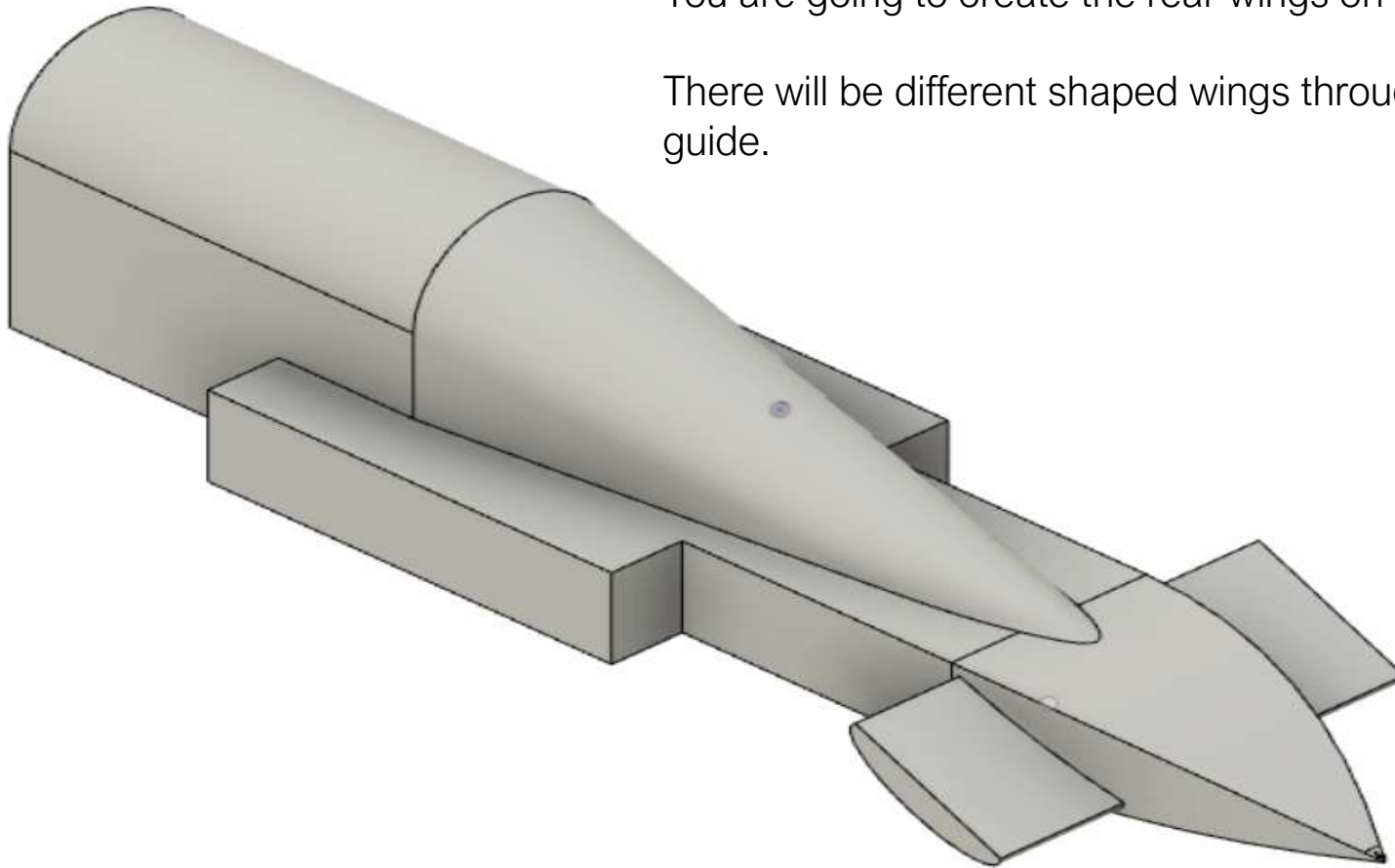


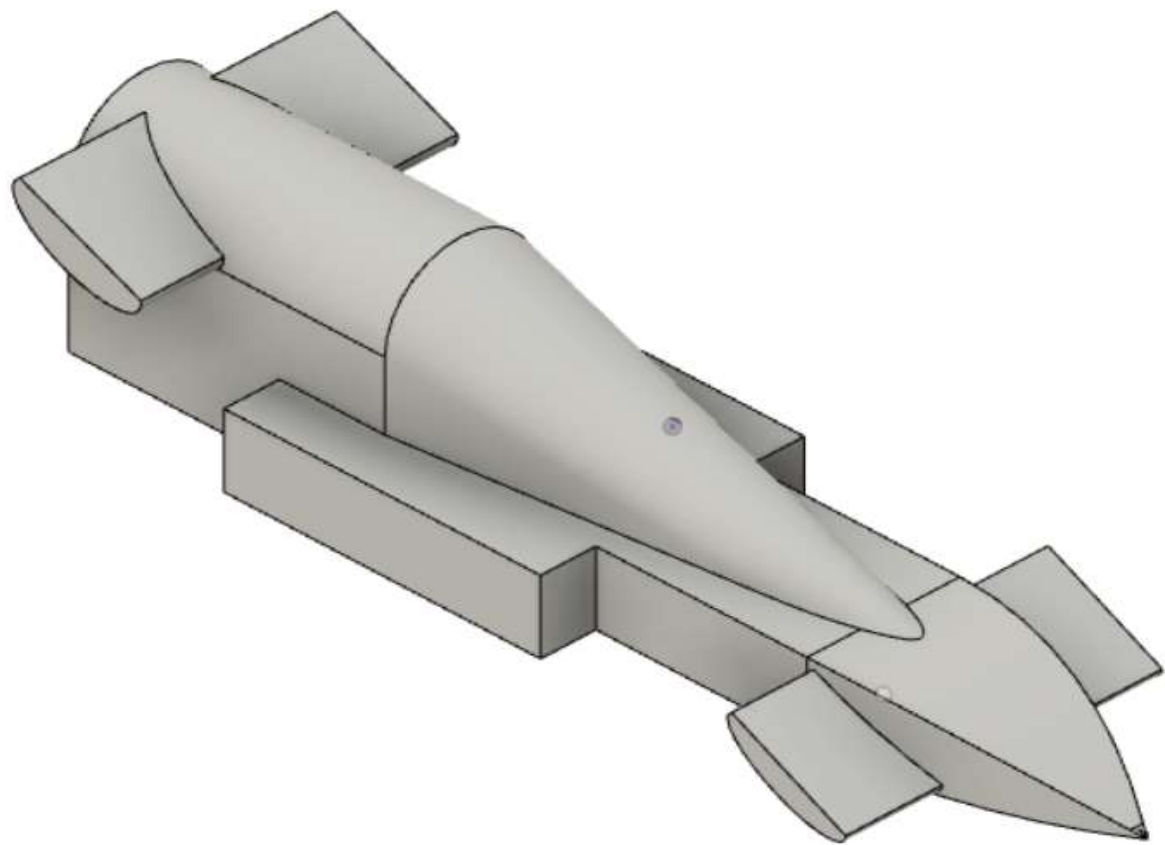
Activity 5- Designing the rear wing.



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

There will be different shaped wings throughout this guide.







BROWSER

no_go_zone_2019_2020_ent...

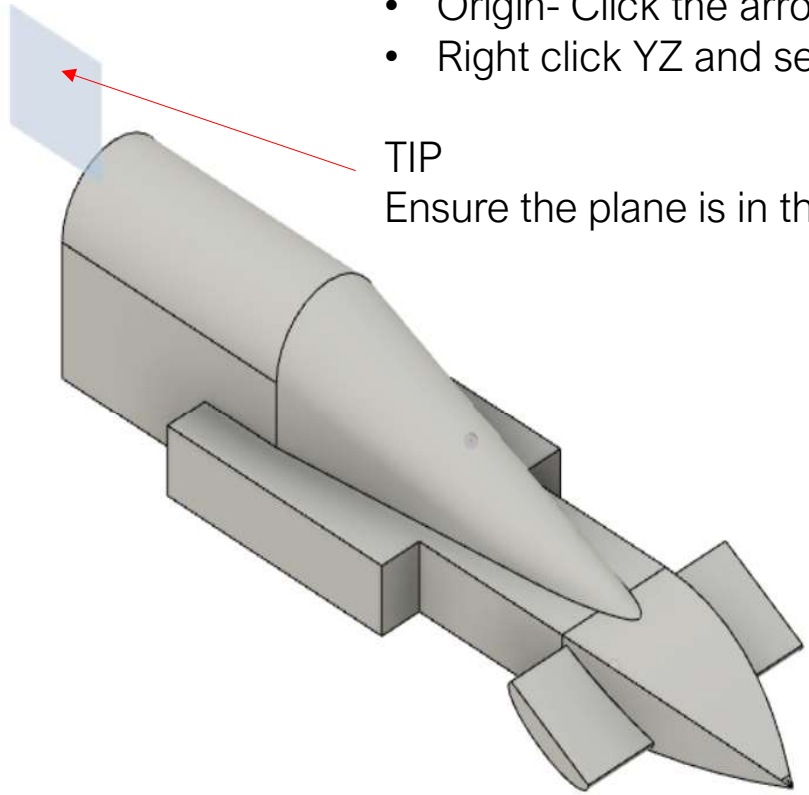
Document Settings

Named Views

Origin

- 0
- X
- Y
- Z
- XY
- XZ
- YZ

- Create Selection Set
- Create Sketch
- Offset Plane
- Copy
- Cut
- Show/Hide
- Find in Window



- 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.

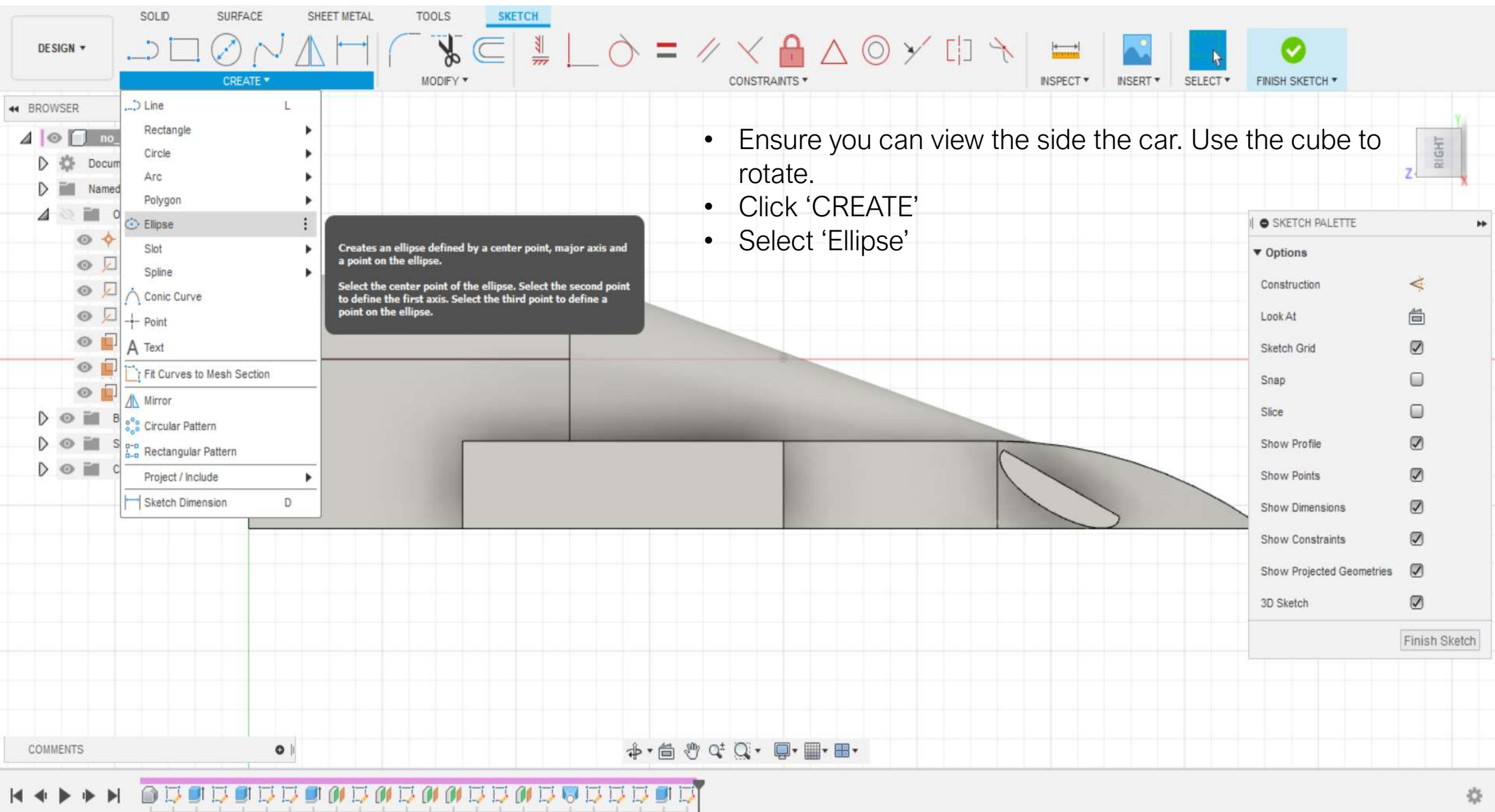


COMMENTS

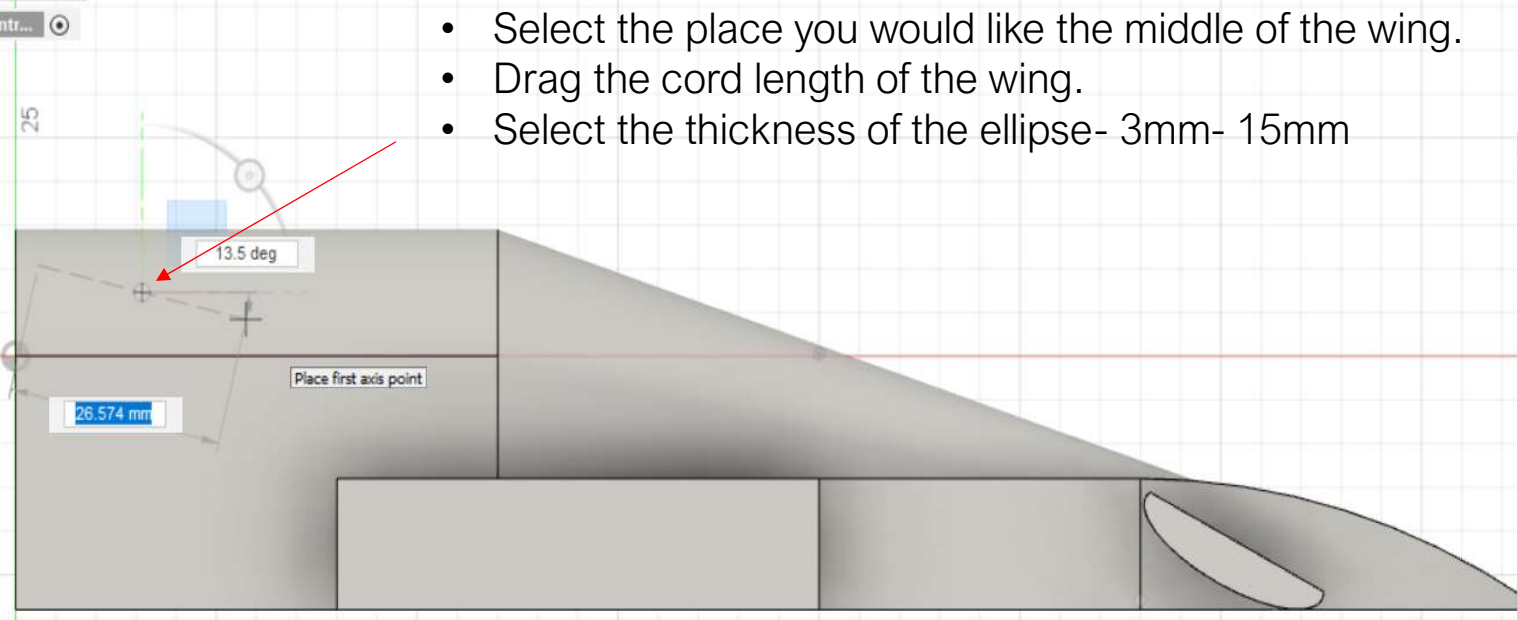
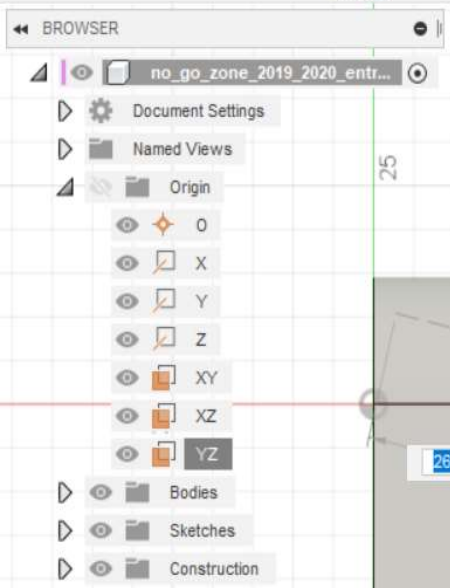


YZ Plane

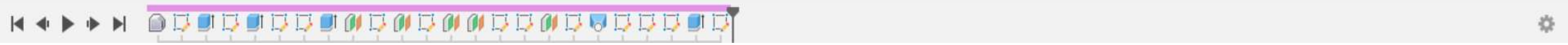
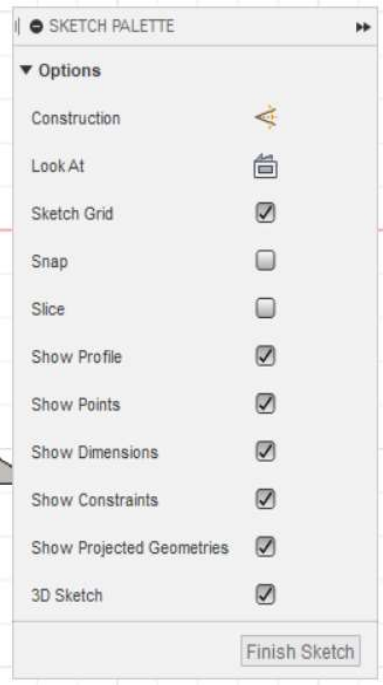


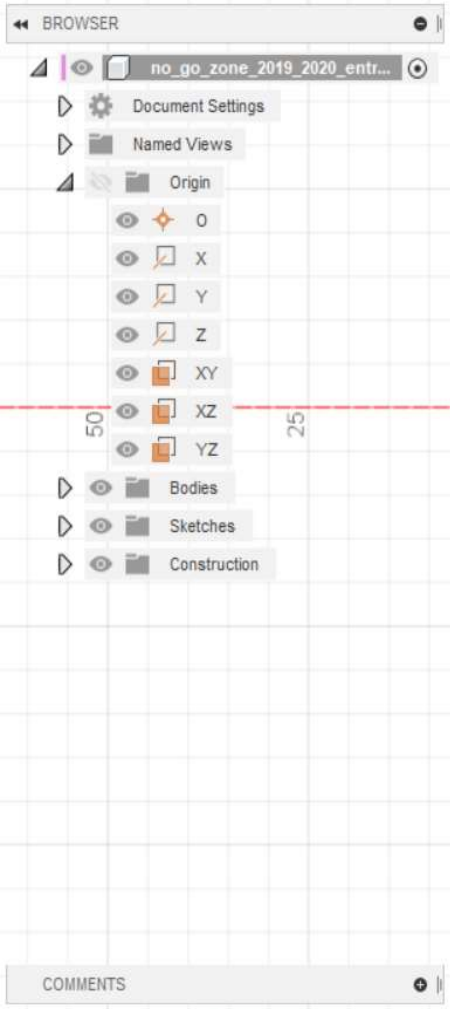
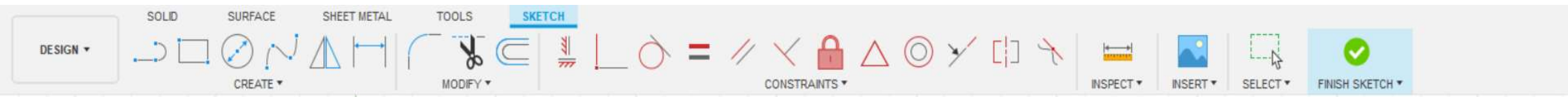


