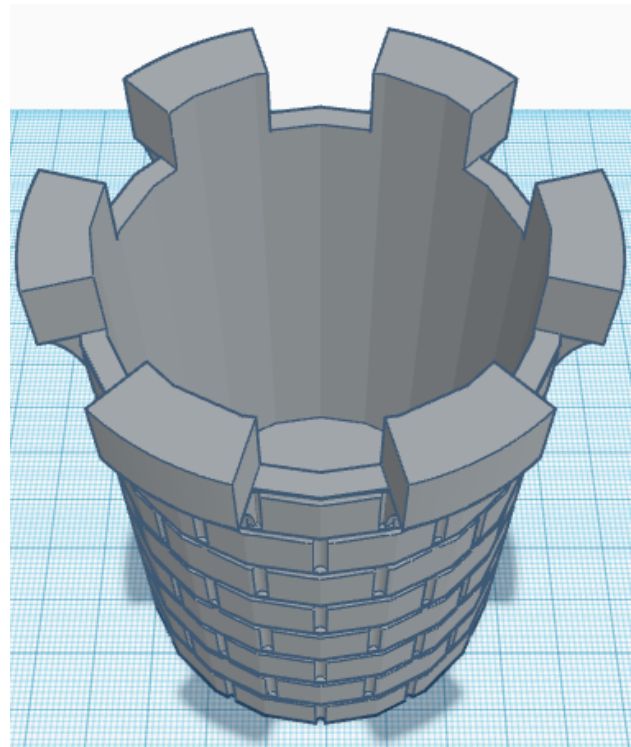
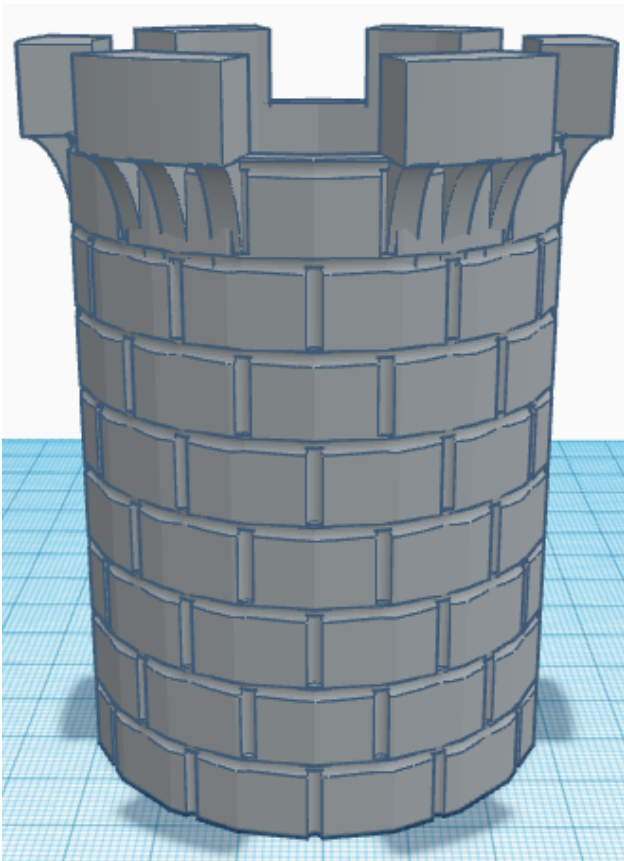




Castle Turret Project

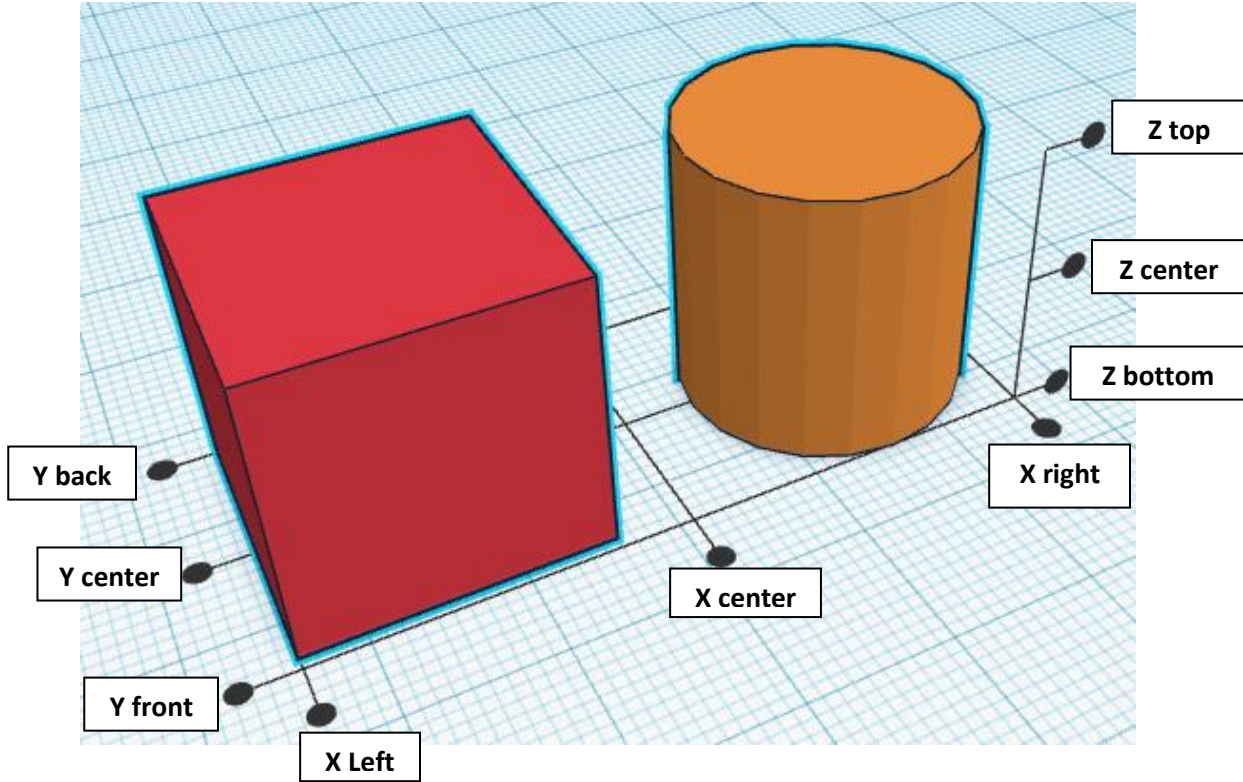


Reference to Aligning, Flip direction, Move direction, and Rotate direction.

