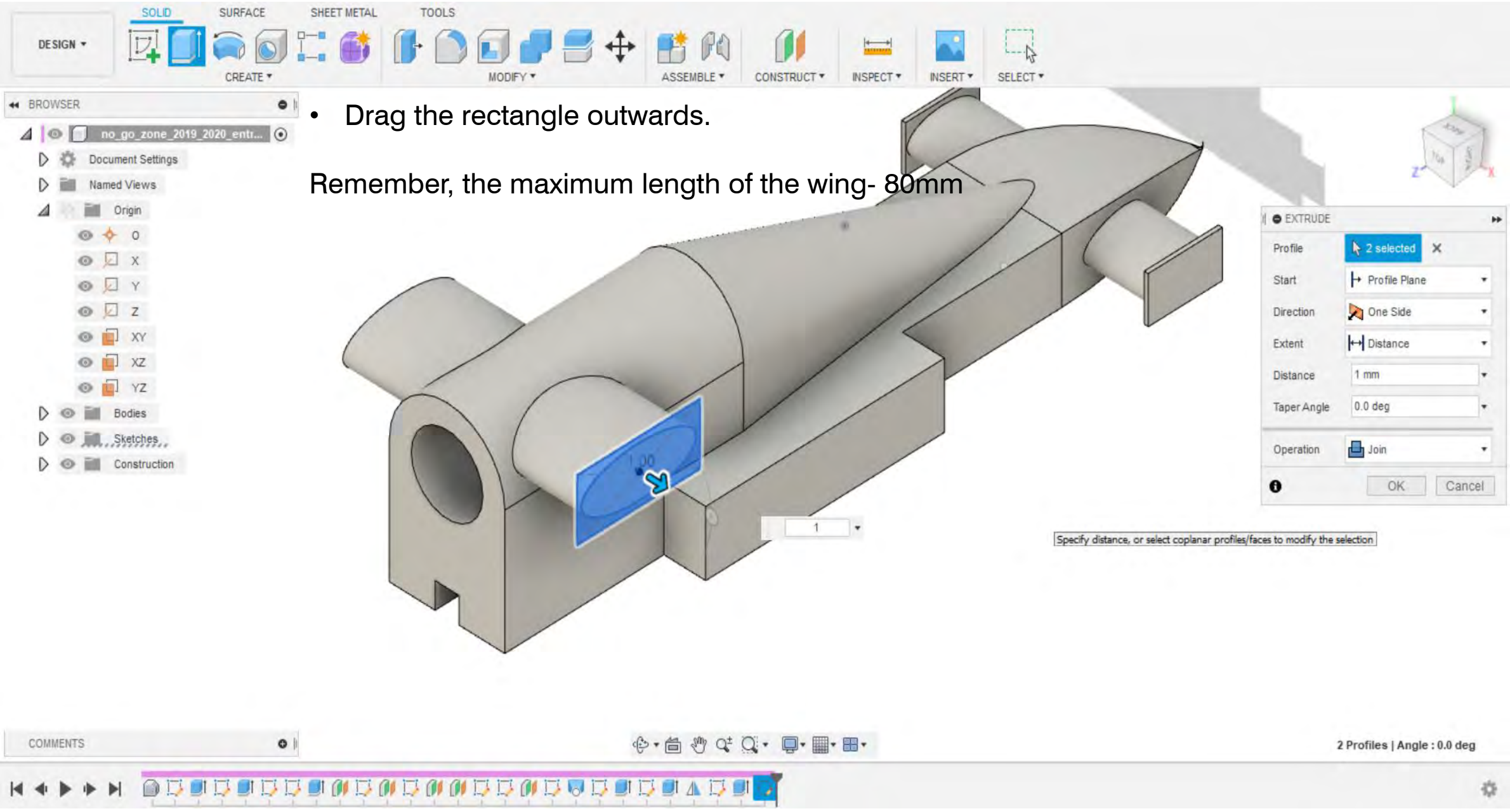
- Select EXTRUDE.
- Select the rectangle made.