- Ensure you can view the side the car. Use the cube to rotate.
- Click 'CREATE'
- Select 'Ellipse'

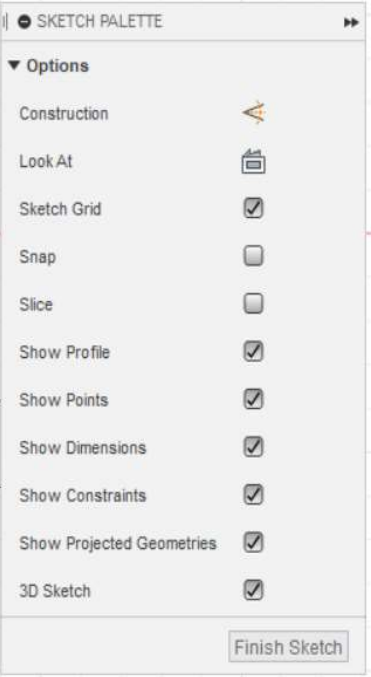
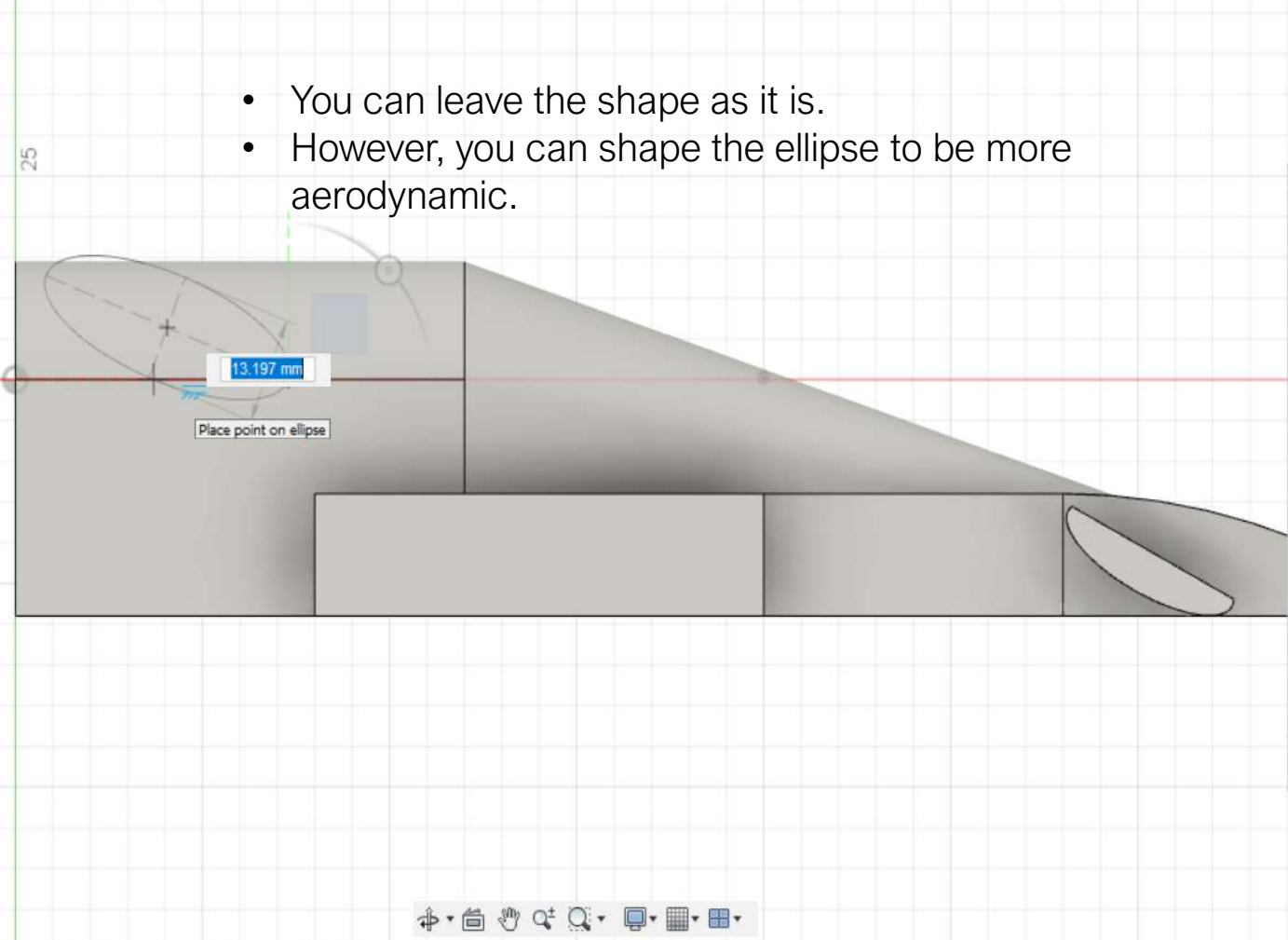


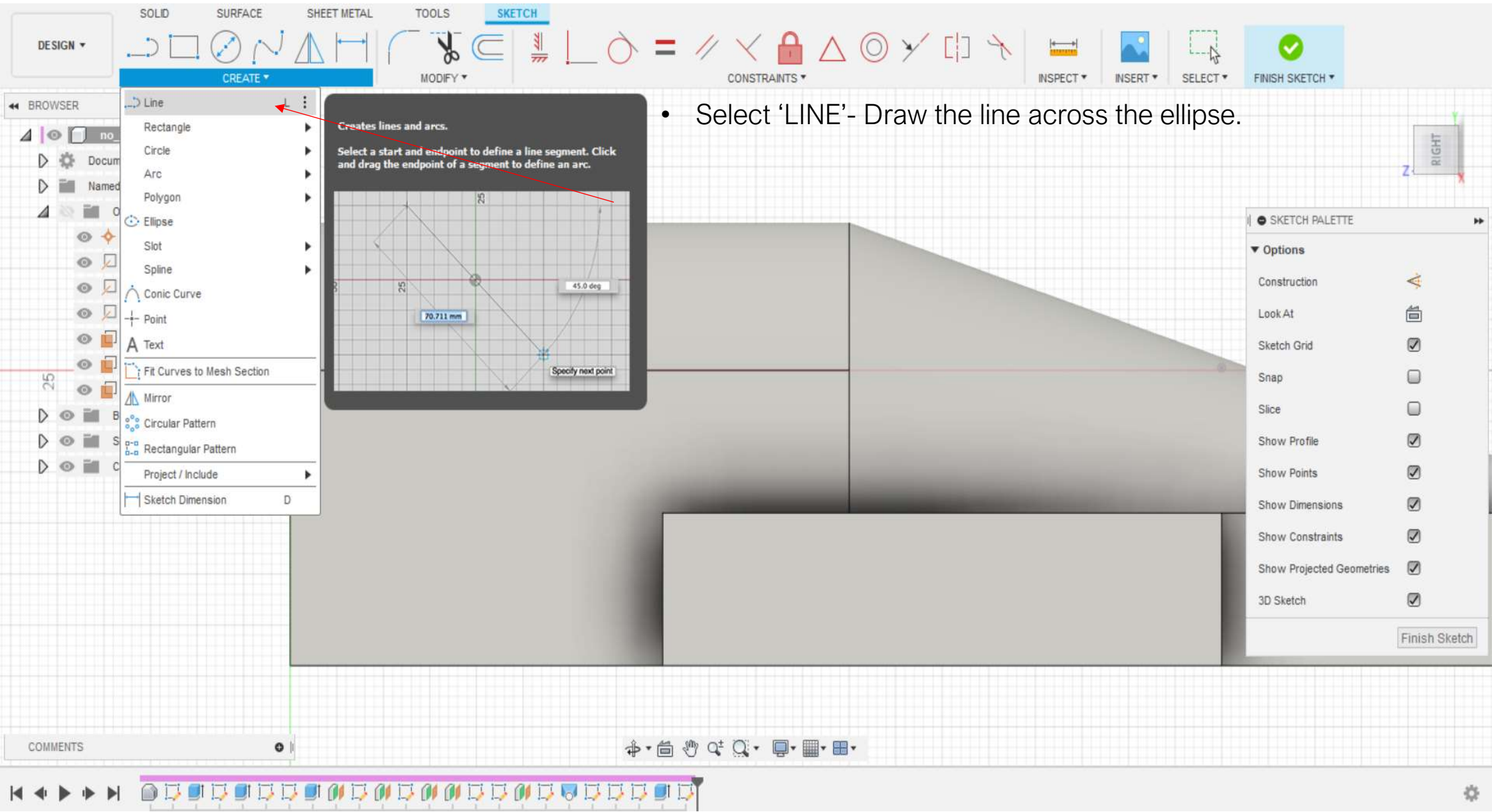
- Select the place you would like the middle of the wing.
- Drag the cord length of the wing.
- Select the thickness of the ellipse- 3mm- 15mm





- 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.

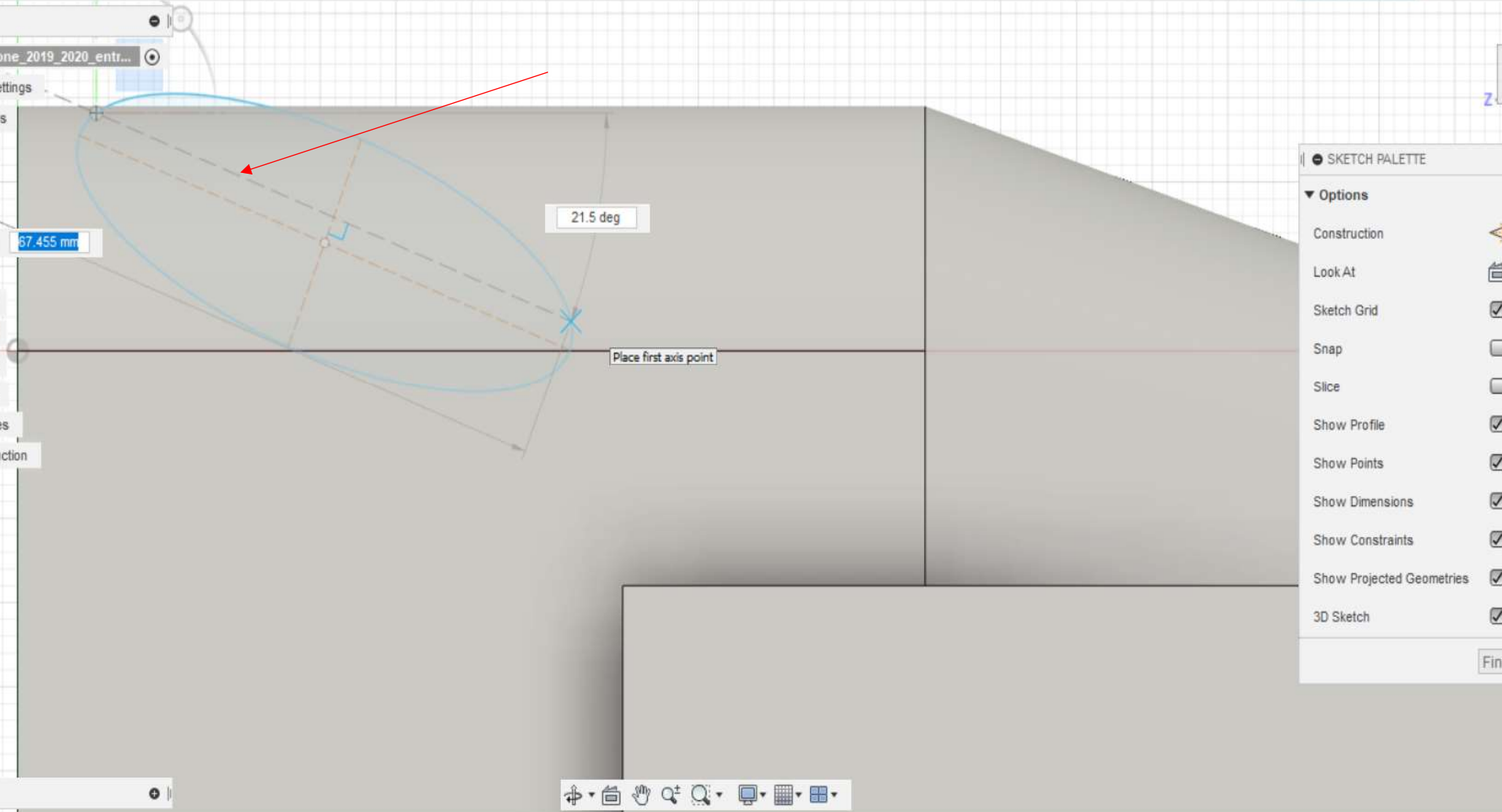
DESIGN ▾ SOLID SURFACE SHEET METAL TOOLS SKETCH

CREATE ▾ MODIFY ▾ CONSTRAINTS ▾ INSPECT ▾ INSERT ▾ SELECT ▾ FINISH SKETCH ▾

BROWSER

no_go_zone_2019_2020_entr...

- Document Settings
- Named Views
- Origin
 - 0
 - X
 - Y 67.455 mm
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



SKETCH PALETTE

Options

- Construction
- Look At
- Sketch Grid
- Snap
- Slice
- Show Profile
- Show Points
- Show Dimensions
- Show Constraints
- Show Projected Geometries
- 3D Sketch

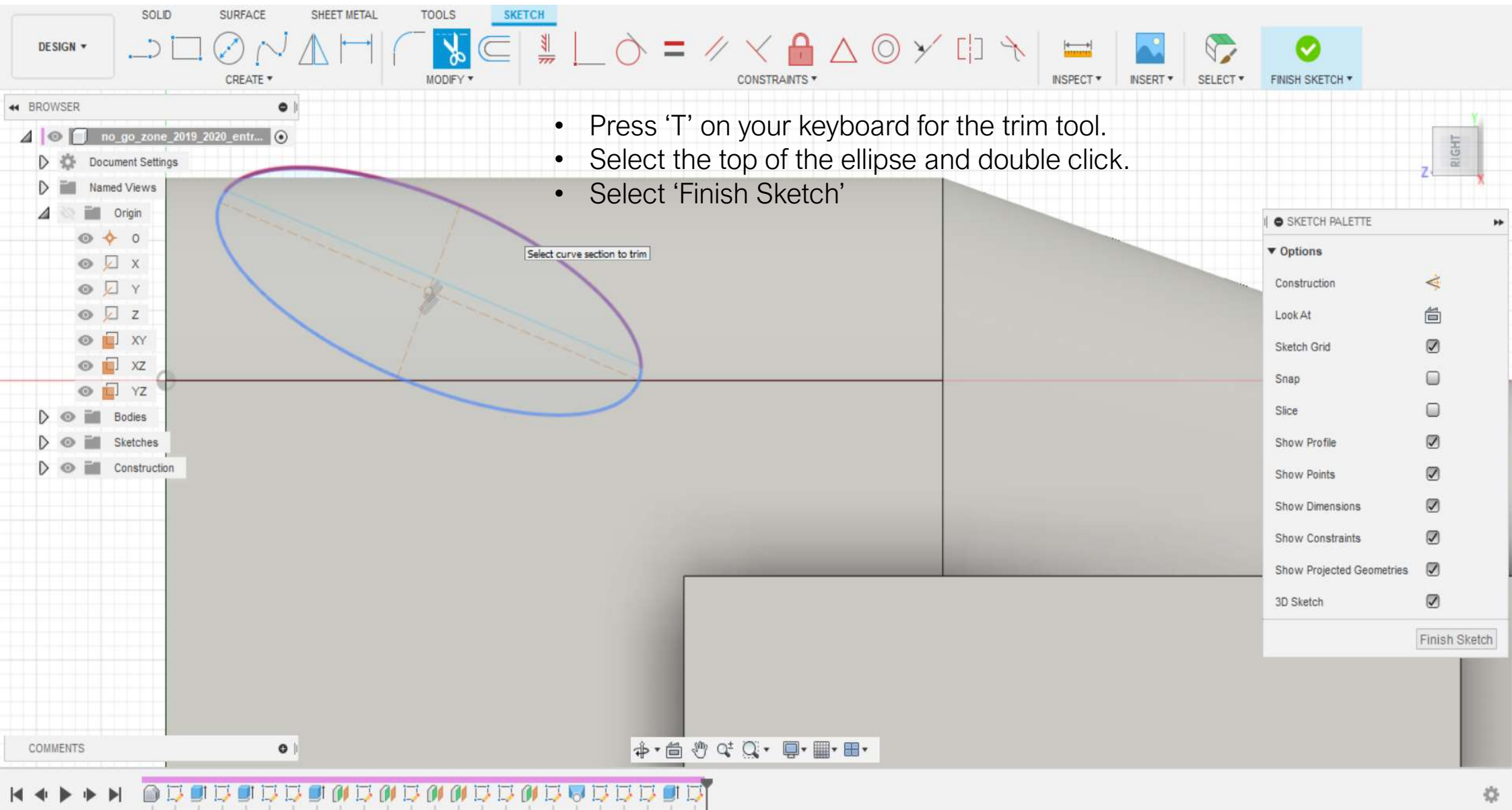
Finish Sketch

COMMENTS

Navigation icons: pan, rotate, zoom, etc.

Timeline and view control icons





- Press 'T' on your keyboard for the trim tool.
- Select the top of the ellipse and double click.
- Select 'Finish Sketch'

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

DESIGN ▾

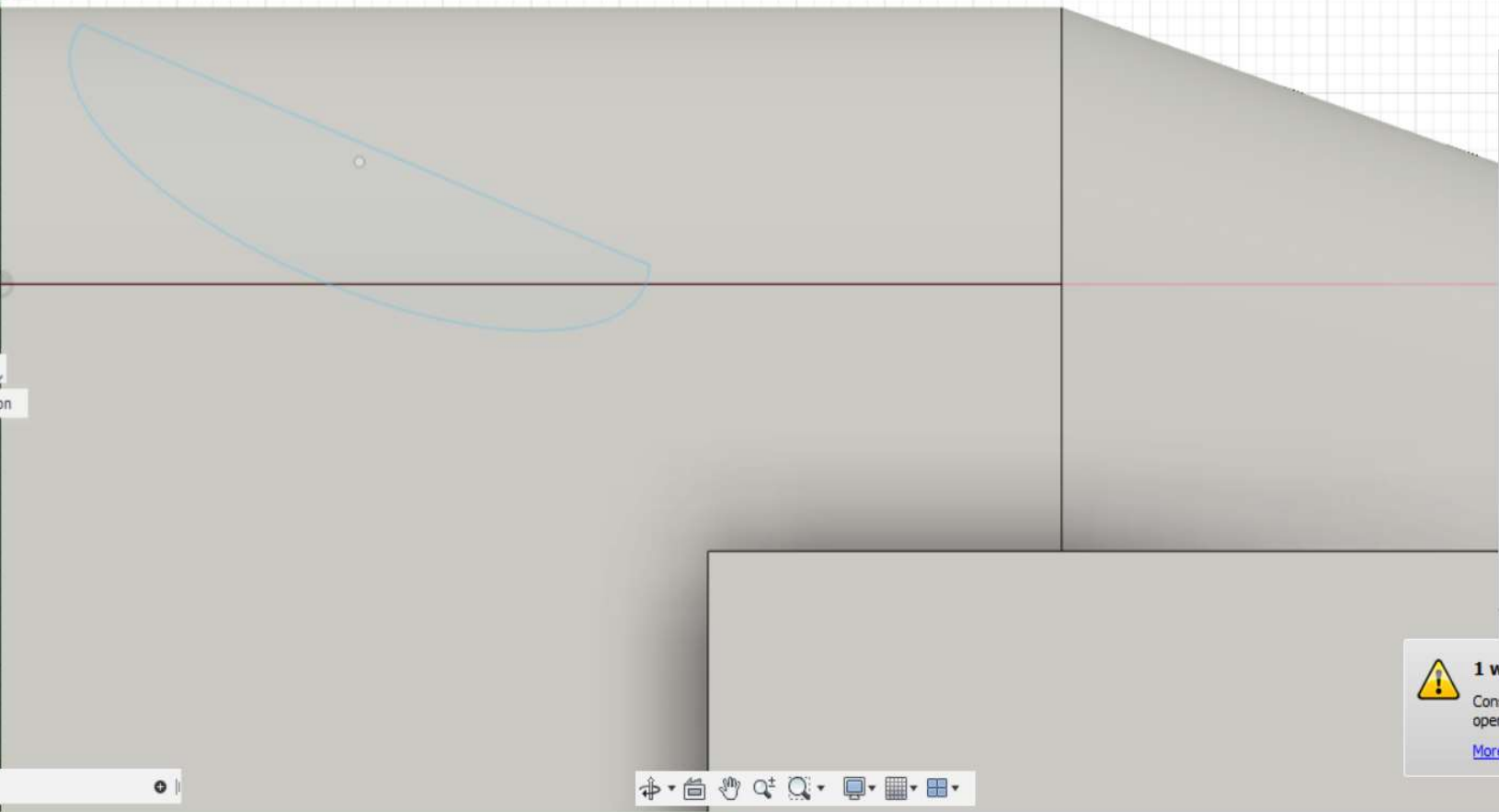
SOLID SURFACE SHEET METAL TOOLS **SKETCH**

CREATE ▾ MODIFY ▾ CONSTRAINTS ▾ INSPECT ▾ INSERT ▾ SELECT ▾ FINISH SKETCH ▾

BROWSER

no_go_zone_2019_2020_entr...