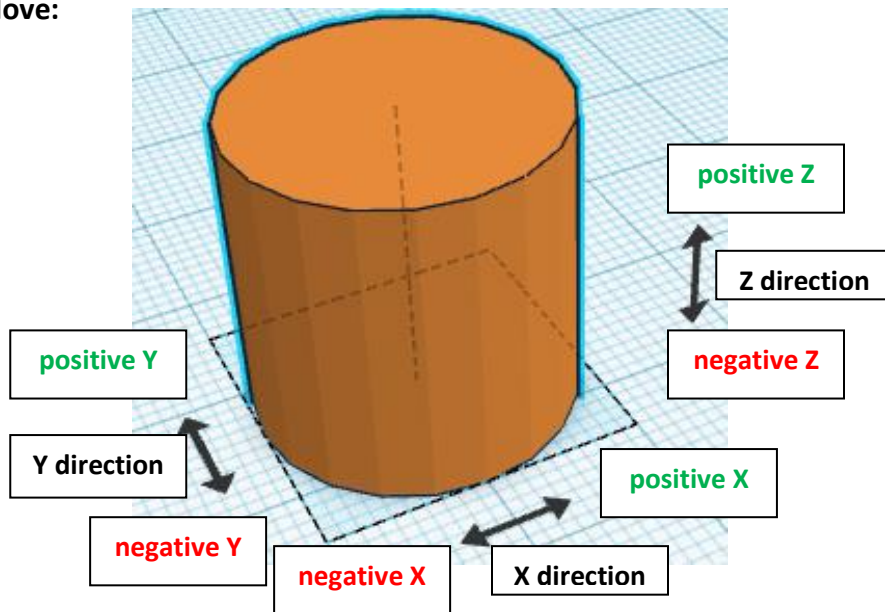
Always be in the "home view" when doing any of these!!!



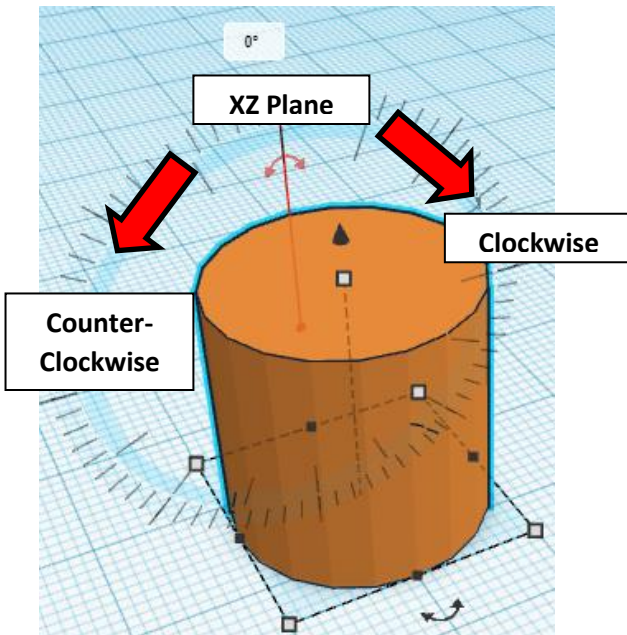
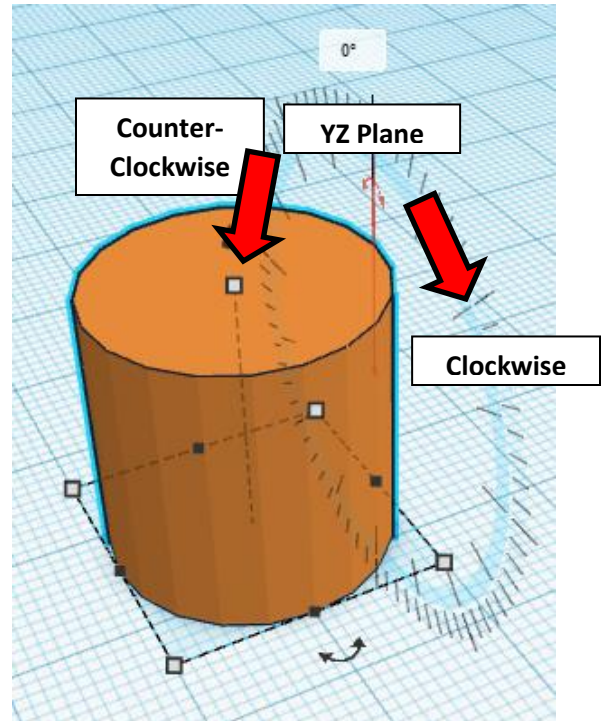
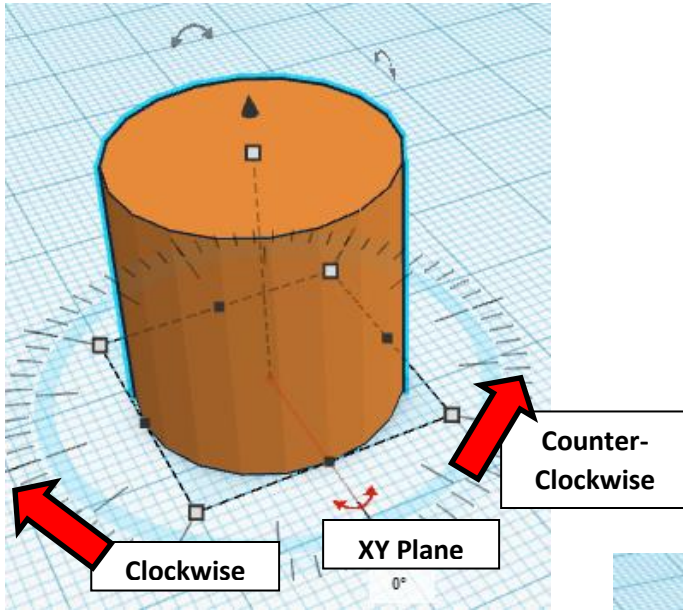
Aligning:



Flip or Mirror and Move:



Rotate:

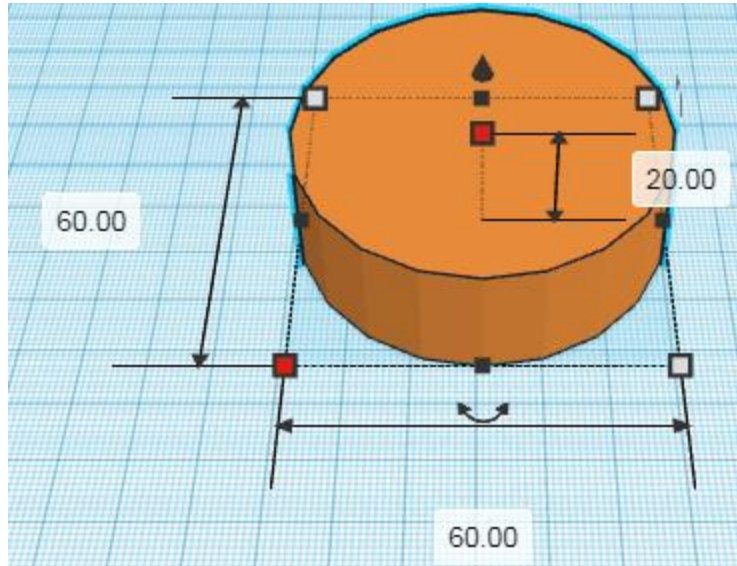


Castle Turret:

Bricks:

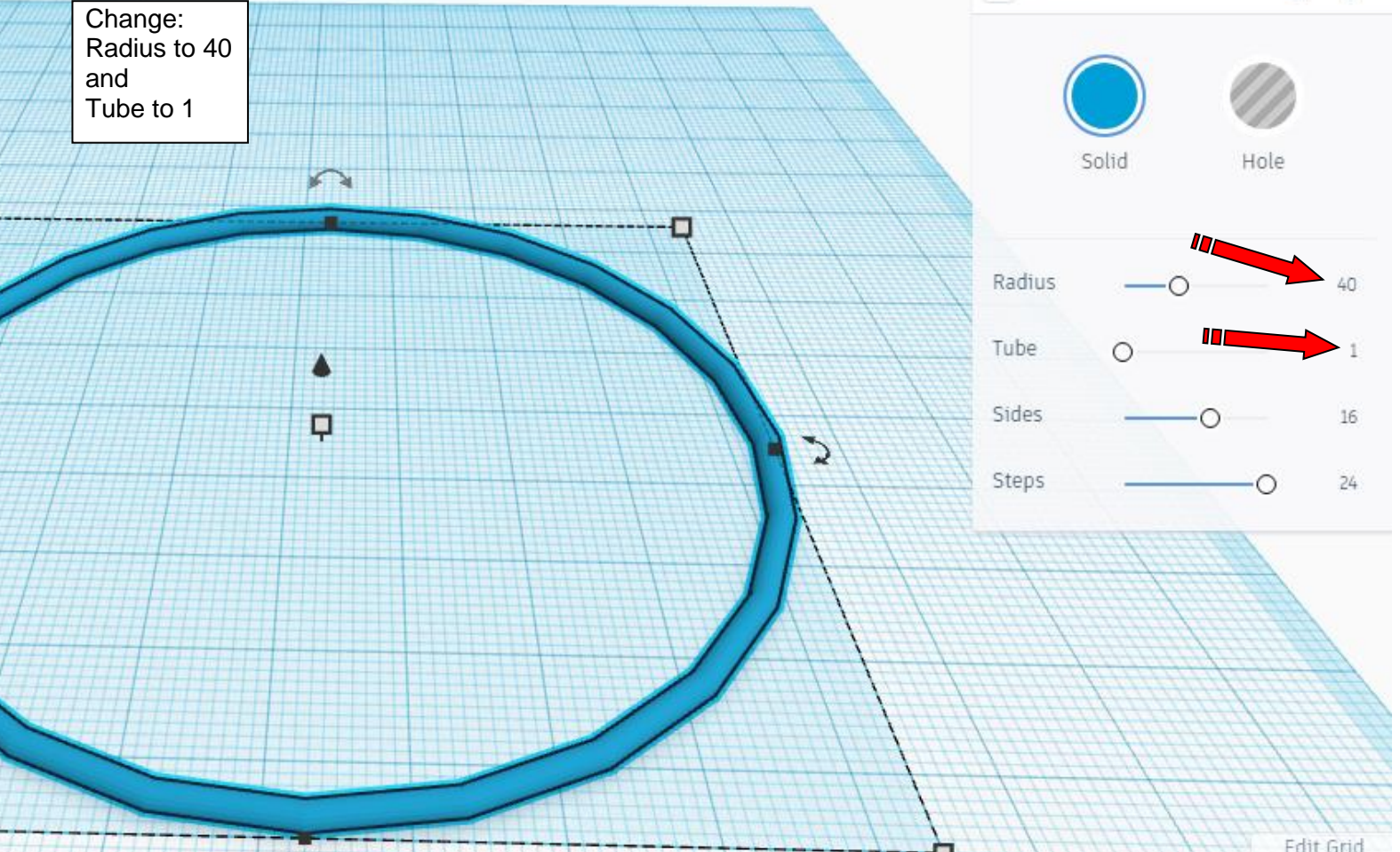
Bring in a Cylinder, located in Basic Shapes on the right 2 shapes down.
From now on this will be called the **Bricks**.

Change the dimensions to
60mm X direction,
60mm Y direction, and
20mm Z direction.



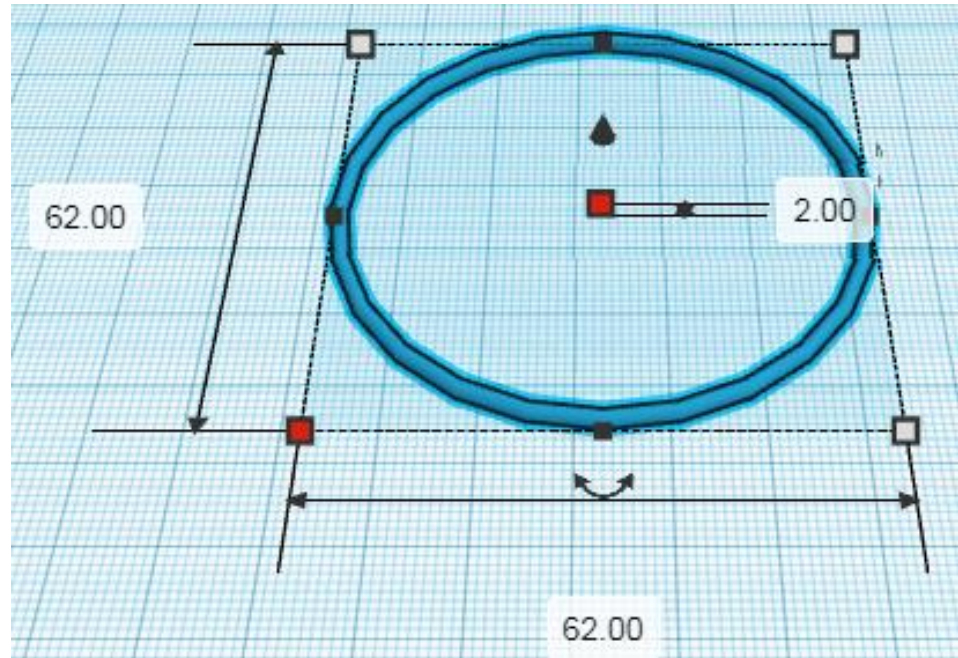
Bring in a Torus, located in Basic Shapes on the right 8 shapes down.
From now on this will be called the **Torus Cutout**.