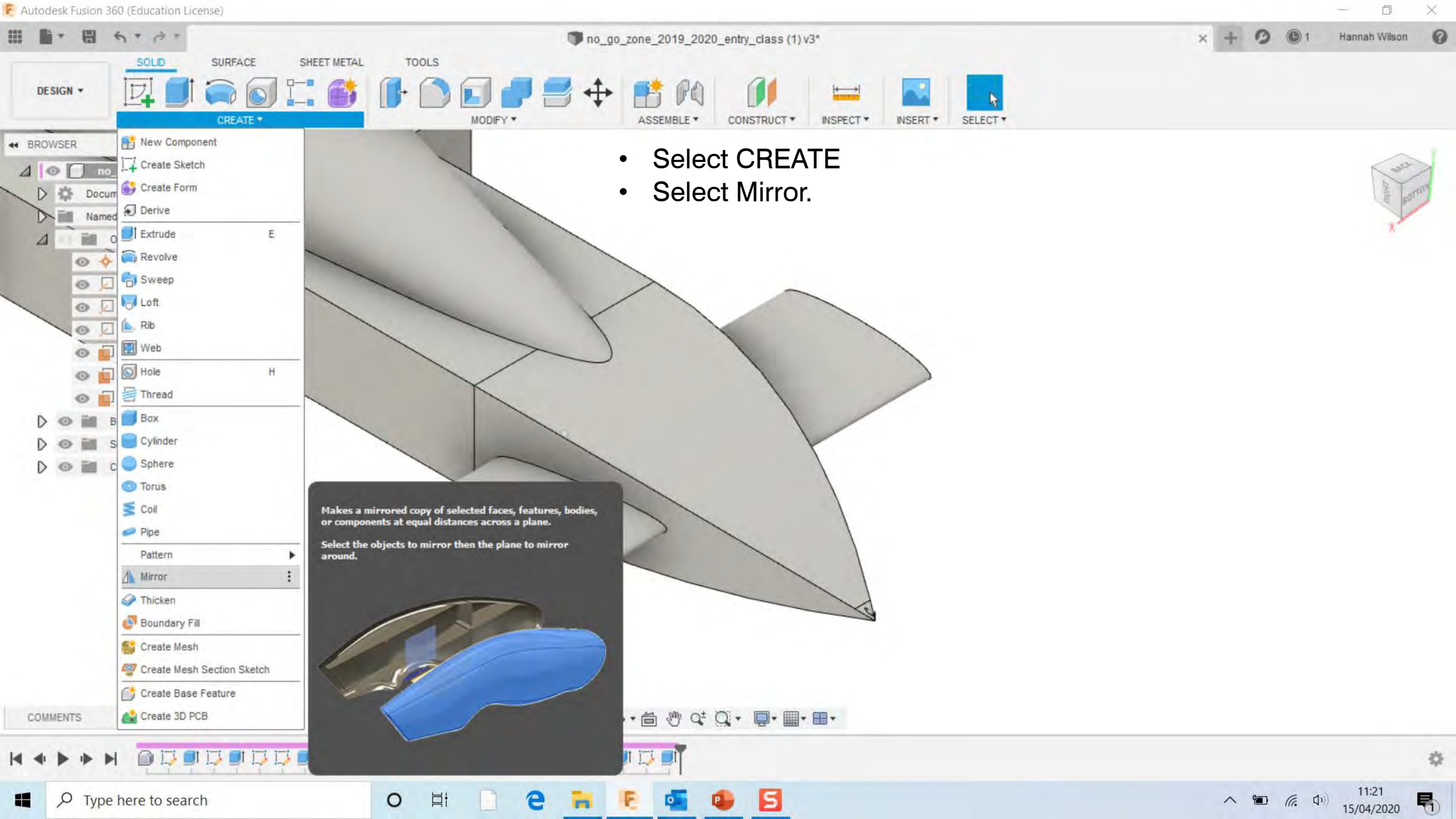
Operation- Join



- Drag the rectangle outwards.