- Document Settings
- Named Views
- Origin
 - 0
 - X
 - Y
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



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

1 warning(s)

Constraints and/or dimensions were removed during operation.

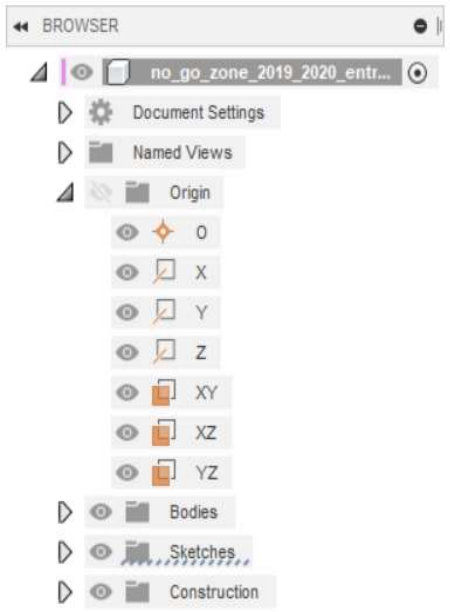
[More Info](#)

COMMENTS

Navigation icons: Home, Previous, Next, Find, Rotate, Zoom, Pan, Grid, etc.

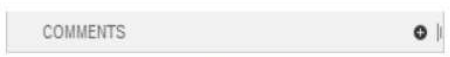
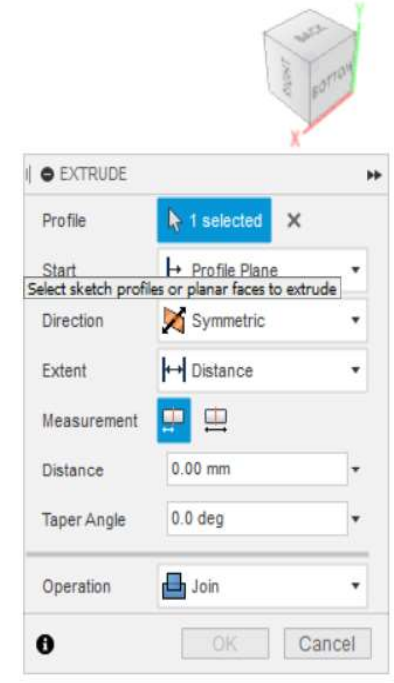
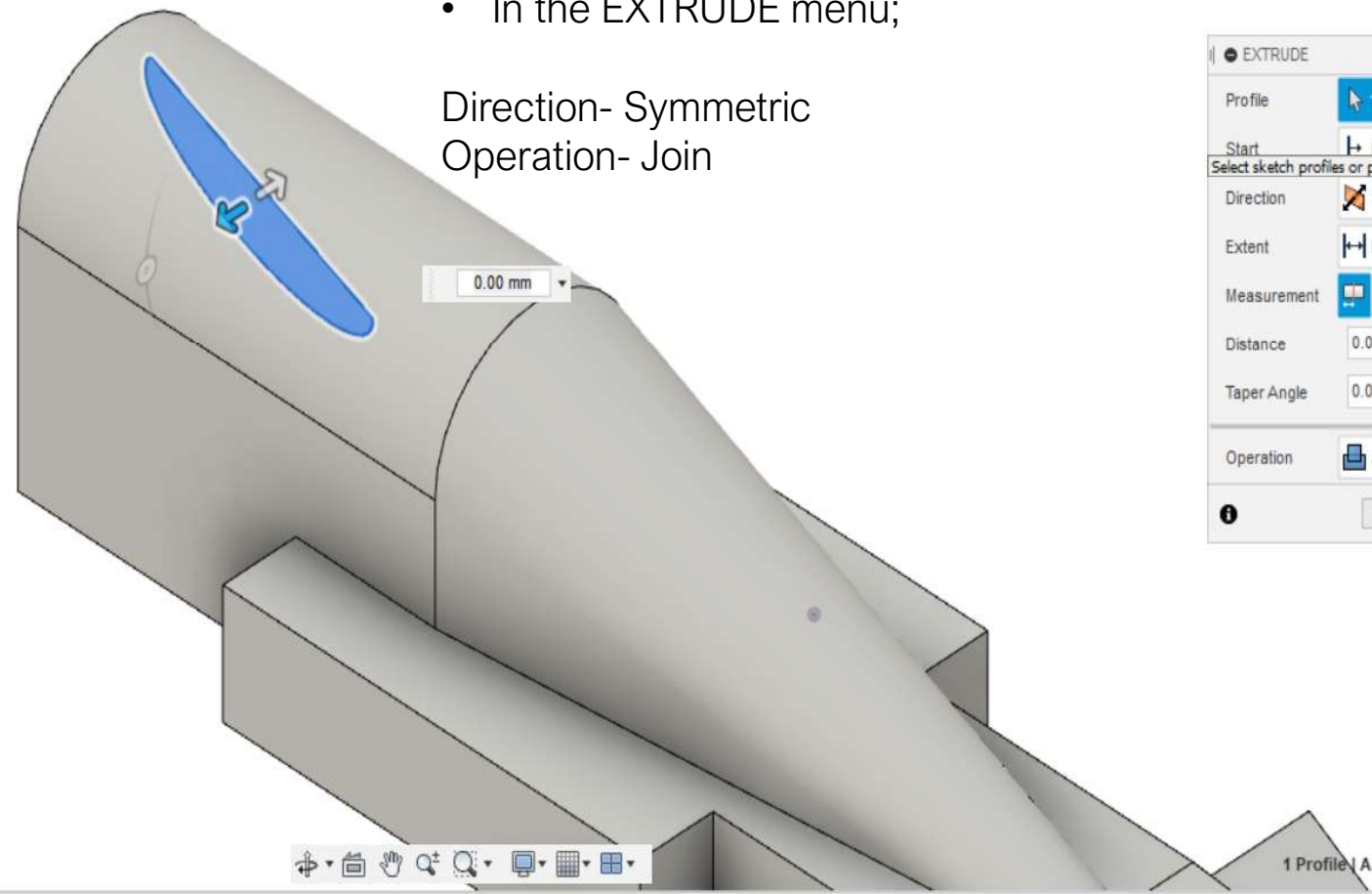
Bottom toolbar with various tool icons for sketching and modeling.



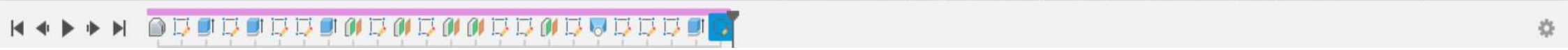


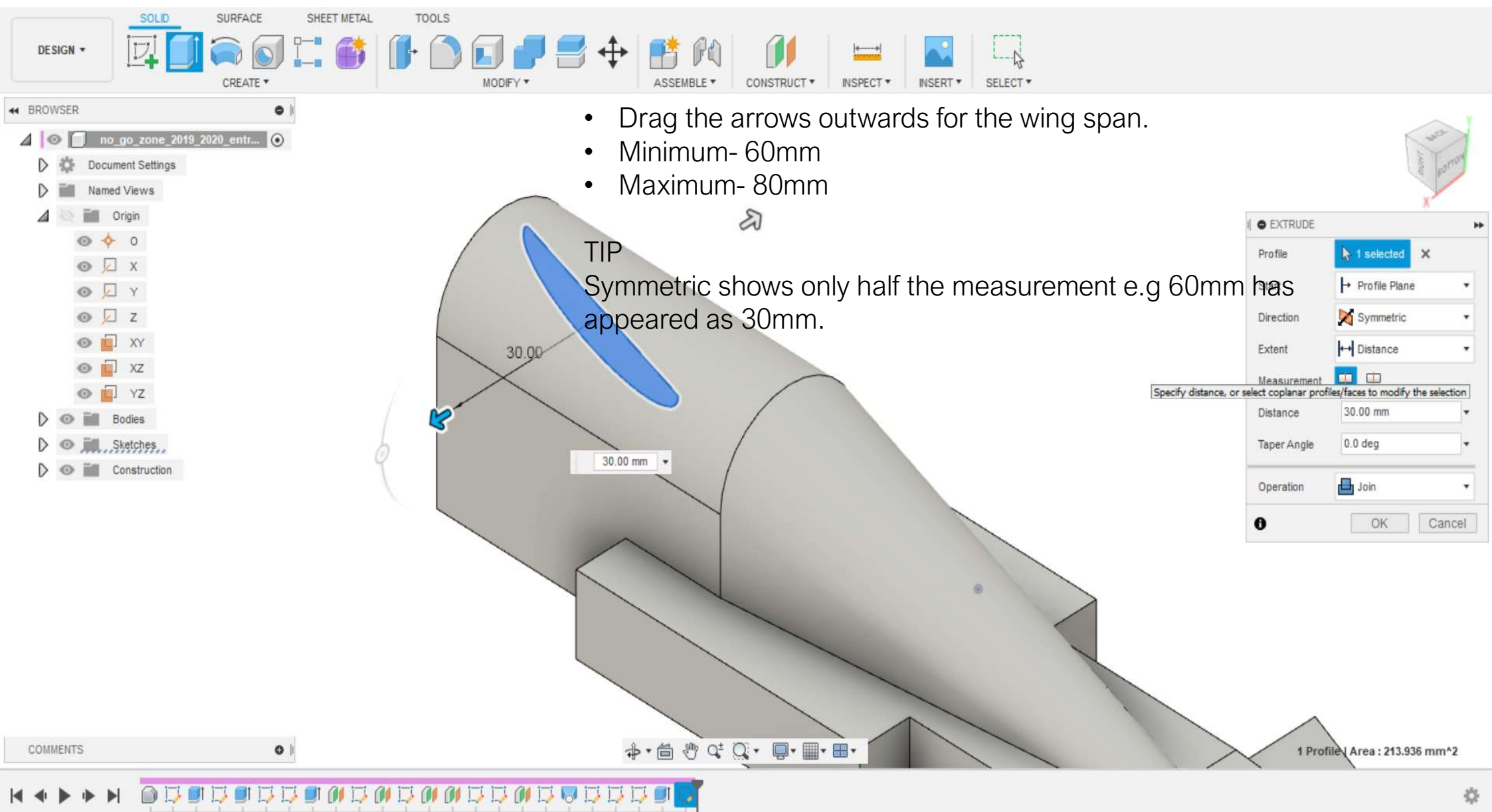
- Click 'E' on your keyboard
- Select the shape you have created.
- In the EXTRUDE menu;

Direction- Symmetric
Operation- Join



1 Profile | Area : 213.936 mm*2





- 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.

EXTRUDE

Profile: 1 selected

Direction: Symmetric

Extent: Distance

Measurement: Specify distance, or select coplanar profiles/faces to modify the selection

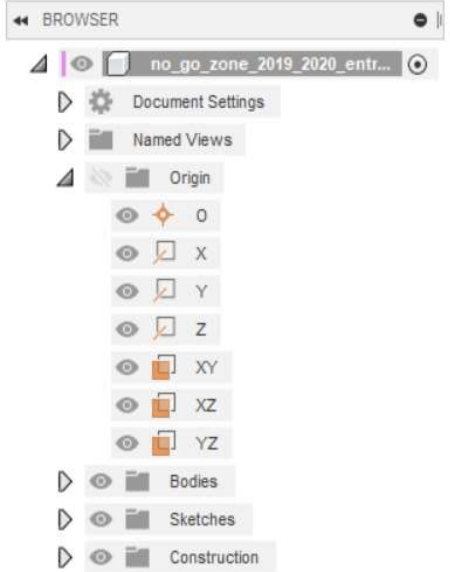
Distance: 30.00 mm

Taper Angle: 0.0 deg

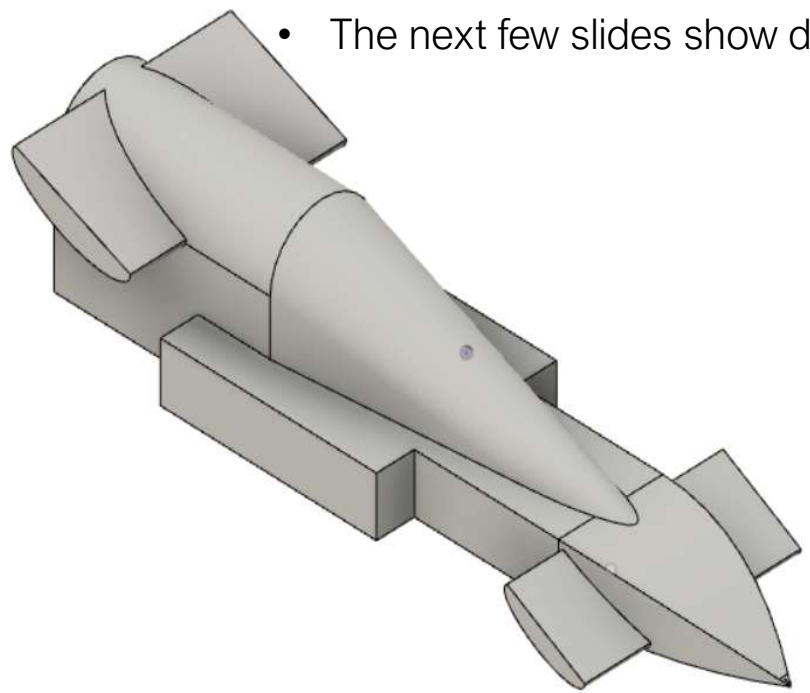
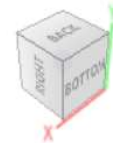
Operation: Join

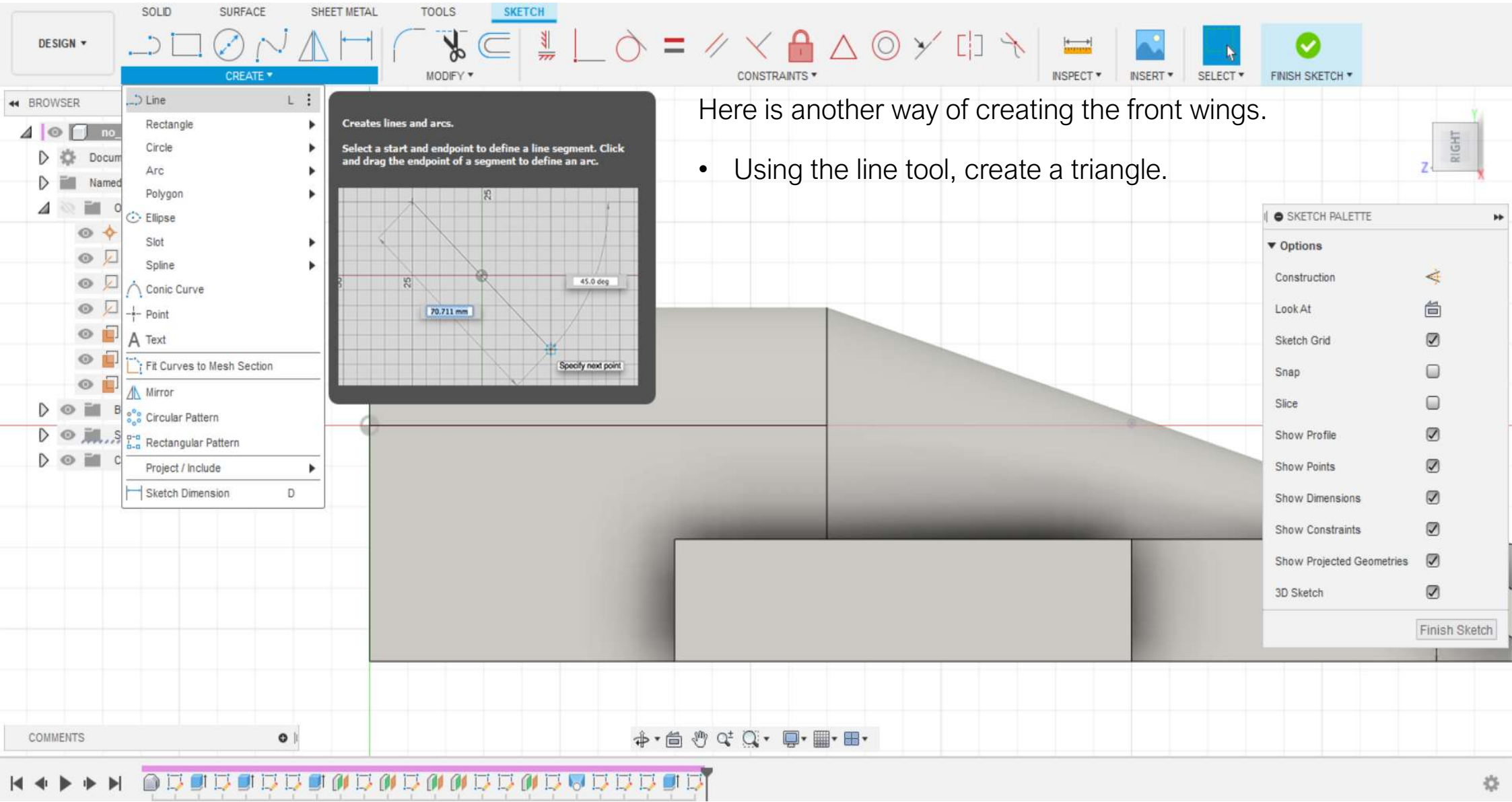
OK Cancel

1 Profile | Area : 213.936 mm²



- Congratulations, you have created a front wing for your car.
- The next few slides show different shaped wings.





Here is another way of creating the front wings.

- Using the line tool, create a triangle.

DESIGN ▾

SOLID SURFACE SHEET METAL TOOLS **SKETCH**

CREATE ▾ MODIFY ▾ CONSTRAINTS ▾ INSPECT ▾ INSERT ▾ SELECT ▾ FINISH SKETCH ▾

BROWSER

no_go_zone_2019_2020_entr...