Change:
Radius to 40
and
Tube to 1



Torus Cutout:

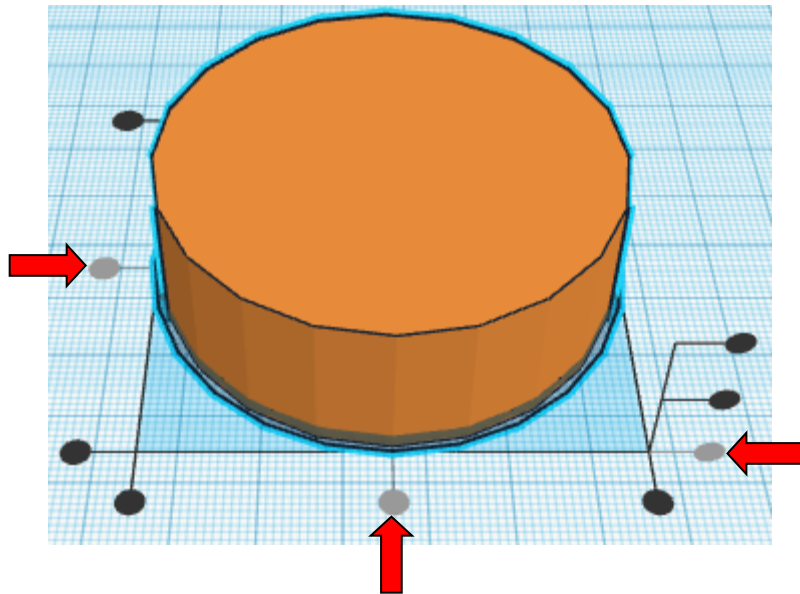
Change the dimensions to 62mm X direction, 62mm Y direction, and 2mm Z direction.



Change Torus Cutout to **Hole** by selecting Torus Cutout and typing "h".

Align Bricks and Torus Cutout

centered in X direction,
centered of Y direction, and
bottom of Z direction.

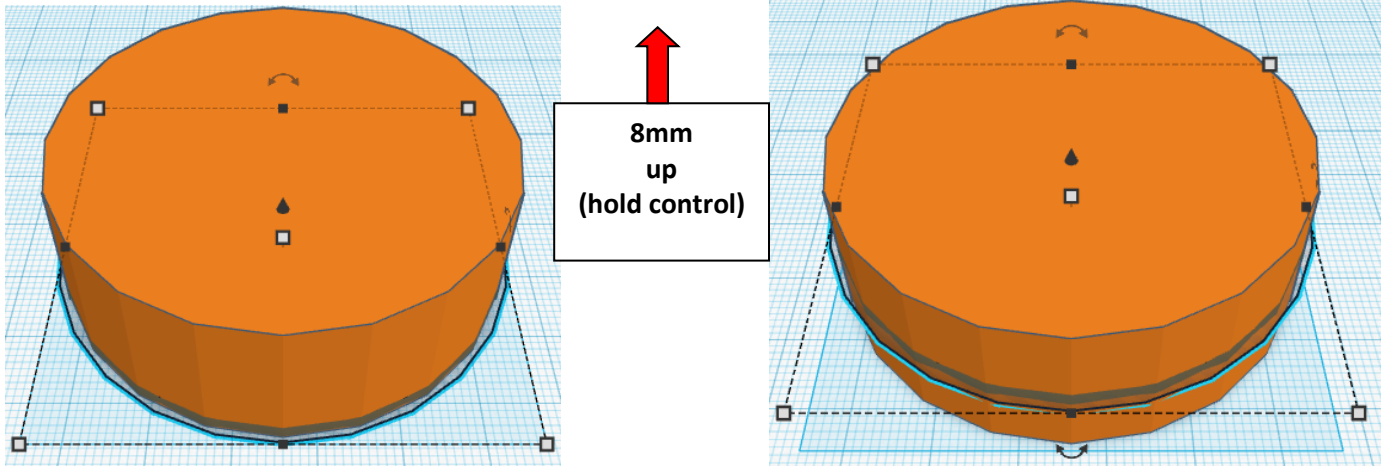


Move Torus Cutout (Must be in home view for this to work!)
move up in positive Z direction 8mm

Hint: Select Torus Cutout and hold down control button and push up arrow key 8 times.

Before

After



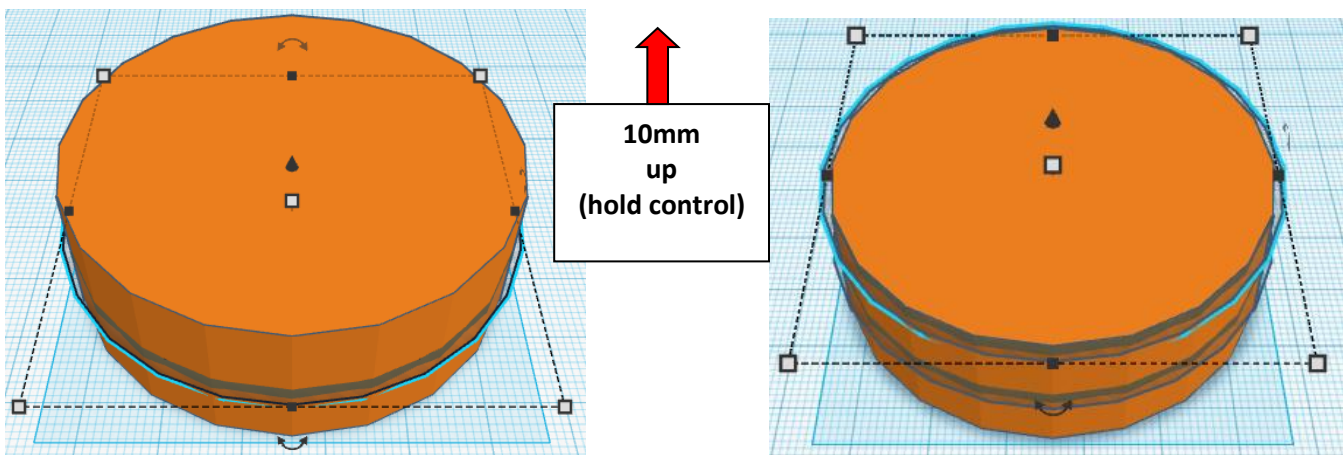
Duplicate Torus Cutout 1 time

Move Torus Cutout (Must be in home view for this to work!)
move up in positive Z direction 10mm

Hint: Select Torus Cutout and hold down control and push up arrow key 10 times.
or
Select Torus Cutout and hold down control and hold down shift and push up arrow key 1 time.