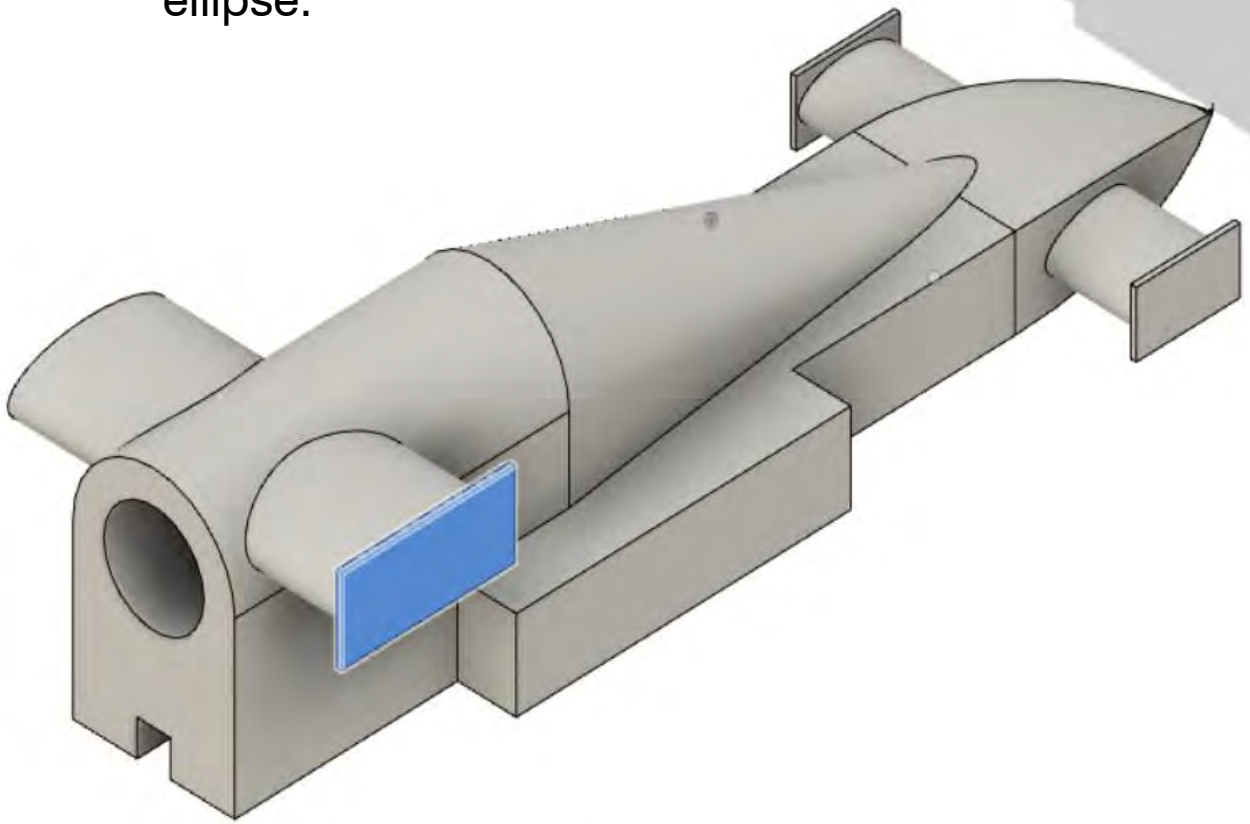
Remember, the maximum length of the wing- 80mm

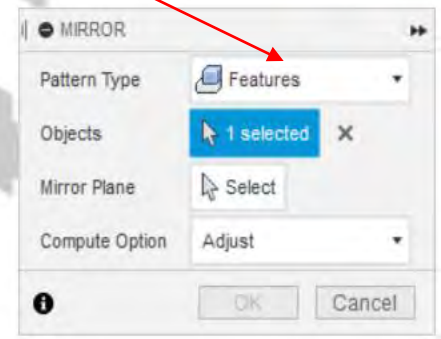




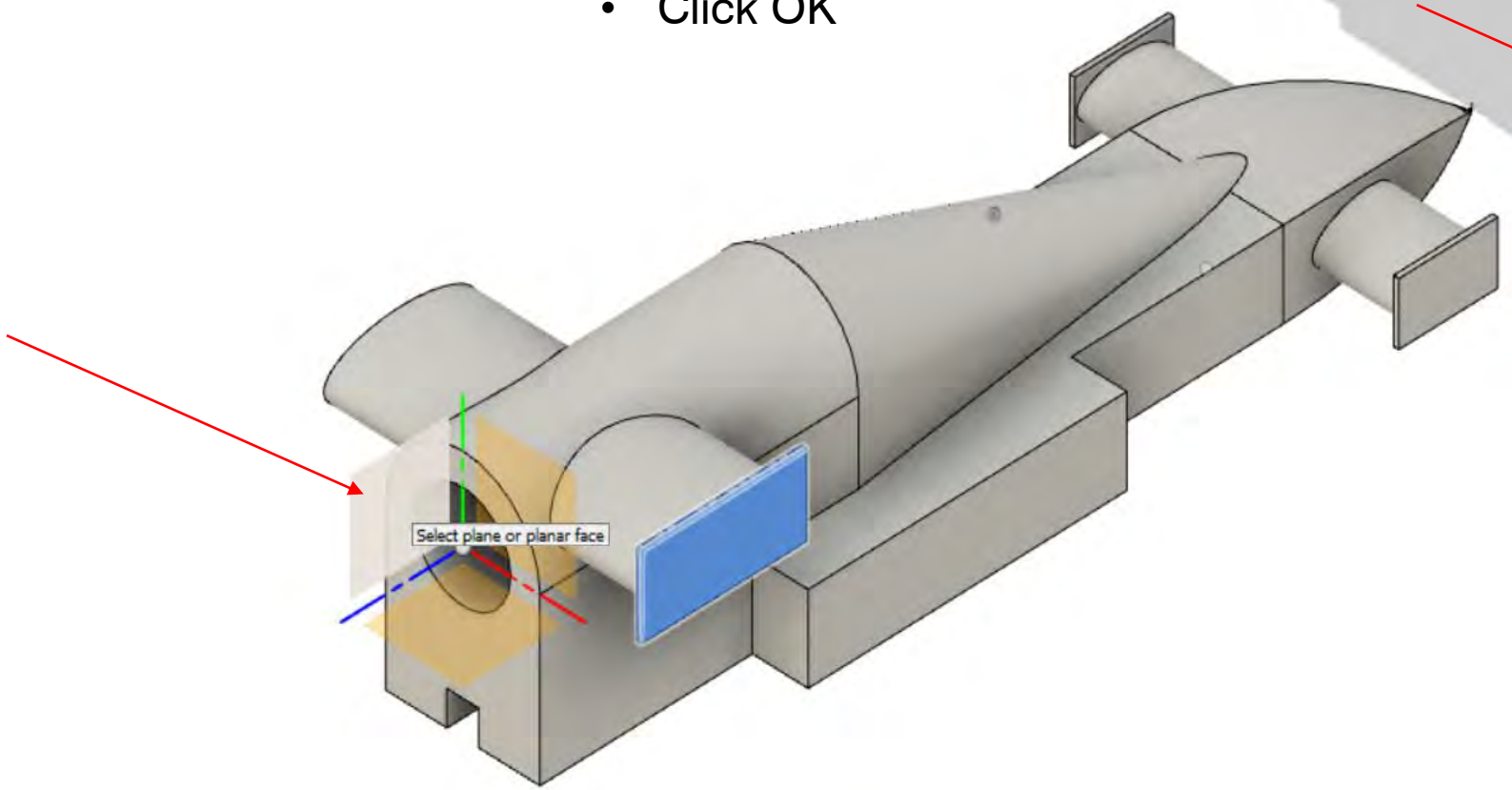
- Select CREATE
- Select Mirror.

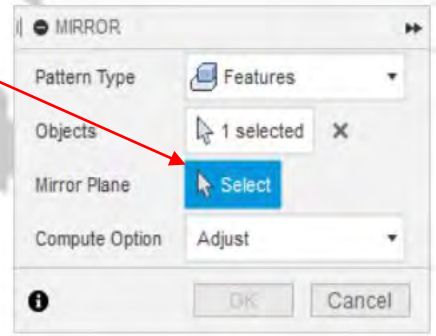
- Pattern type- Features
- Select the rectangle you have created on the end of the ellipse.