- Document Settings
- Named Views
- Origin
 - O
 - X
 - Y
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction

13.564 mm

90.0 deg

Specify next point

25

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

DESIGN ▾

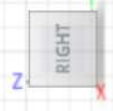
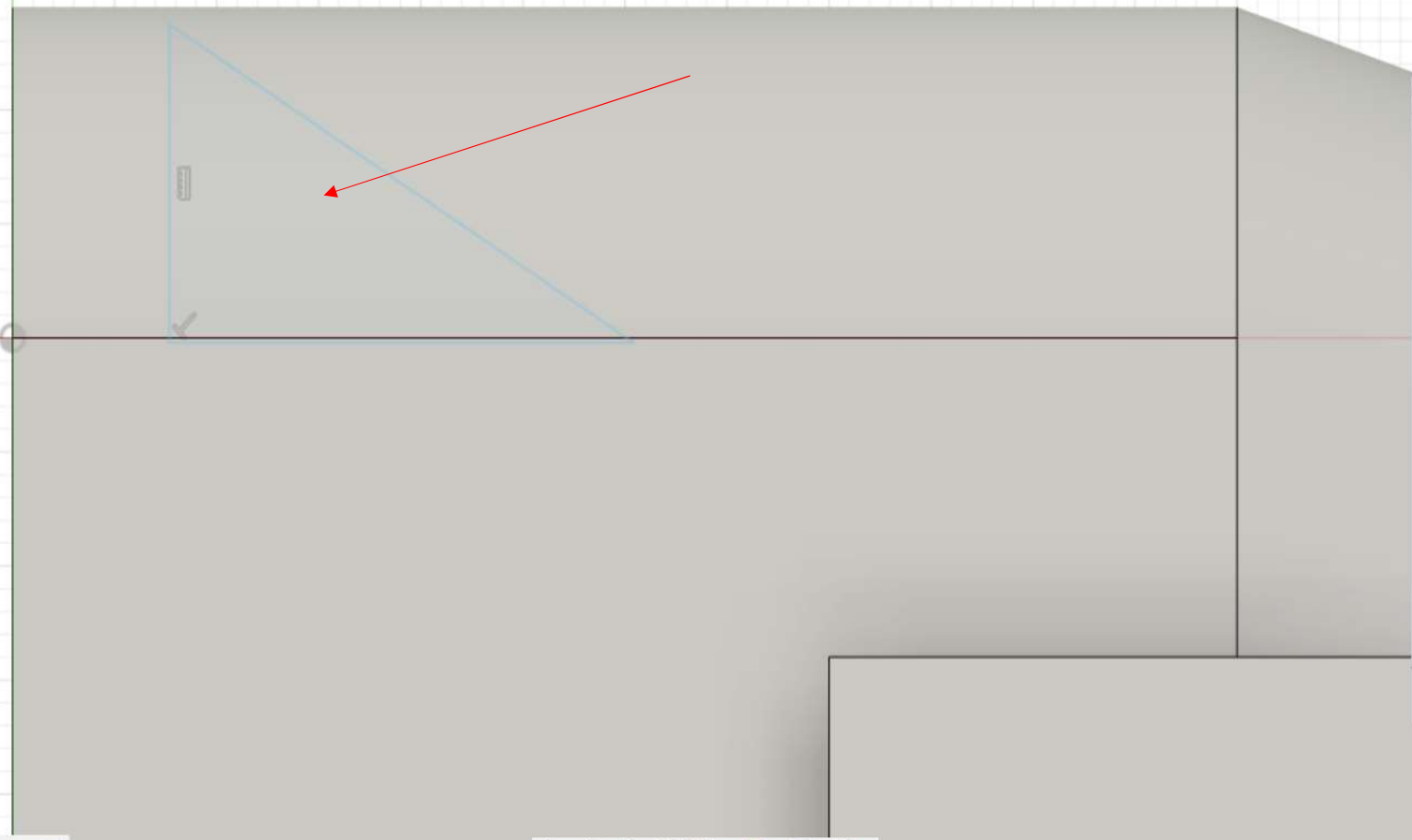
SOLID SURFACE SHEET METAL TOOLS **SKETCH**

CREATE ▾ MODIFY ▾ CONSTRAINTS ▾ INSPECT ▾ INSERT ▾ SELECT ▾ FINISH SKETCH ▾

← BROWSER

no_go_zone_2019_2020_entr...

- Document Settings
- Named Views
- Origin
 - O
 - X
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 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



SKETCH PALETTE

Options

- Construction
- Look At
- Sketch Grid
- Snap
- Slice
- Show Profile
- Show Points
- Show Dimensions
- Show Constraints
- Show Projected Geometries
- 3D Sketch

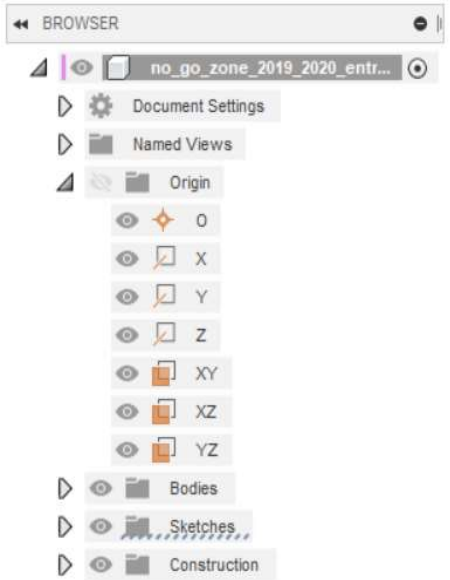
Finish Sketch

COMMENTS

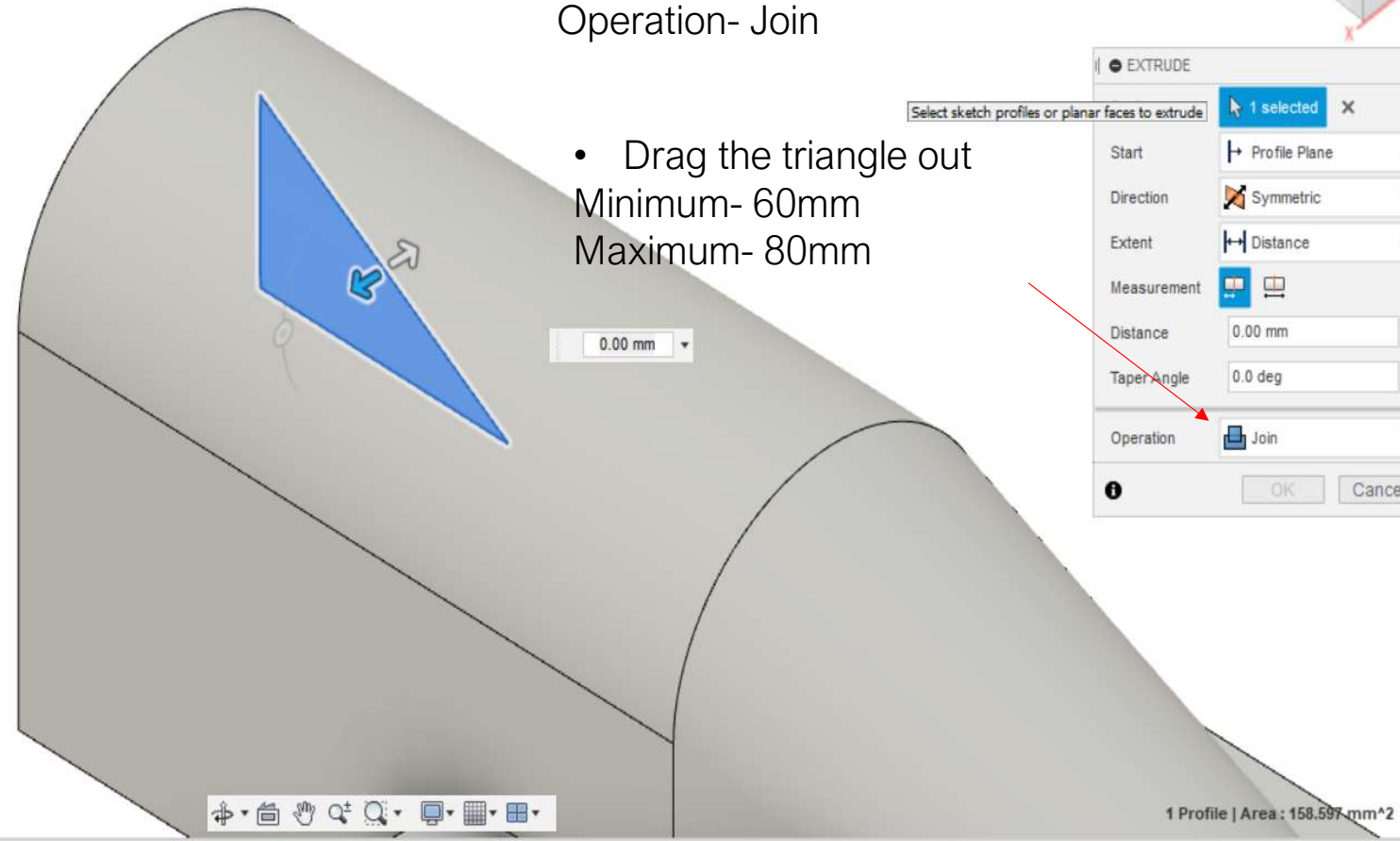
Navigation icons: pan, rotate, zoom, etc.

Timeline and feature tree icons.

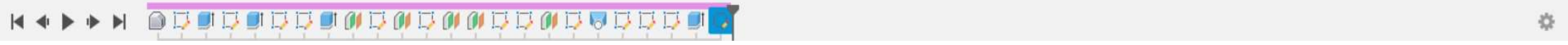
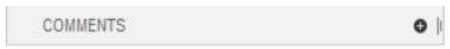
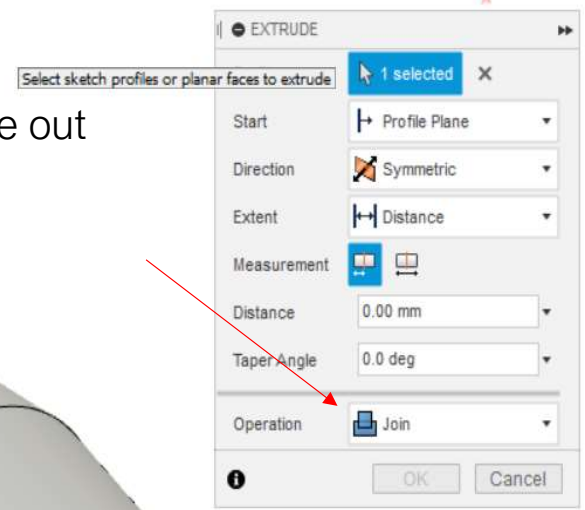




Click 'E' on your keyboard
Direction- Symmetric
Operation- Join



- Drag the triangle out
Minimum- 60mm
Maximum- 80mm



DESIGN ▾

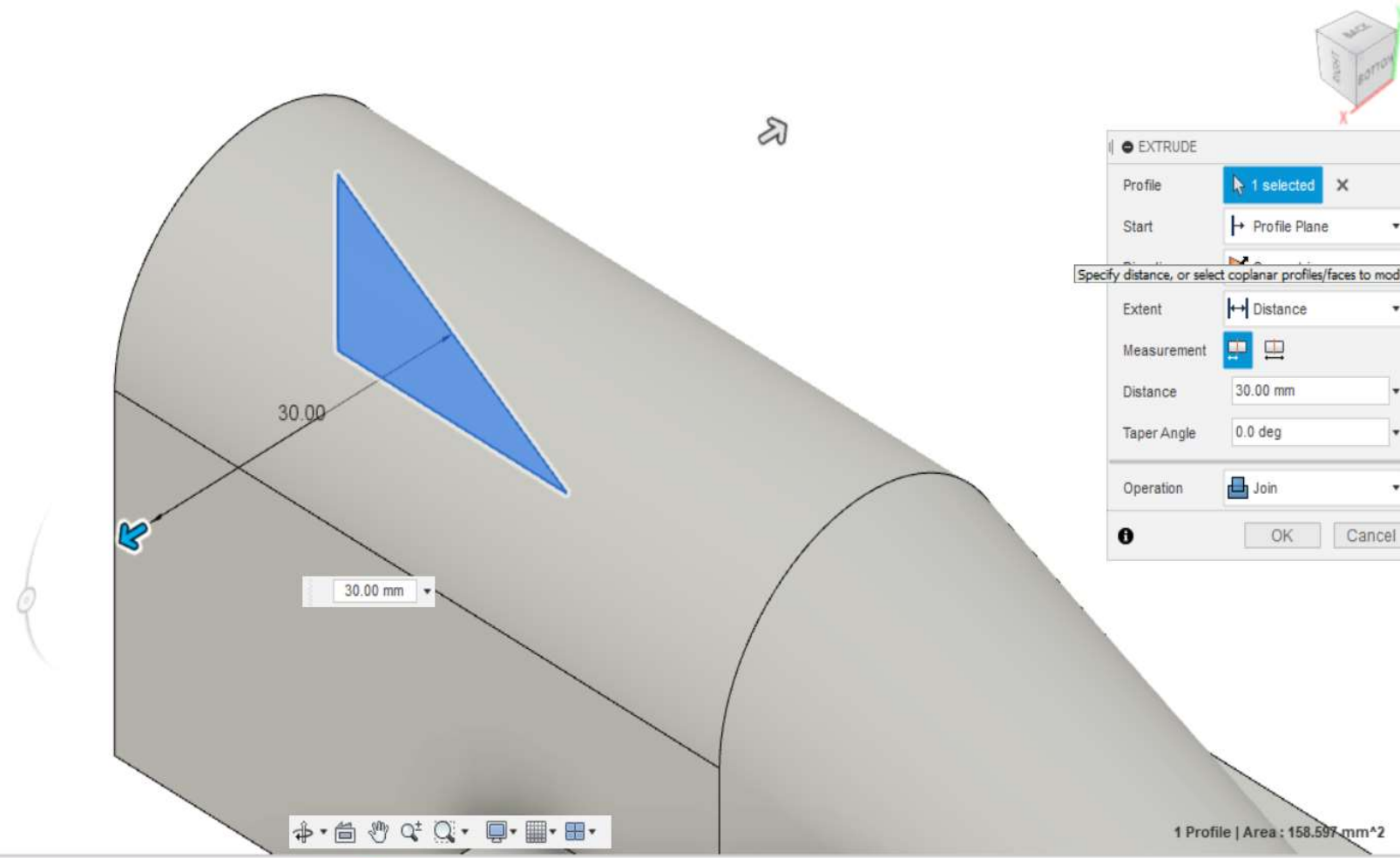
SOLID SURFACE SHEET METAL TOOLS

CREATE ▾ MODIFY ▾ ASSEMBLE ▾ CONSTRUCT ▾ INSPECT ▾ INSERT ▾ SELECT ▾

BROWSER

no_go_zone_2019_2020_entr...

- Document Settings
- Named Views
- Origin
 - 0
 - X
 - Y
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



EXTRUDE

Profile 1 selected

Start Profile Plane

Specify distance, or select coplanar profiles/faces to modify the

Extent Distance

Measurement

Distance 30.00 mm

Taper Angle 0.0 deg

Operation Join

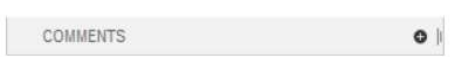
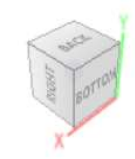
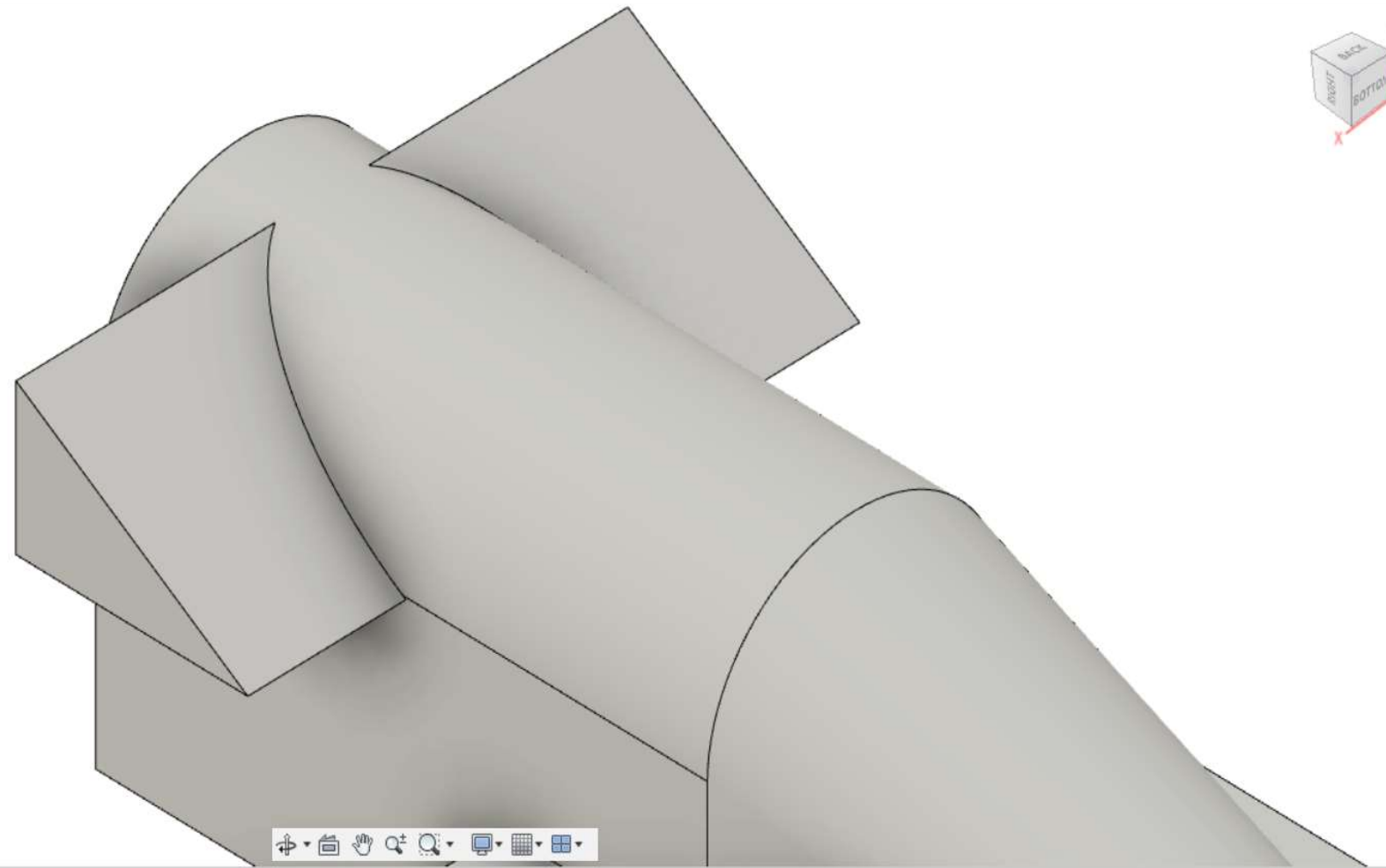
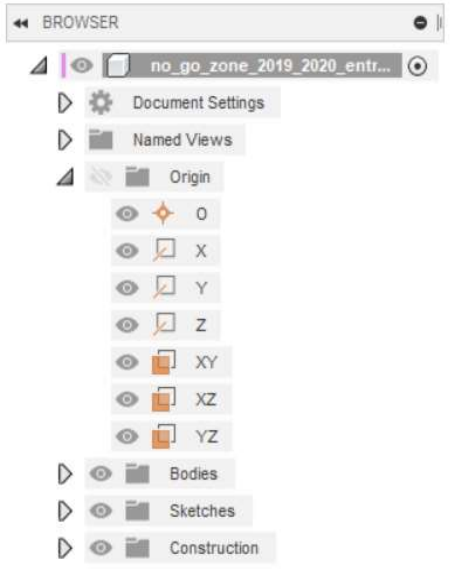
OK Cancel

COMMENTS

Navigation icons: pan, rotate, zoom, etc.

1 Profile | Area: 158.597 mm²

Bottom toolbar with various application icons and a settings gear icon.