Before

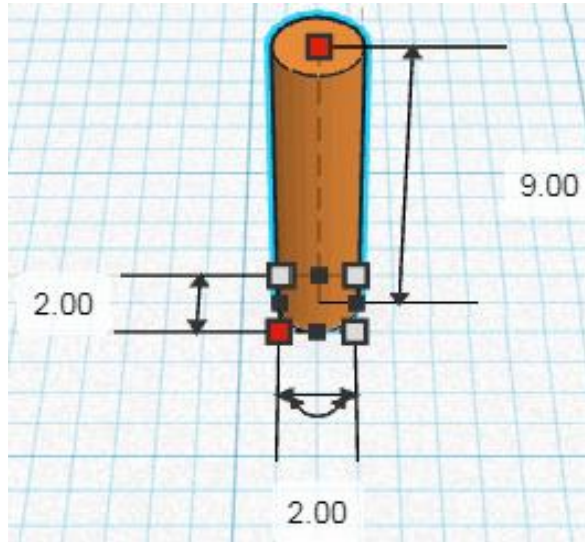
After



Group Bricks and Torus Cutout
From now on this will be called the **Bricks**.

Bring in a Cylinder, located in Basic Shapes on the right 2 shapes down.
From now on this will be called the **Cylinder Cutout**.

Change the dimensions to
2mm X direction,
2mm Y direction, and
9mm Z direction.



Duplicate Cylinder Cutout 1 time

Move Cylinder Cutout (Must be in home view for this to work!)
move right in positive X direction 60mm

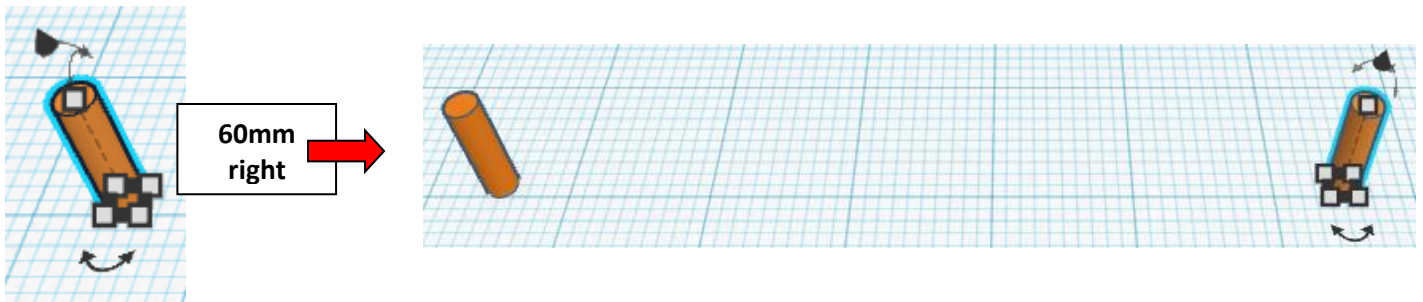
Hint: Select Cylinder Cutout and push right arrow key 60 times.

or

Select Cylinder Cutout and hold down shift and push right arrow key 6 times.

Before

After

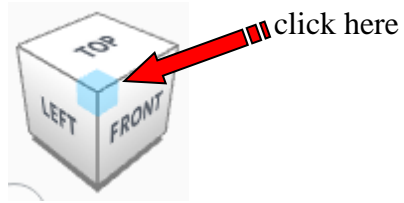


Group both Cylinder Cutouts

From now on this will be called the **Cylinder Cutout Set**.