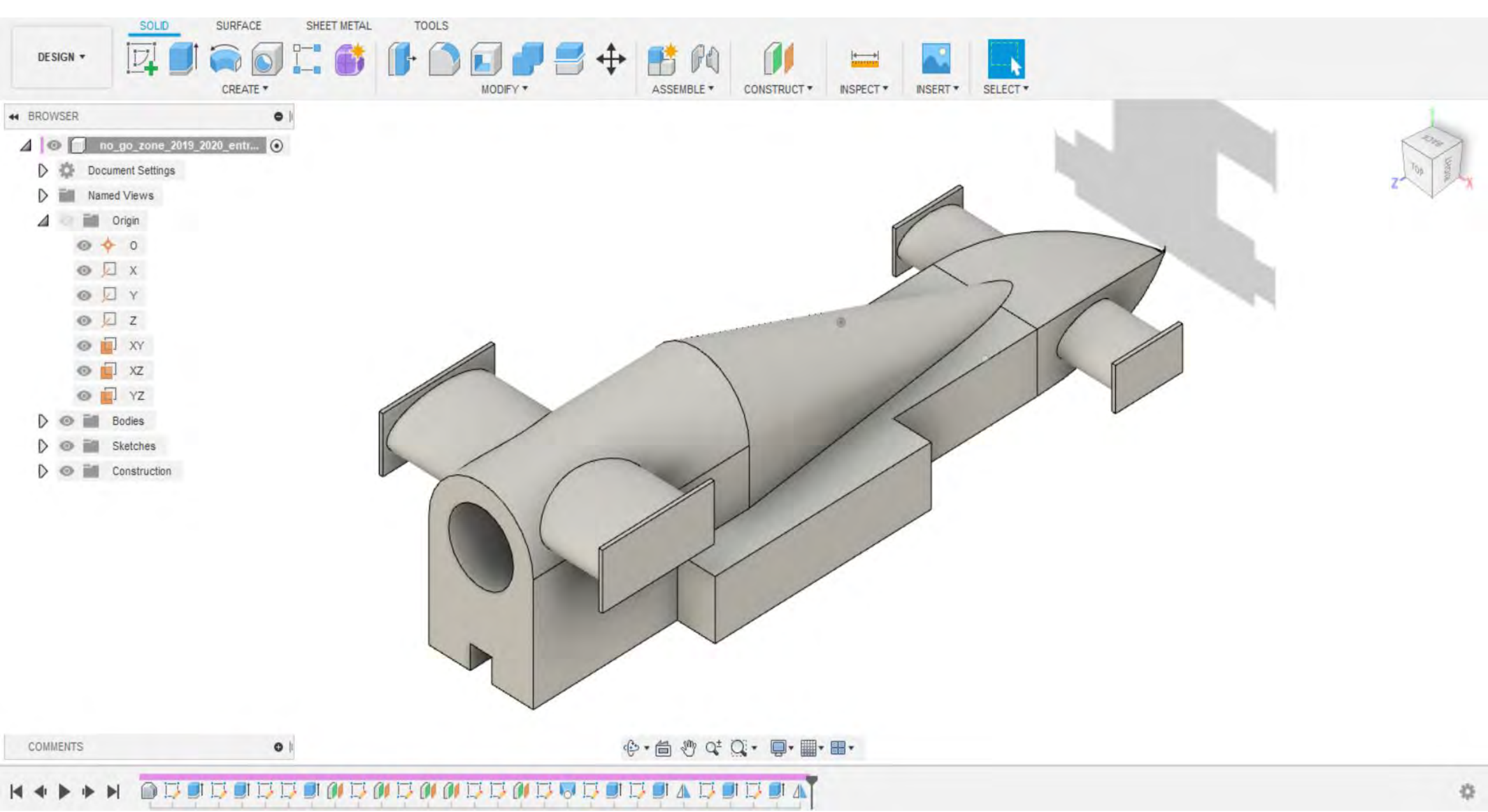




- Select Mirror Plane in the MIRROR menu
- Select the middle plane
- Click OK