DESIGN ▾

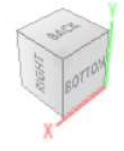
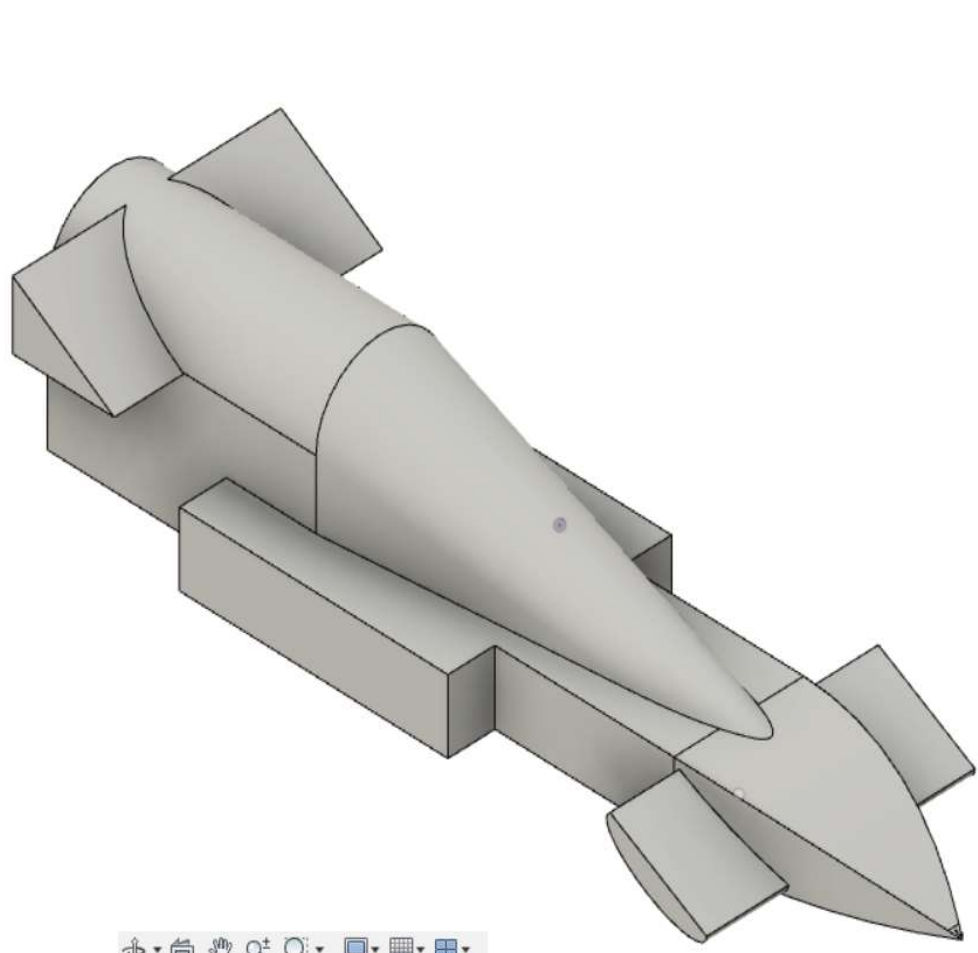
SOLID SURFACE SHEET METAL TOOLS

CREATE ▾ MODIFY ▾ ASSEMBLE ▾ CONSTRUCT ▾ INSPECT ▾ INSERT ▾ SELECT ▾

BROWSER

no_go_zone_2019_2020_entr...

- Document Settings
- Named Views
- Origin
 - 0
 - X
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 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



COMMENTS

Navigation and utility icons including a hand, a magnifying glass, and a grid.

Timeline and undo/redo icons.



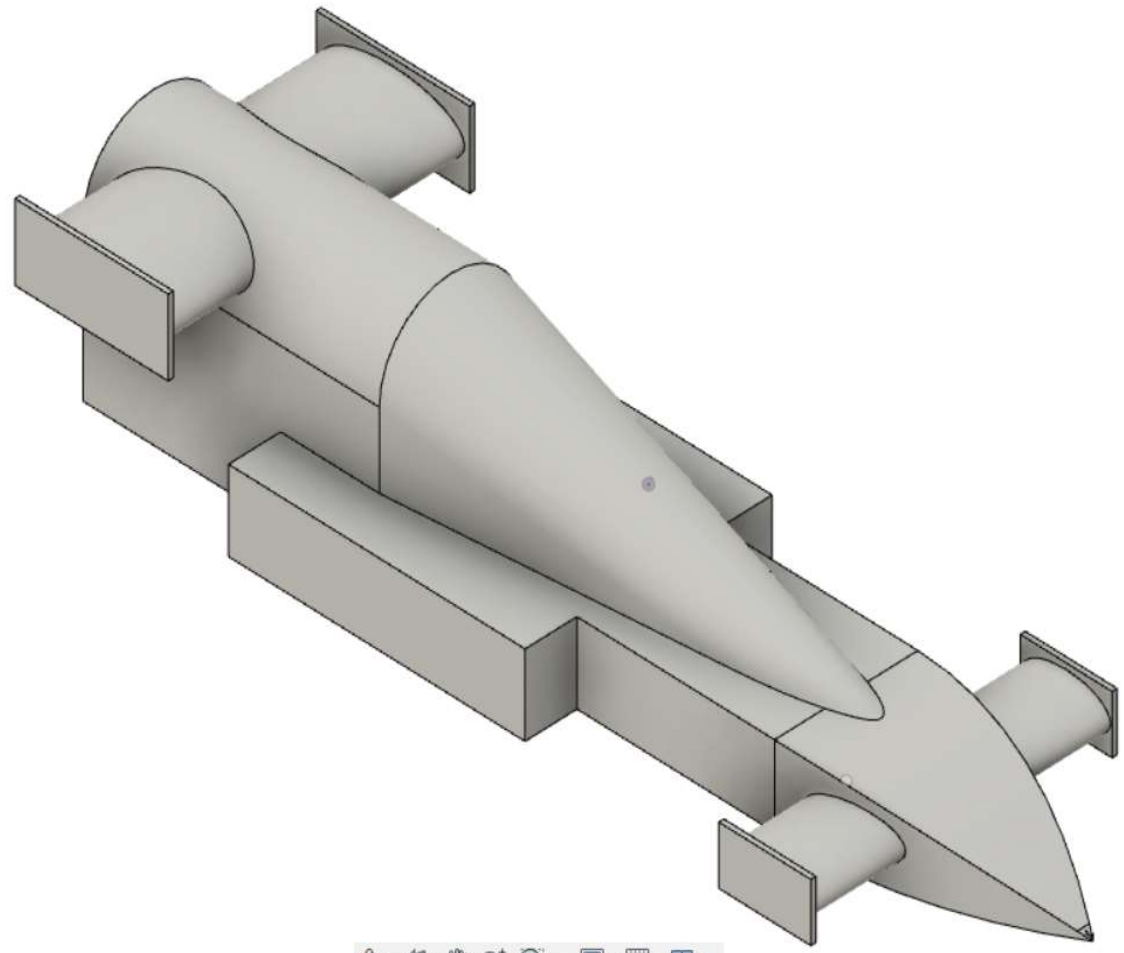
DESIGN ▾

SOLID SURFACE SHEET METAL TOOLS

CREATE ▾ MODIFY ▾ ASSEMBLE ▾ CONSTRUCT ▾ INSPECT ▾ INSERT ▾ SELECT ▾

BROWSER

- no_go_zone_2019_2020_entr...
- Document Settings
- Named Views
- Origin
 - 0
 - X
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 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction

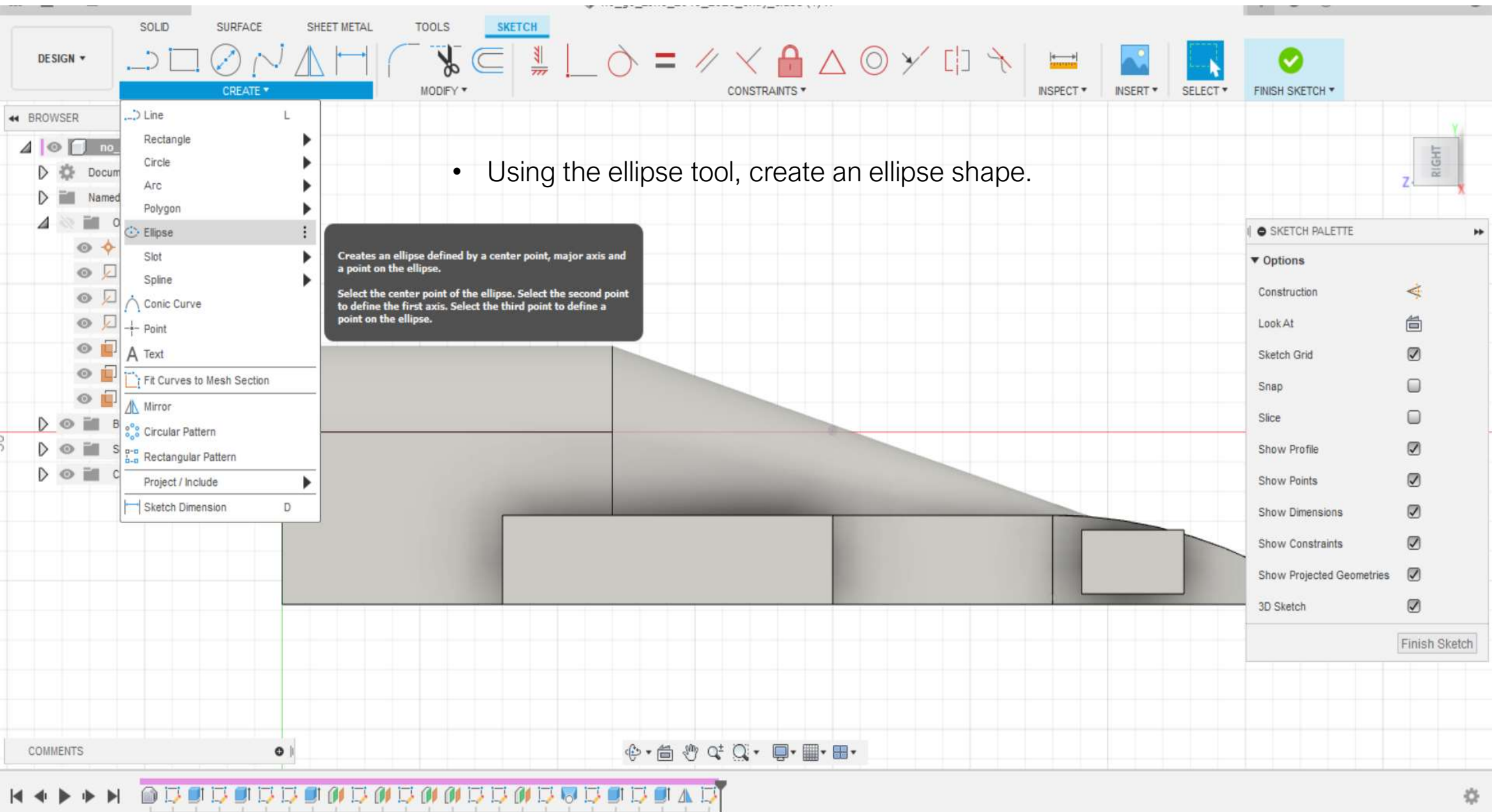


COMMENTS

Navigation and interaction icons including pan, rotate, zoom, and view toggles.

Main toolbar containing various CAD tools such as sketching, modeling, and analysis tools.





- Using the ellipse tool, create an ellipse shape.

Creates an ellipse defined by a center point, major axis and a point on the ellipse.

Select the center point of the ellipse. Select the second point to define the first axis. Select the third point to define a point on the ellipse.

RIGHT

Finish Sketch

DESIGN ▾

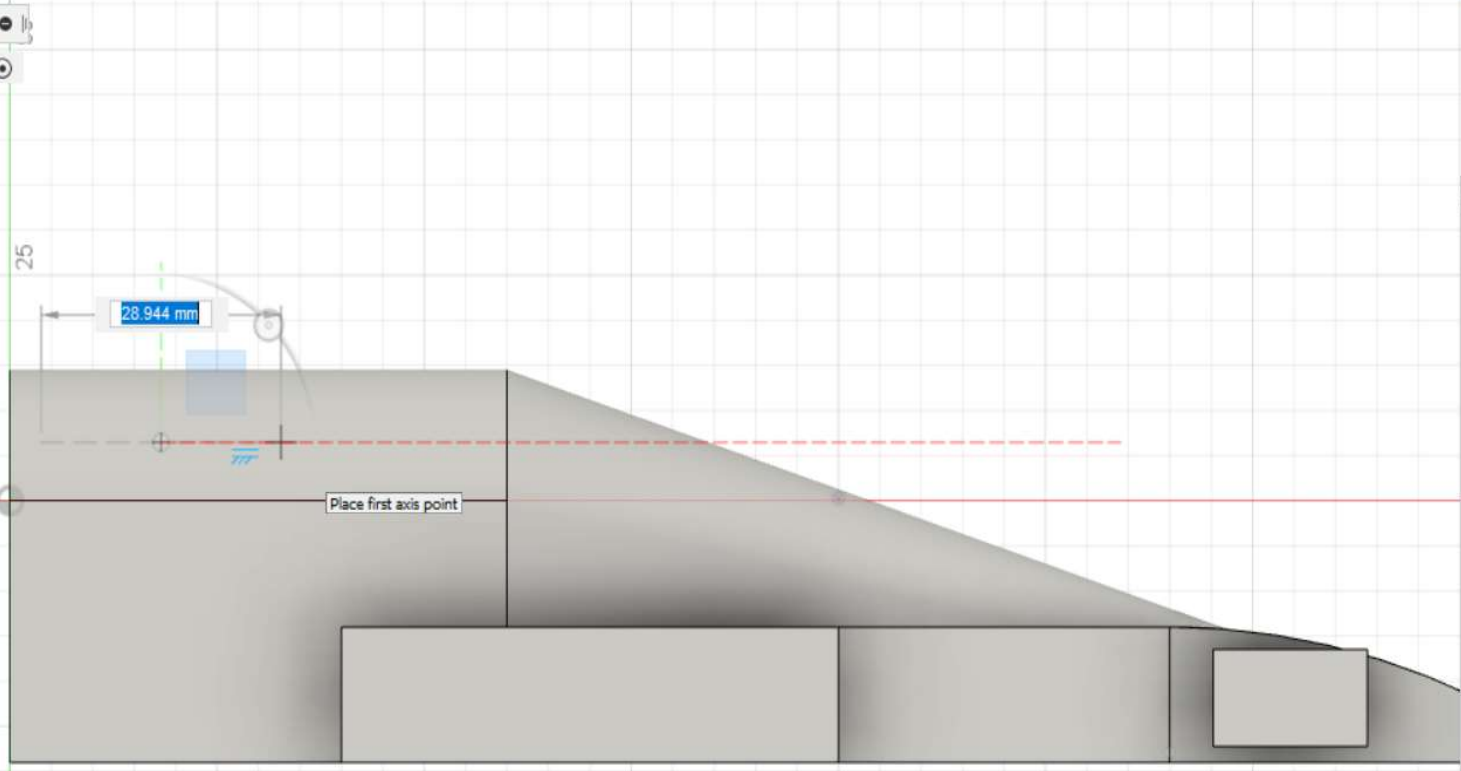
SOLID SURFACE SHEET METAL TOOLS **SKETCH**

CREATE ▾ MODIFY ▾ CONSTRAINTS ▾ INSPECT ▾ INSERT ▾ SELECT ▾ **FINISH SKETCH ▾**

BROWSER

no_go_zone_2019_2020_ent...

- Document Settings
- Named Views
- Origin
 - O
 - X
 - Y
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



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

Navigation icons: Undo, Redo, Home, Rotate, Zoom, Pan, etc.

Timeline and view control icons.

DESIGN ▾

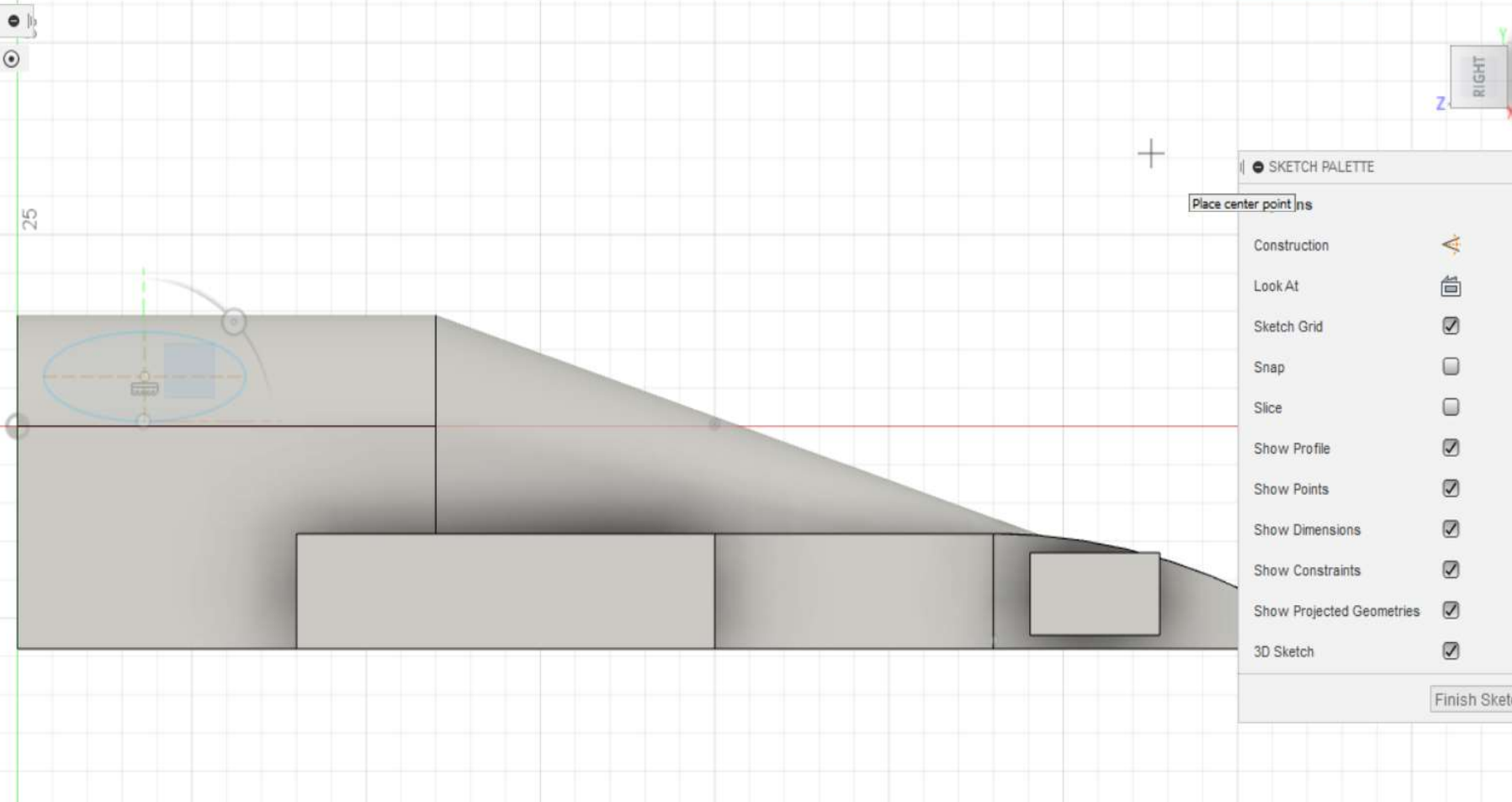
SOLID SURFACE SHEET METAL TOOLS **SKETCH**

CREATE ▾ MODIFY ▾ CONSTRAINTS ▾ INSPECT ▾ INSERT ▾ SELECT ▾ FINISH SKETCH ▾

BROWSER

no_go_zone_2019_2020_ent...