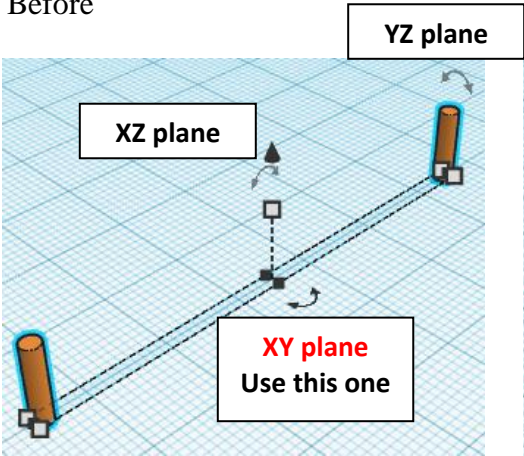
Duplicate Cylinder Cutout Set 5 times

Go to TOP LEFT FRONT view for rotations

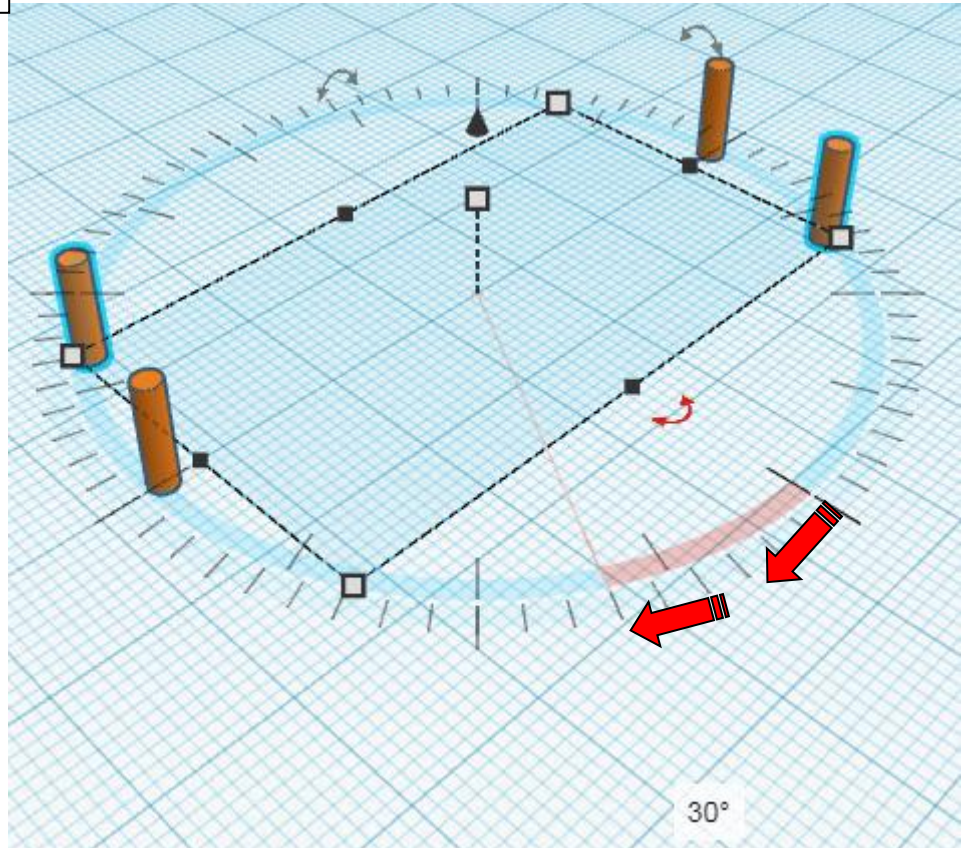


Rotate the Cylinder Cutout Set clockwise 30 degrees in XY plane.

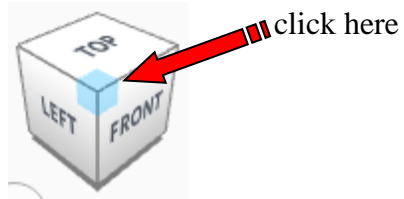
Before



After

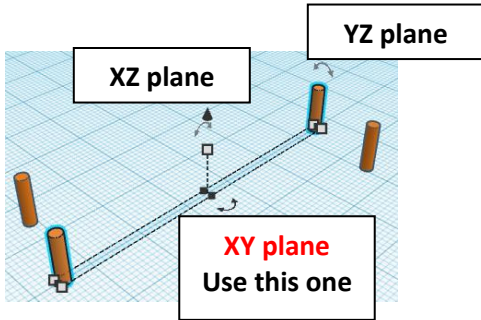


Go to TOP LEFT FRONT view for rotations

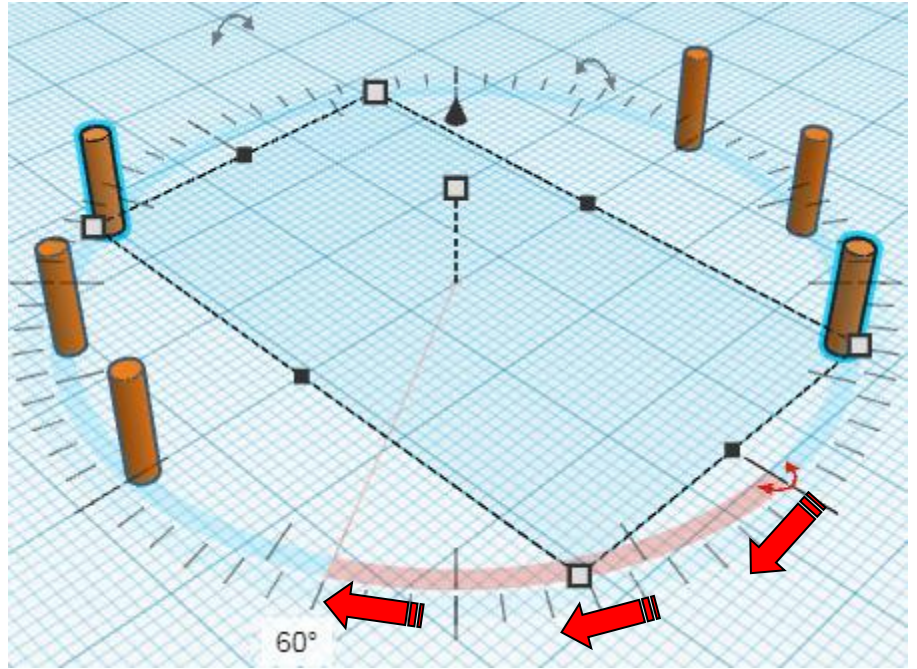


Rotate the Cylinder Cutout Set clockwise 60 degrees in XY plane.

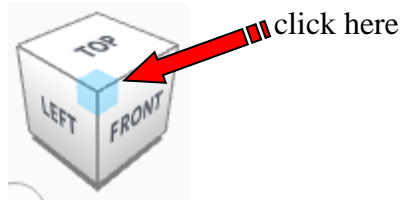
Before



After

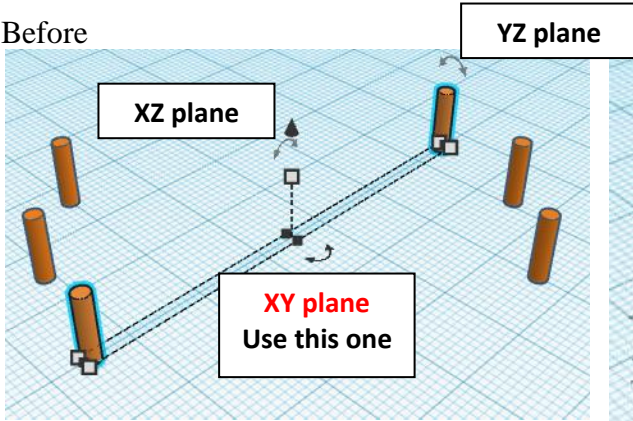


Go to TOP LEFT FRONT view for rotations

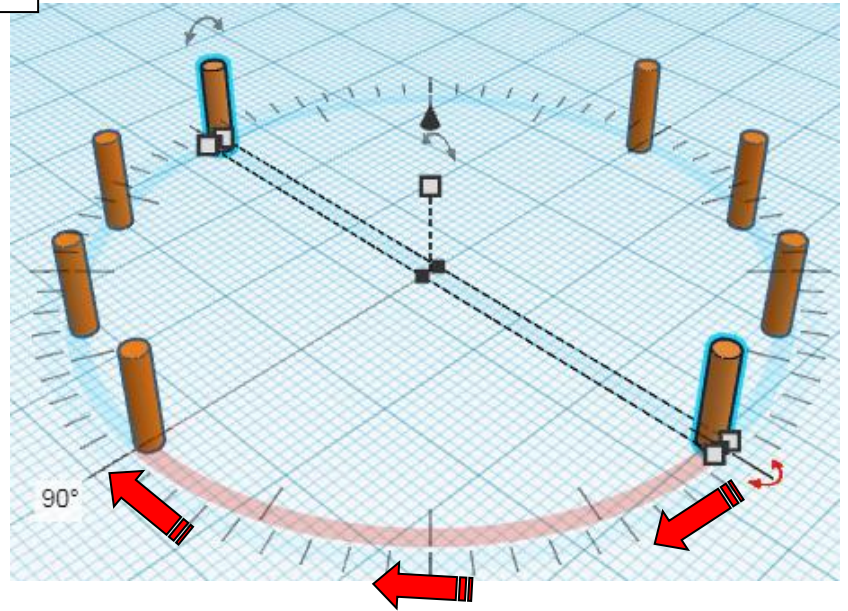


Rotate the Cylinder Cutout Set clockwise 90 degrees in XY plane.