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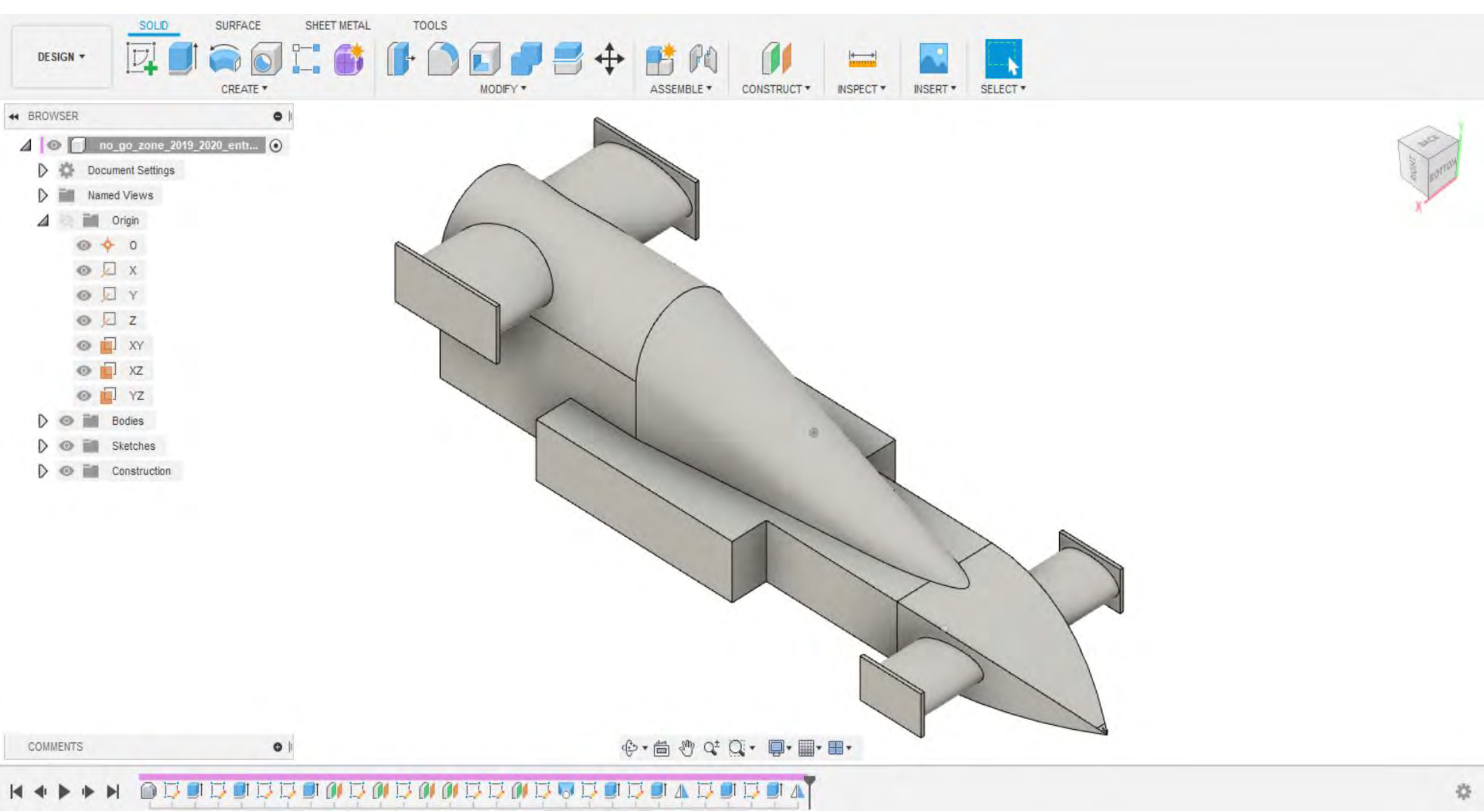
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