- Document Settings
- Named Views
- Origin
 - 0
 - X
 - Y
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



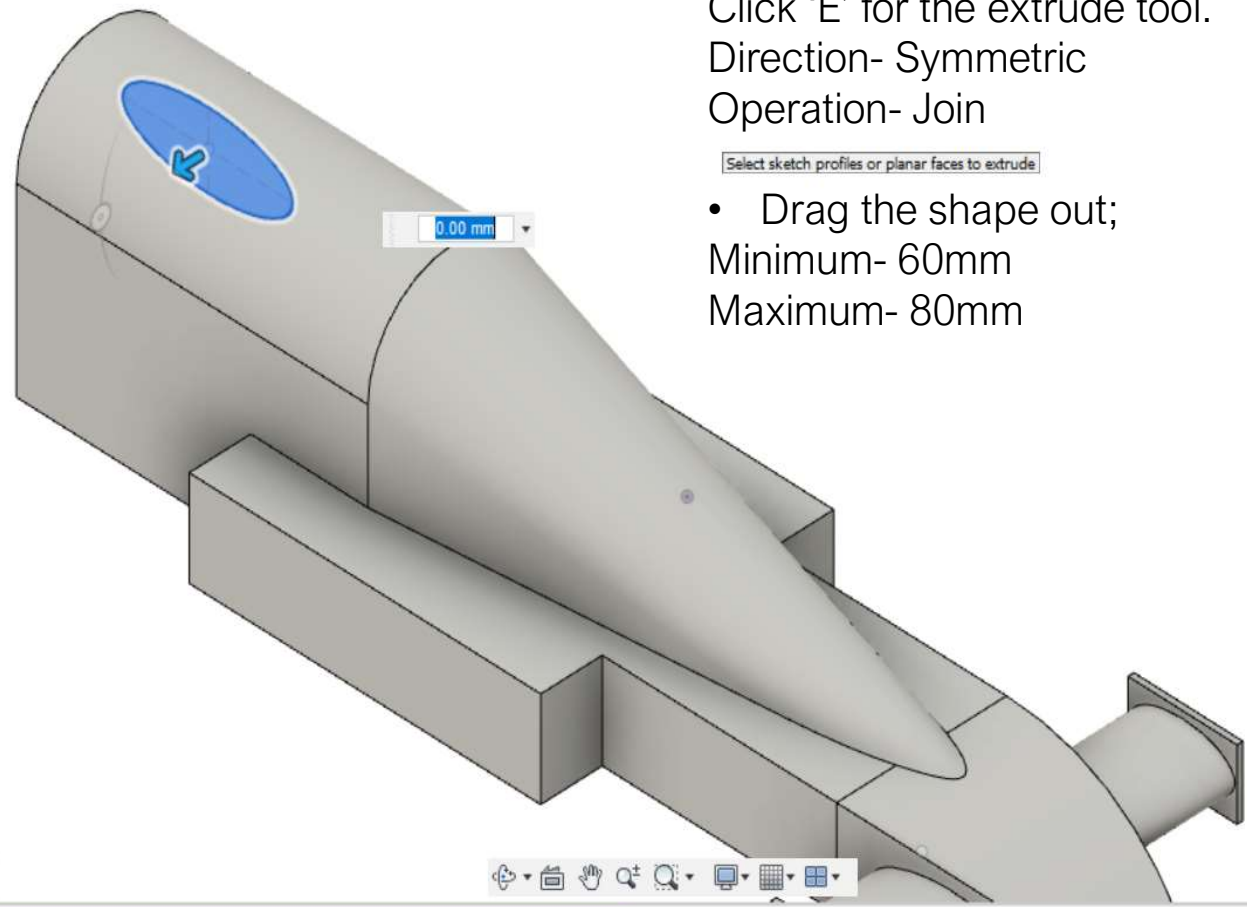
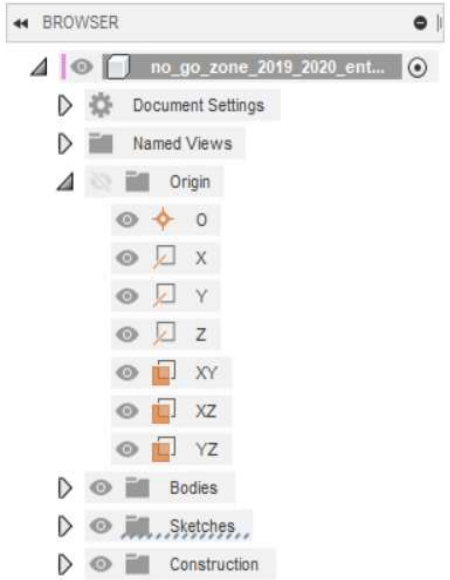
SKETCH PALETTE

Place center point [ns]

- Construction
- Look At
- Sketch Grid
- Snap
- Slice
- Show Profile
- Show Points
- Show Dimensions
- Show Constraints
- Show Projected Geometries
- 3D Sketch

Finish Sketch

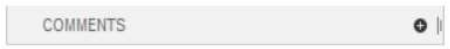
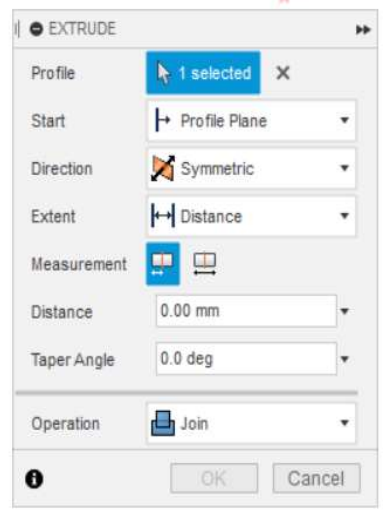
COMMENTS



Click 'E' for the extrude tool.
Direction- Symmetric
Operation- Join

- Drag the shape out;
Minimum- 60mm
Maximum- 80mm

Select sketch profiles or planar faces to extrude



1 Profile | Area : 264.815 mm^2



DESIGN ▾

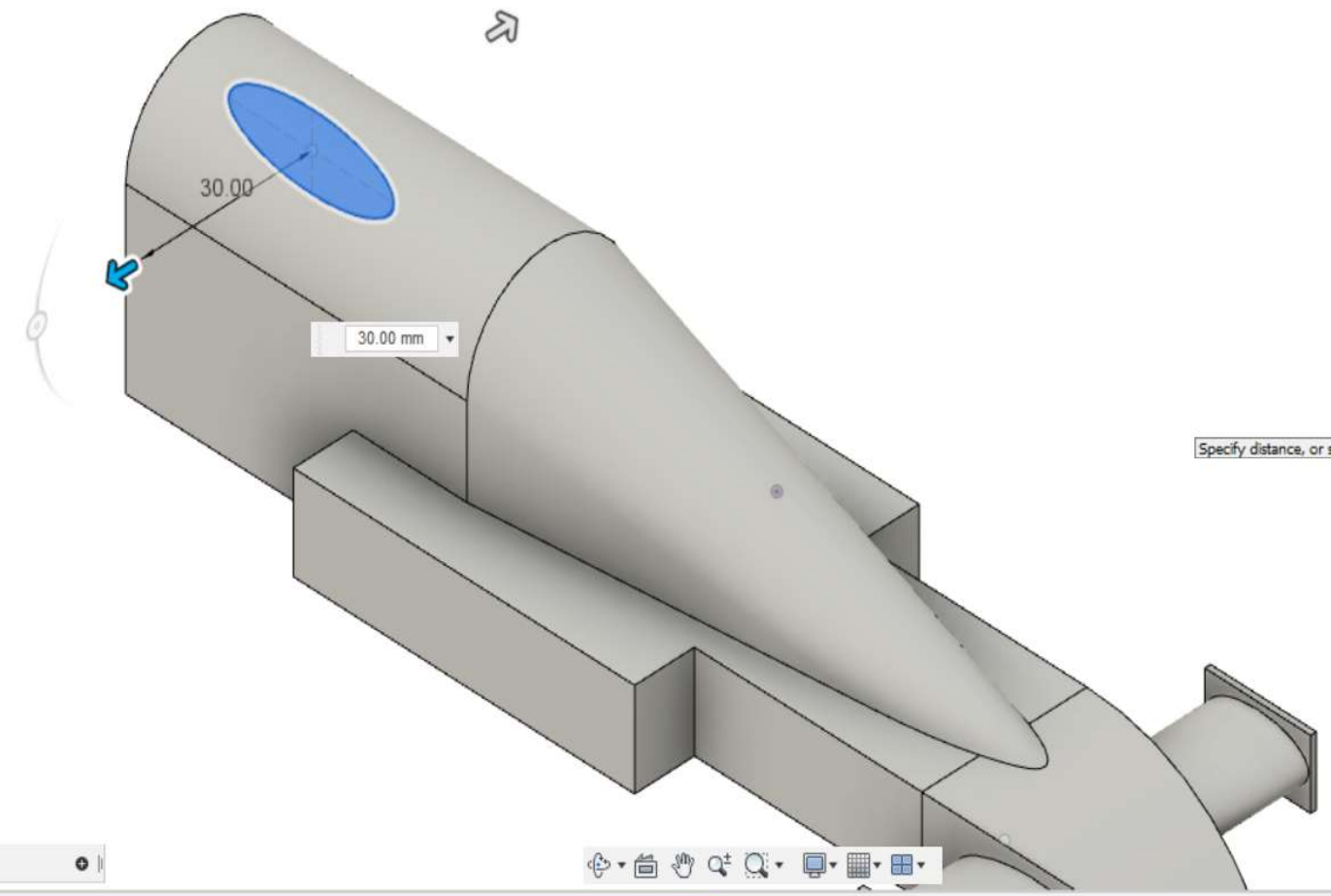
SOLID SURFACE SHEET METAL TOOLS

CREATE ▾ MODIFY ▾ ASSEMBLY ▾ CONSTRUCT ▾ INSPECT ▾ INSERT ▾ SELECT ▾

BROWSER

no_go_zone_2019_2020_ent...

- Document Settings
- Named Views
- Origin
 - 0
 - X
 - Y
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



EXTRUDE

Profile 1 selected

Start Profile Plane

Direction Symmetric

Extent Distance

Measurement

Distance 30.00 mm

Taper Angle 0.0 deg

Specify distance, or select coplanar profiles/faces to modify the selection

Operation Join

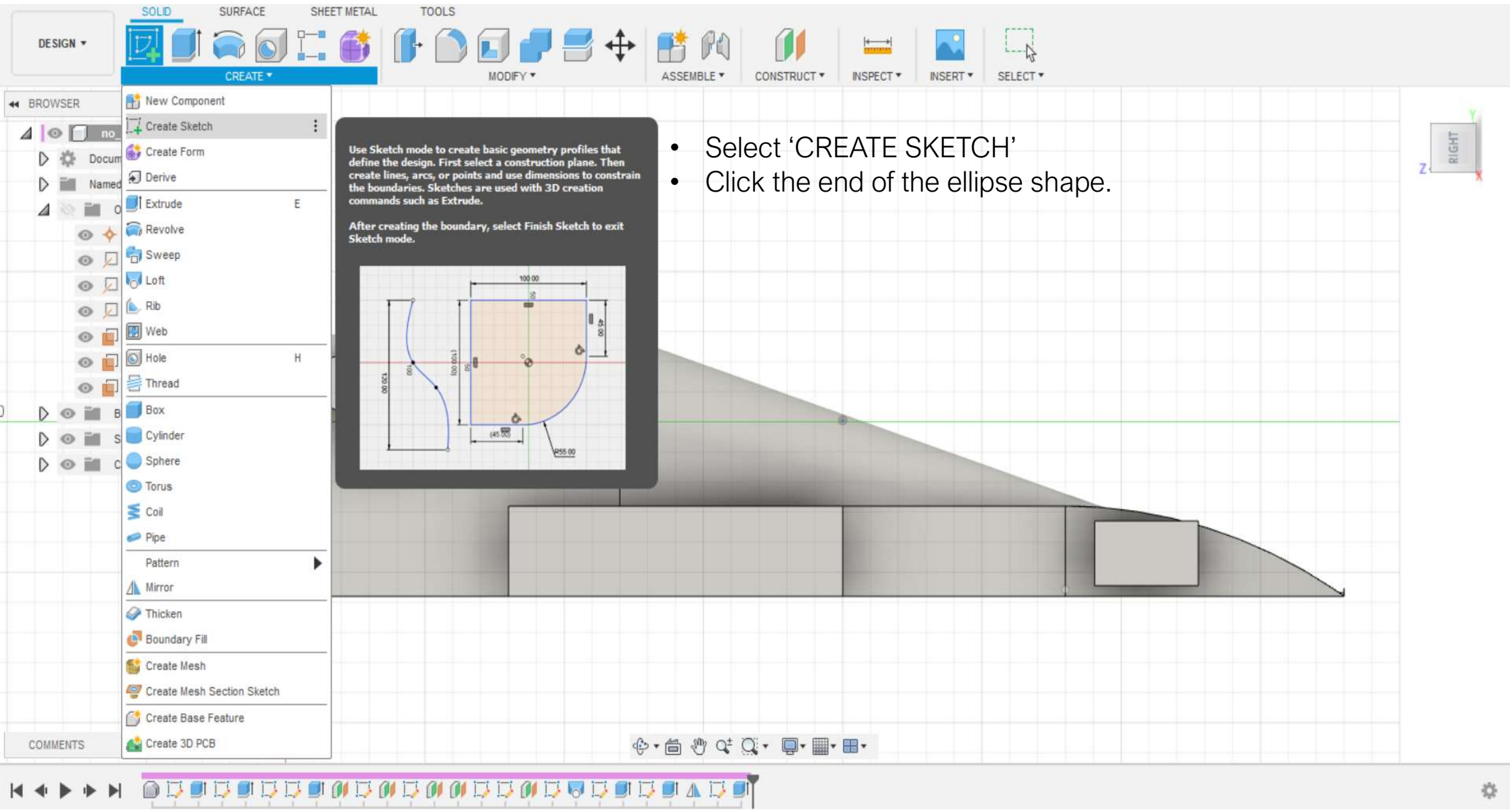
OK Cancel

COMMENTS

Navigation icons: Rotate, Pan, Zoom, etc.

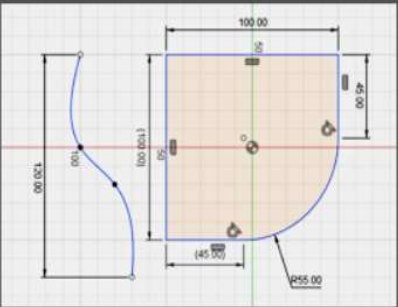
1 Profile | Area : 264.815 mm²

Bottom status bar with navigation and tool icons.

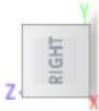


Use Sketch mode to create basic geometry profiles that define the design. First select a construction plane. Then create lines, arcs, or points and use dimensions to constrain the boundaries. Sketches are used with 3D creation commands such as Extrude.

After creating the boundary, select Finish Sketch to exit Sketch mode.



- Select 'CREATE SKETCH'
- Click the end of the ellipse shape.



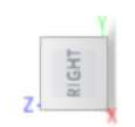
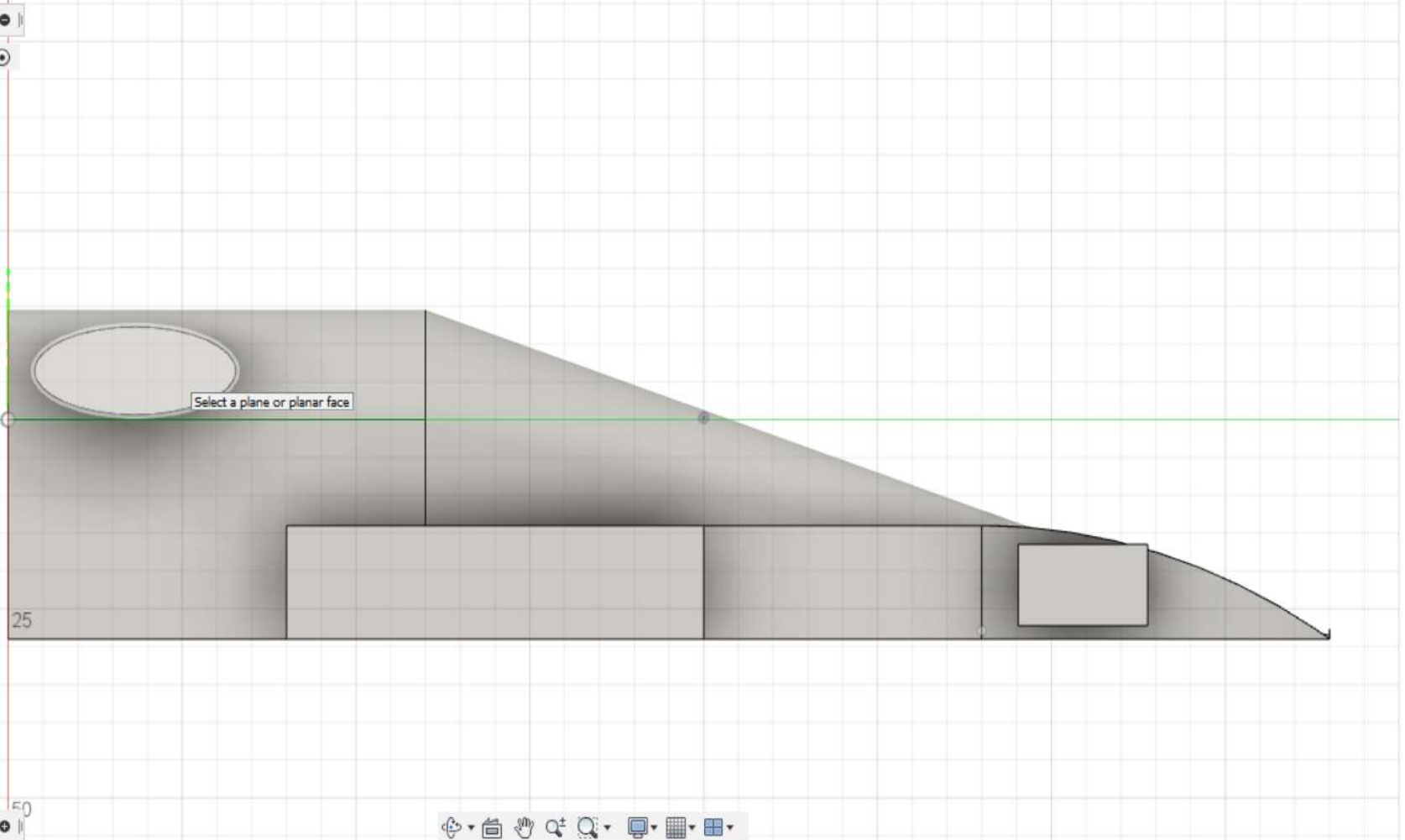


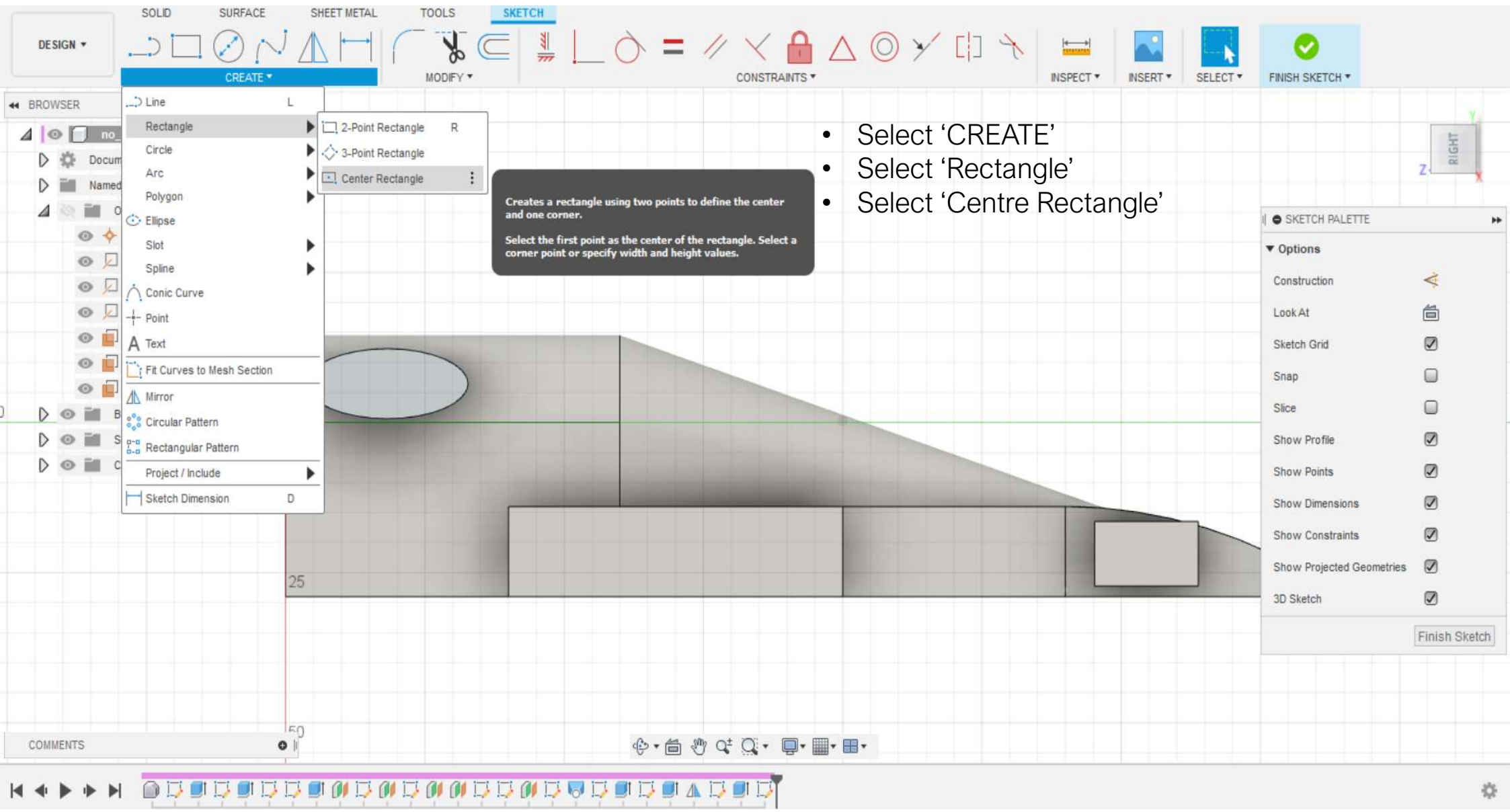
BROWSER

no_go_zone_2019_2020_entr...