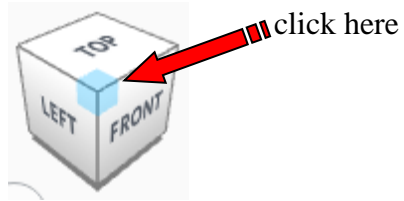
Before



After

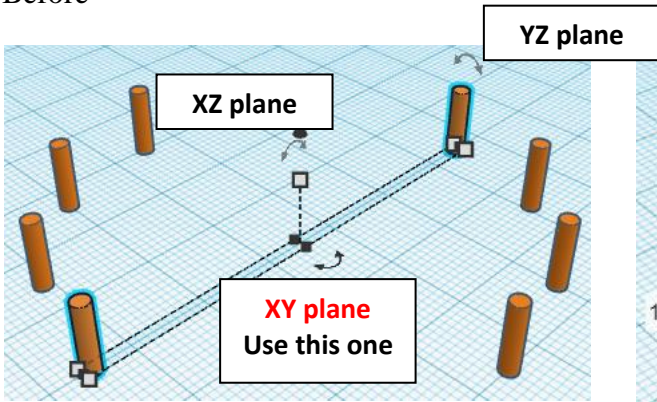


Go to TOP LEFT FRONT view for rotations

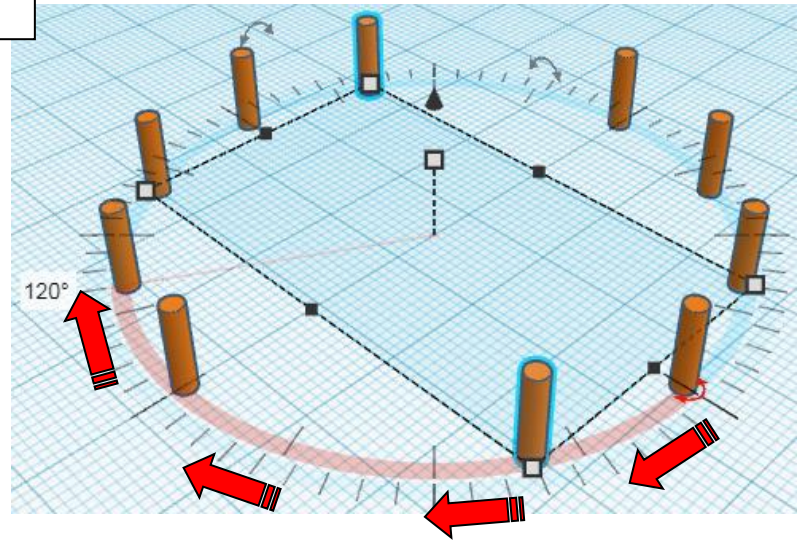


Rotate the Cylinder Cutout Set clockwise 120 degrees in XY plane.

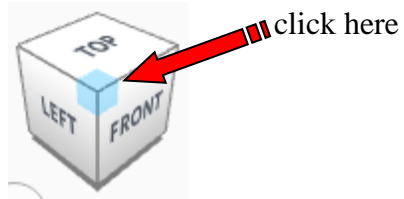
Before



After

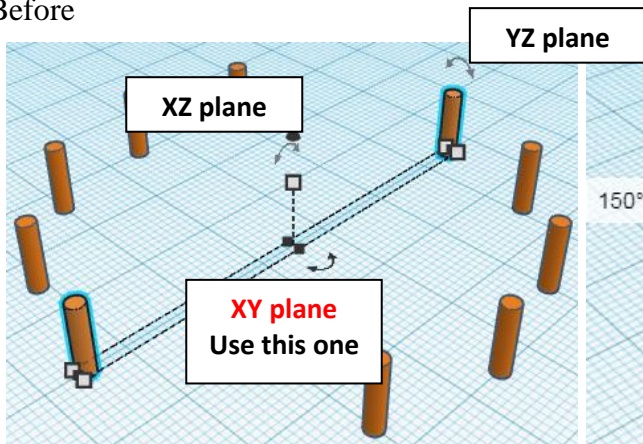


Go to TOP LEFT FRONT view for rotations

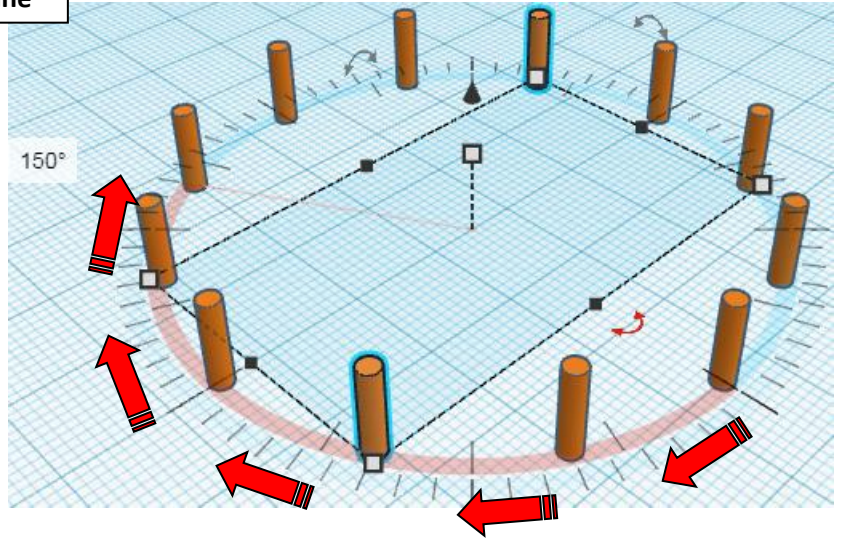


Rotate the Cylinder Cutout Set clockwise 150 degrees in XY plane.