- Document Settings
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 - YZ
- Bodies
- Sketches
- Construction

COMMENTS





- Select 'CREATE'
- Select 'Rectangle'
- Select 'Centre Rectangle'

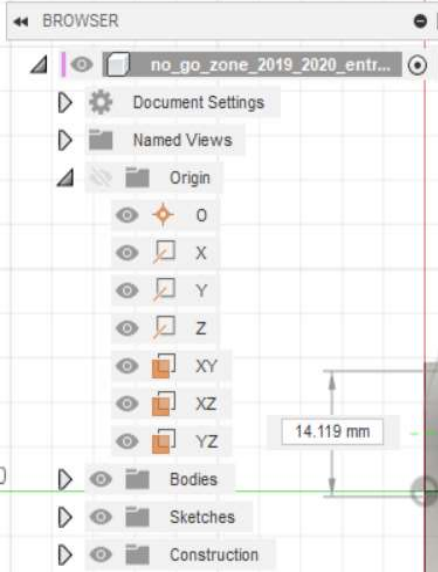
Creates a rectangle using two points to define the center and one corner.
Select the first point as the center of the rectangle. Select a corner point or specify width and height values.

SKETCH PALETTE

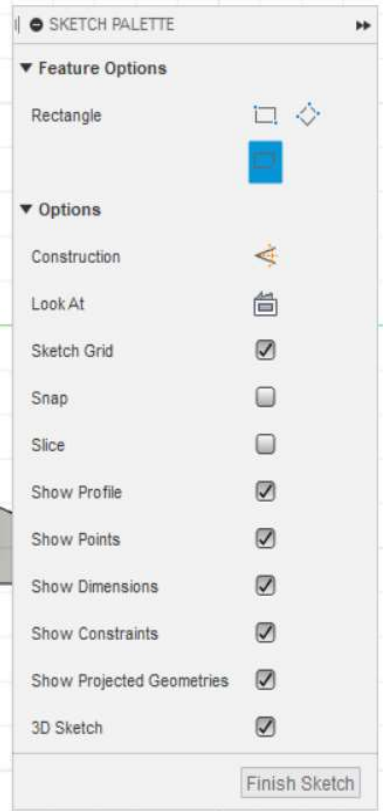
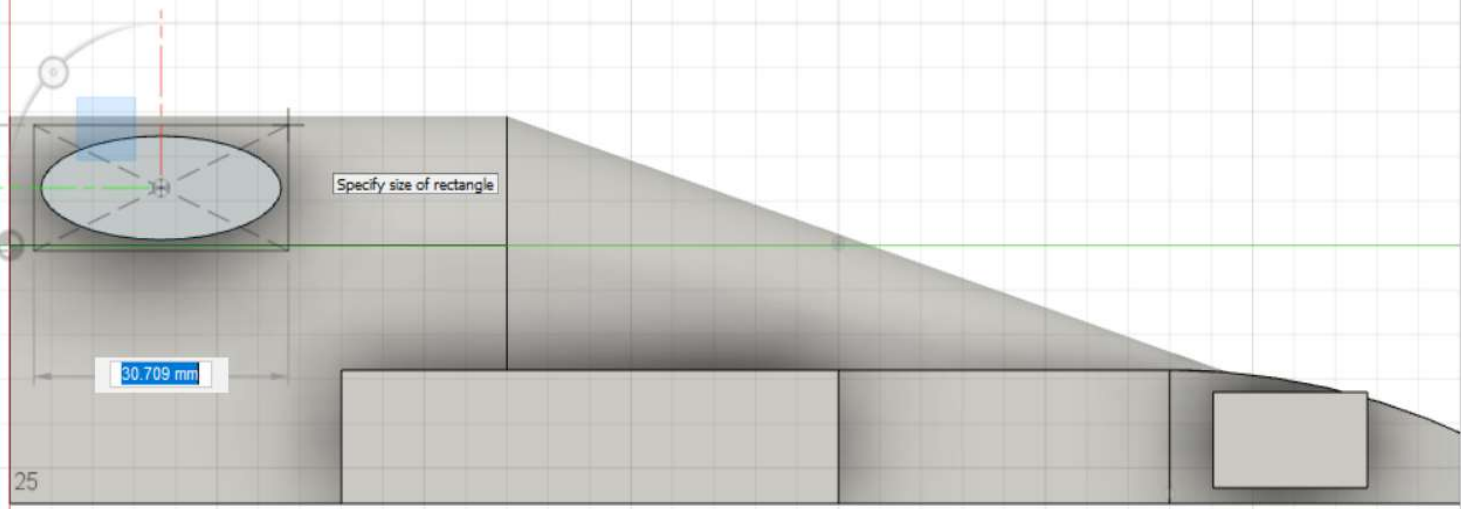
Options

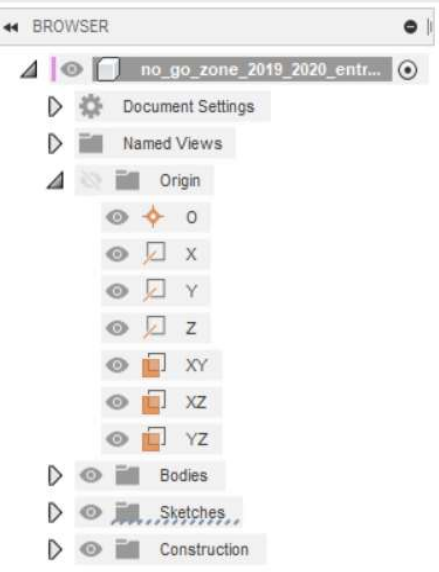
- Construction
- Look At
- Sketch Grid
- Snap
- Slice
- Show Profile
- Show Points
- Show Dimensions
- Show Constraints
- Show Projected Geometries
- 3D Sketch

Finish Sketch

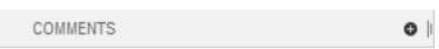
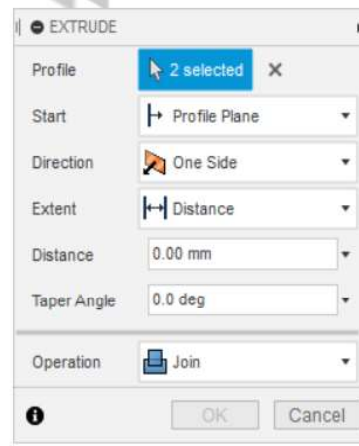
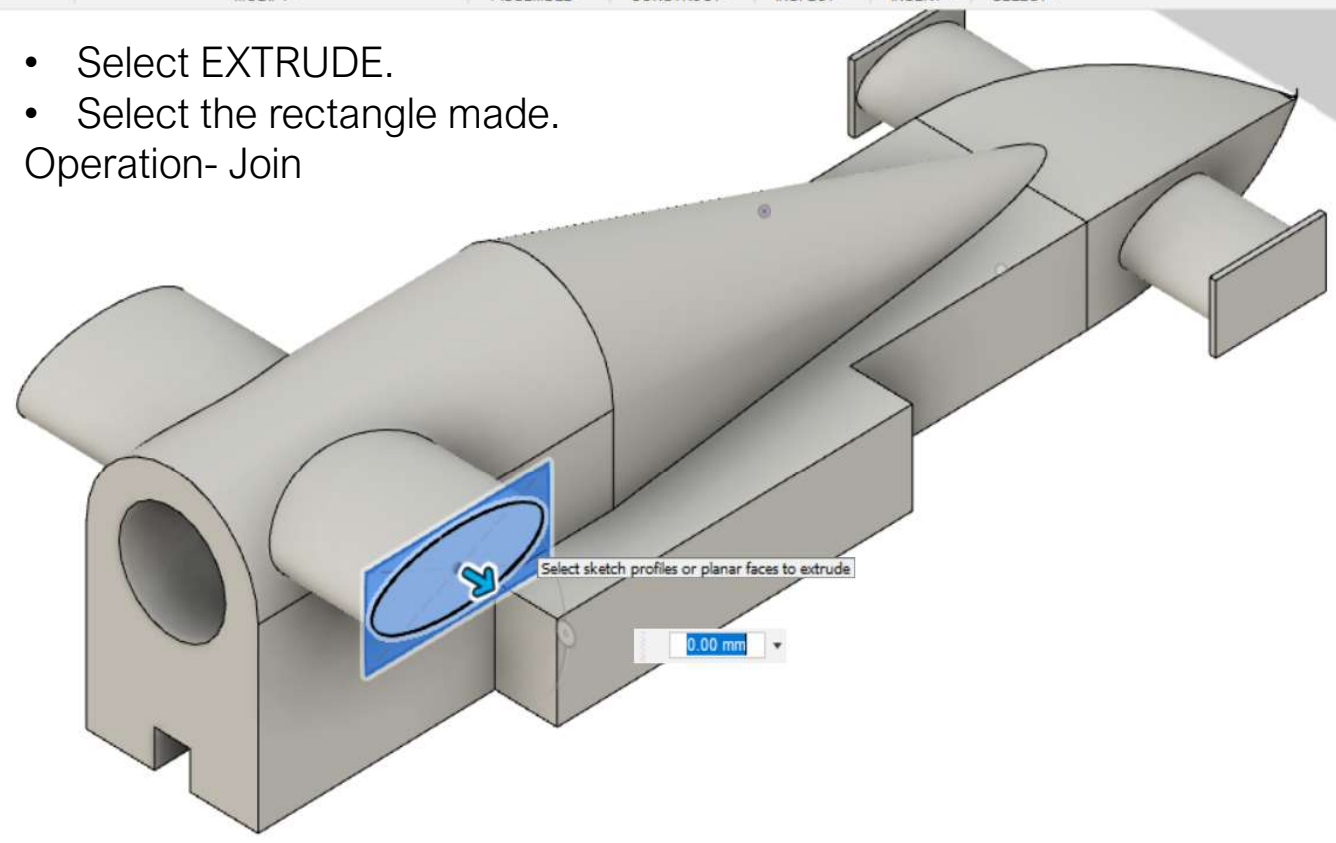


- Select the middle of the ellipse.
- Create a rectangle



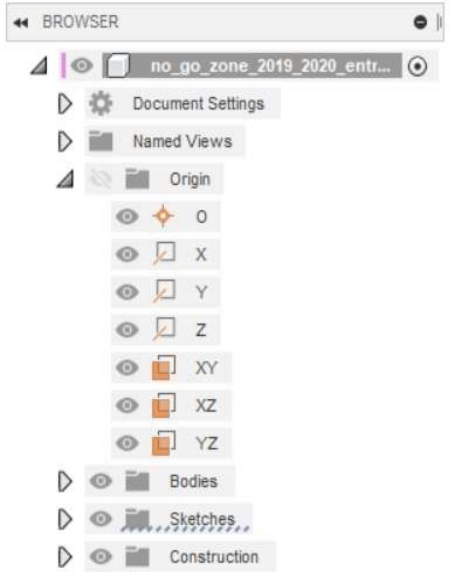


- Select EXTRUDE.
 - Select the rectangle made.
- Operation- Join



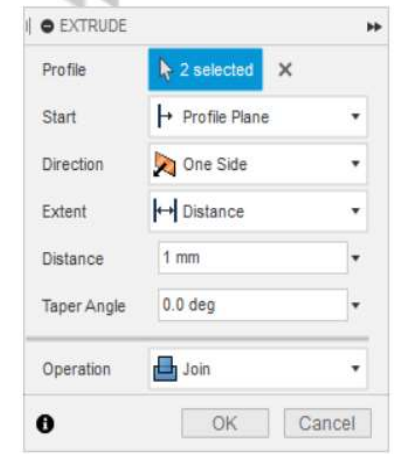
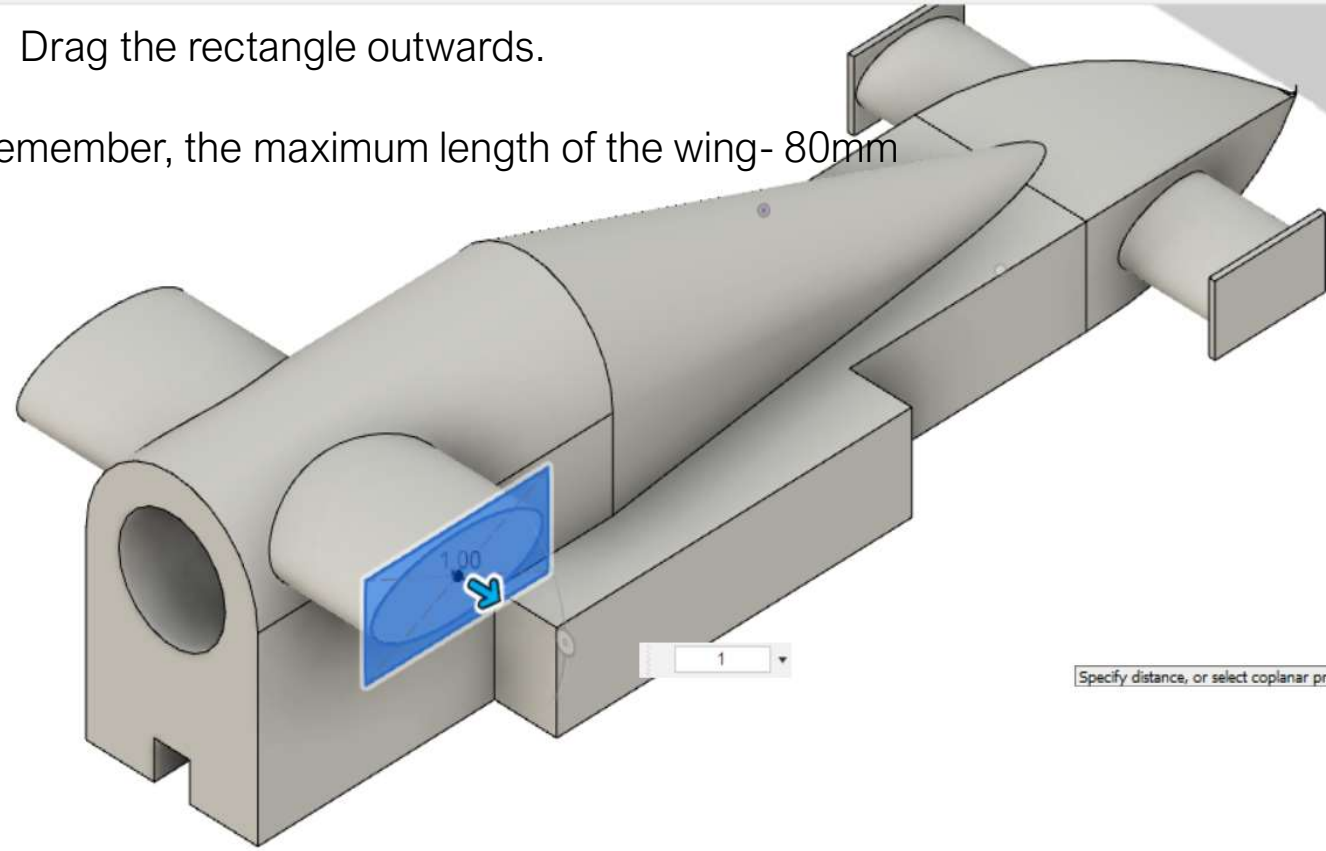
2 Profiles | Angle : 0.0 deg



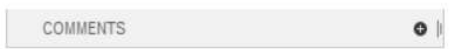


- Drag the rectangle outwards.

Remember, the maximum length of the wing- 80mm

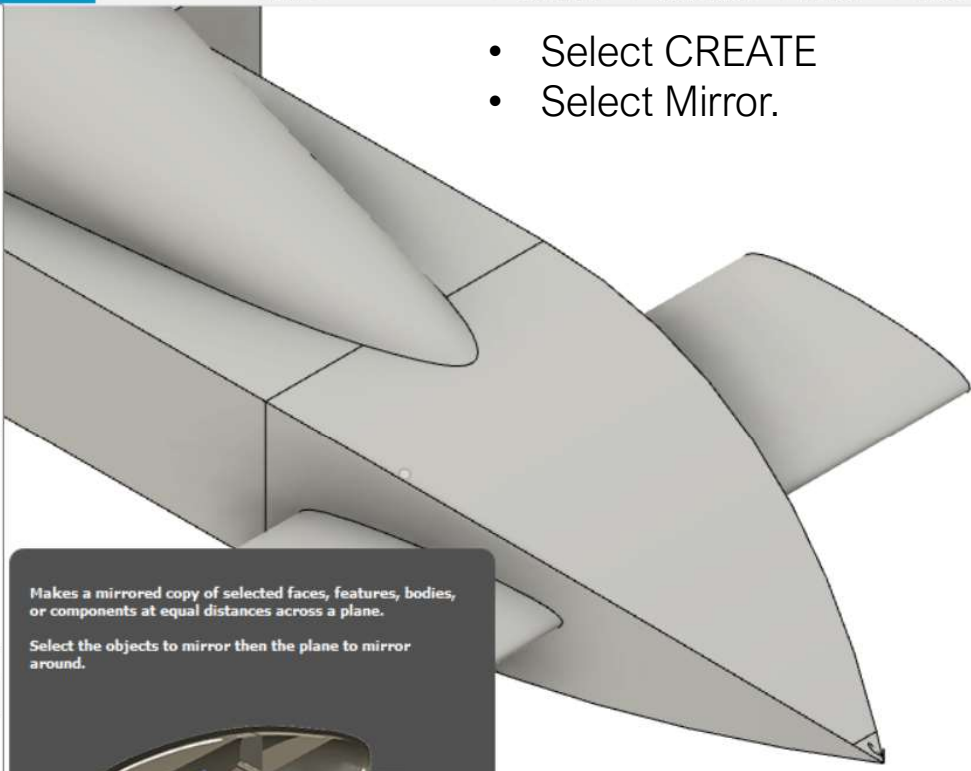
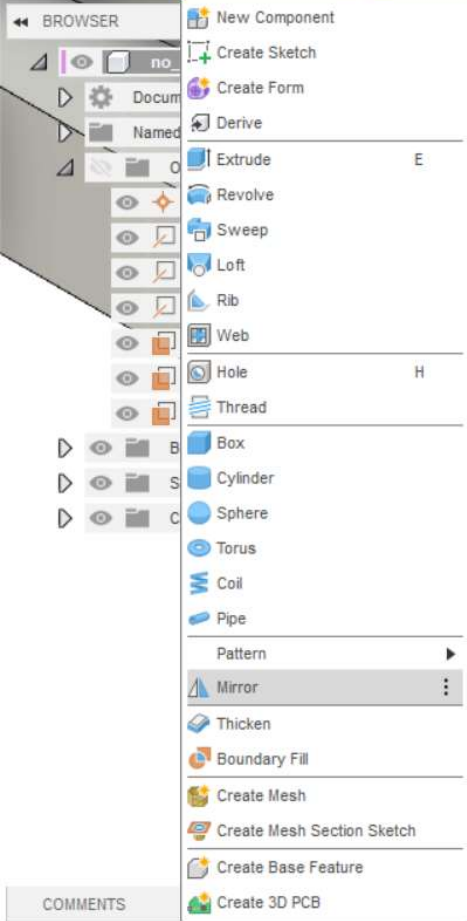


Specify distance, or select coplanar profiles/faces to modify the selection



2 Profiles | Angle : 0.0 deg



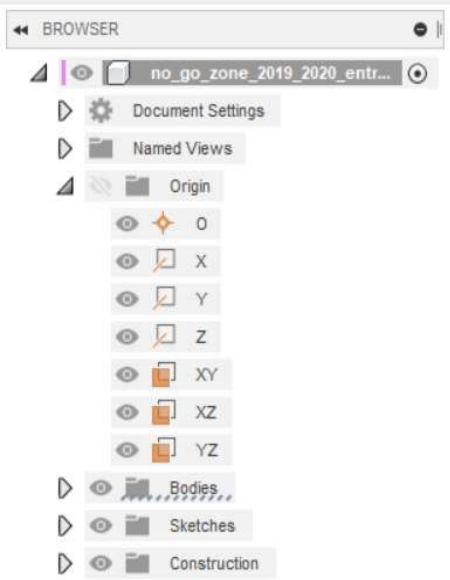


- Select CREATE
- Select Mirror.

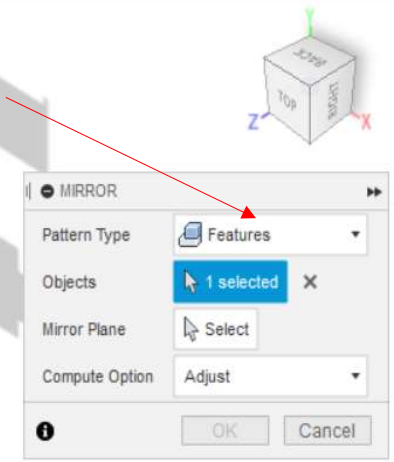
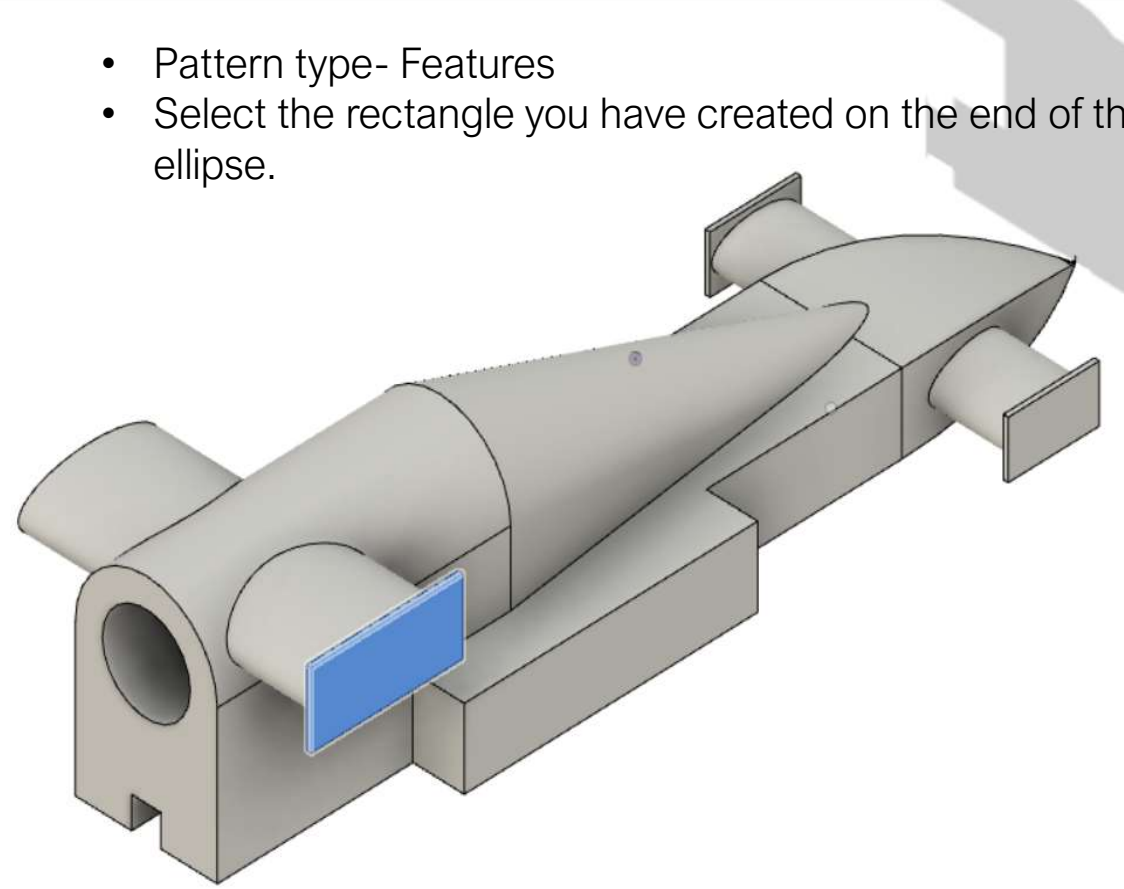
Makes a mirrored copy of selected faces, features, bodies, or components at equal distances across a plane.

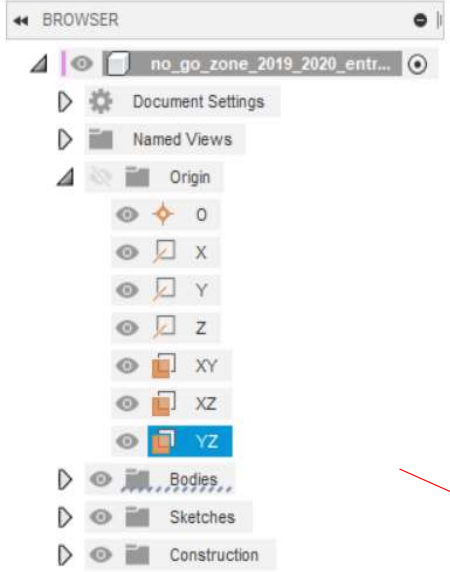
Select the objects to mirror then the plane to mirror around.



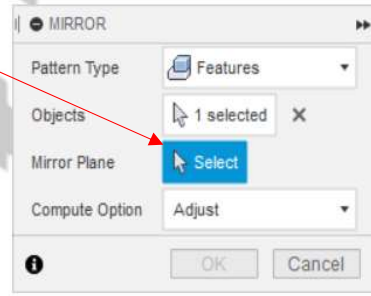
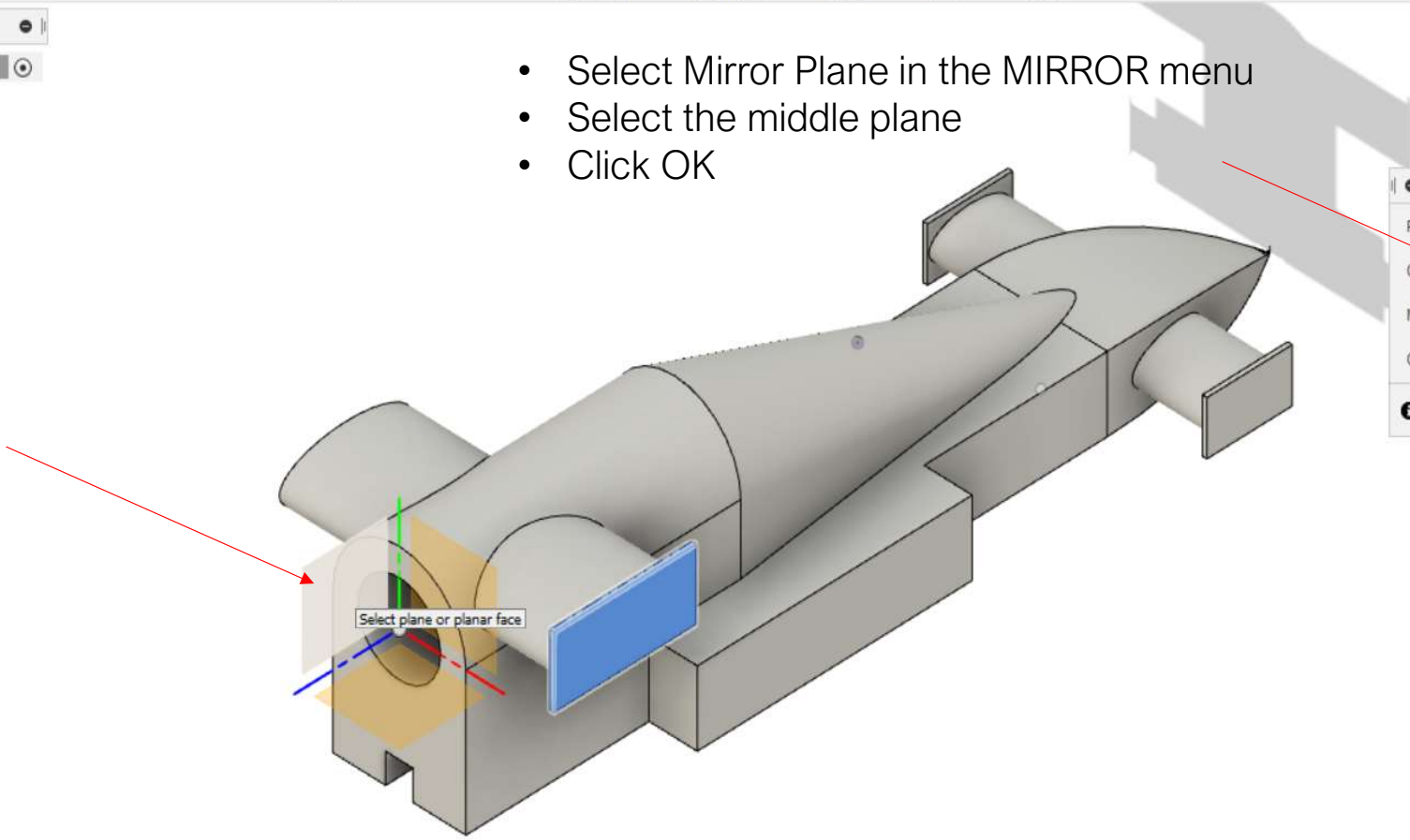


- Pattern type- Features
- Select the rectangle you have created on the end of the ellipse.





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



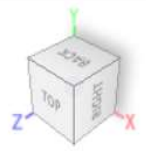
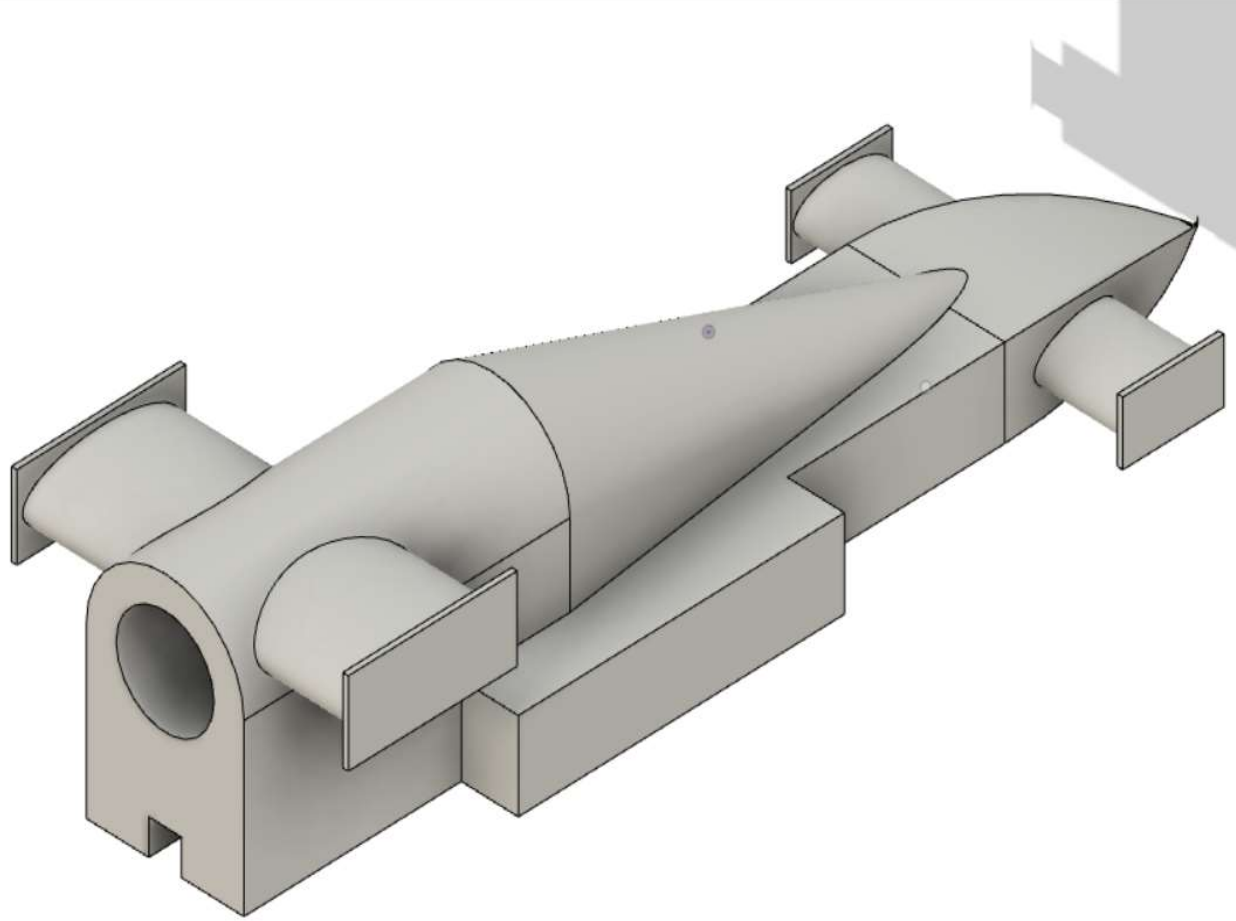
DESIGN ▾

SOLID SURFACE SHEET METAL TOOLS

CREATE ▾ MODIFY ▾ ASSEMBLE ▾ CONSTRUCT ▾ INSPECT ▾ INSERT ▾ SELECT ▾

BROWSER

- no_go_zone_2019_2020_entr...
- Document Settings
- Named Views
- Origin
 - 0
 - X
 - Y
 - Z
 - XY
 - XZ
 - YZ
- Bodies
- Sketches
- Construction



COMMENTS

Navigation icons: Home, Hand, Rotate, Zoom, Pan, Grid, and other standard CAD navigation tools.

Bottom status bar with various icons for file operations, view manipulation, and system settings.

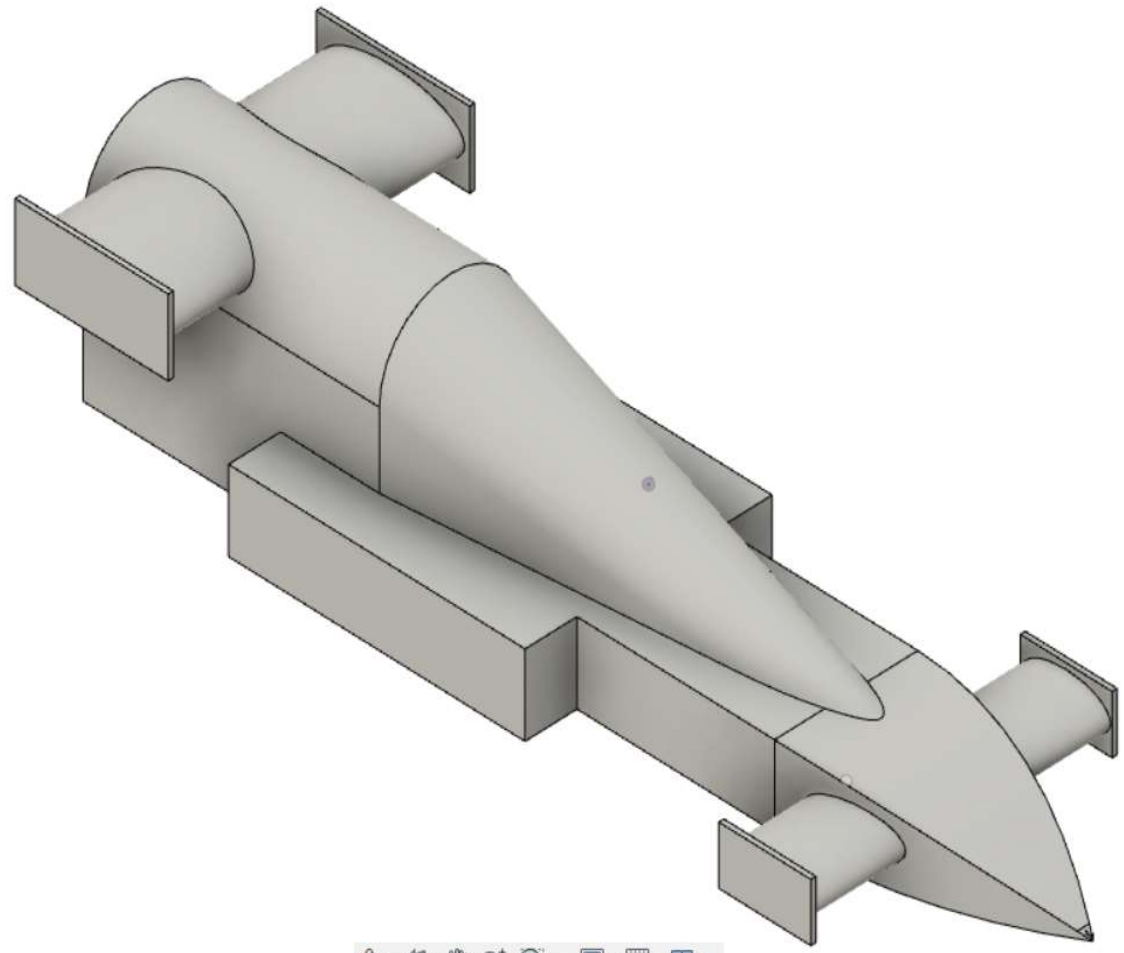
DESIGN ▾

SOLID SURFACE SHEET METAL TOOLS

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COMMENTS

Navigation icons: pan, rotate, zoom, etc.

Bottom status bar with navigation and tool icons.