Before



After



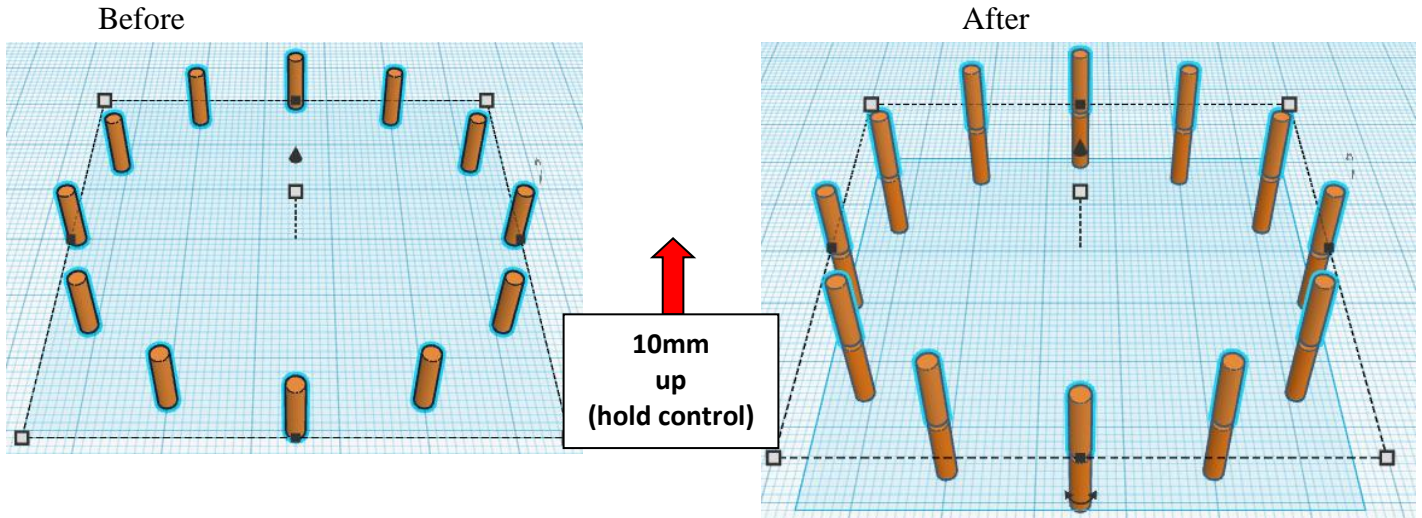
Group all Cylinder Cutouts

From now on this will be called the **Full Cylinder Cutout Set**.

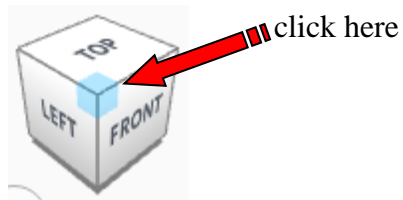
Duplicate Full Cylinder Cutout Set 1 time

Move Full Cylinder Cutout Set (Must be in home view for this to work!)
move up in positive Z direction 10mm

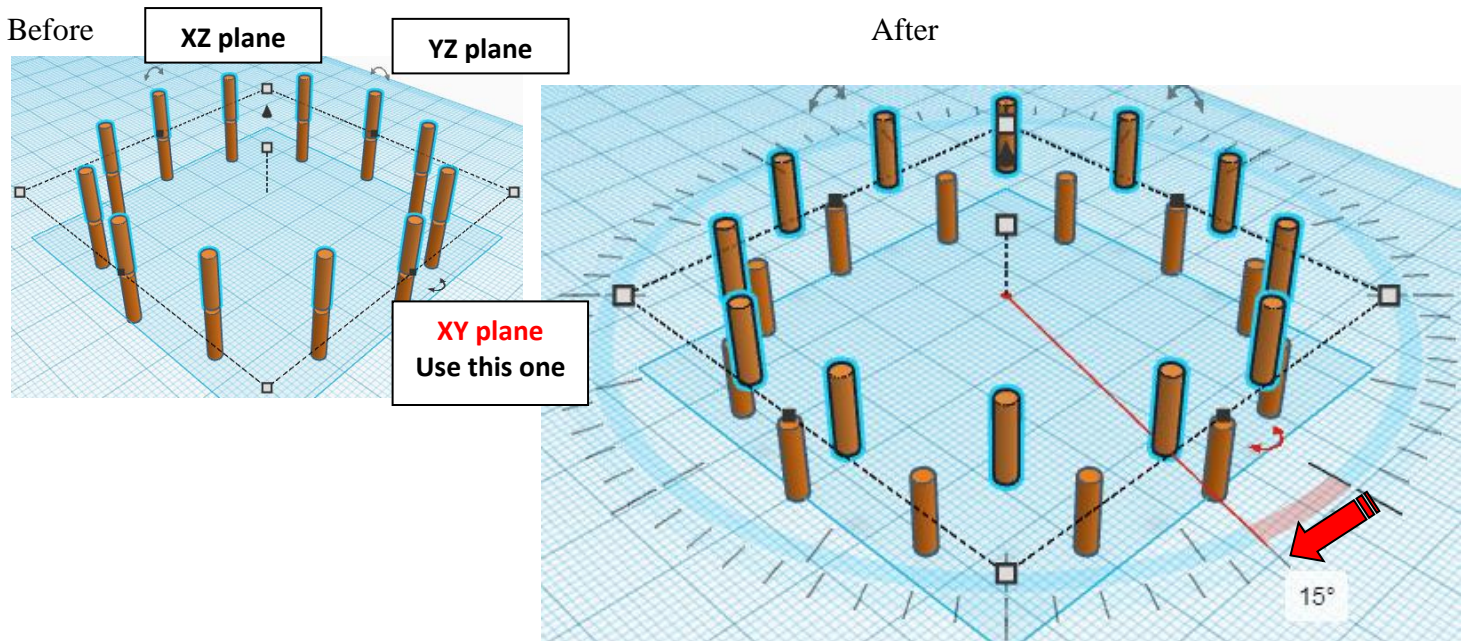
Hint: Select Full Cylinder Cutout Set and hold down control and push up arrow key 10 times.
or
Select Full Cylinder Cutout Set and hold down shift and push right arrow key 1 time.



Go to TOP LEFT FRONT view for rotations



Rotate the top Full Cylinder Cutout Set clockwise 15 degrees in XY plane.



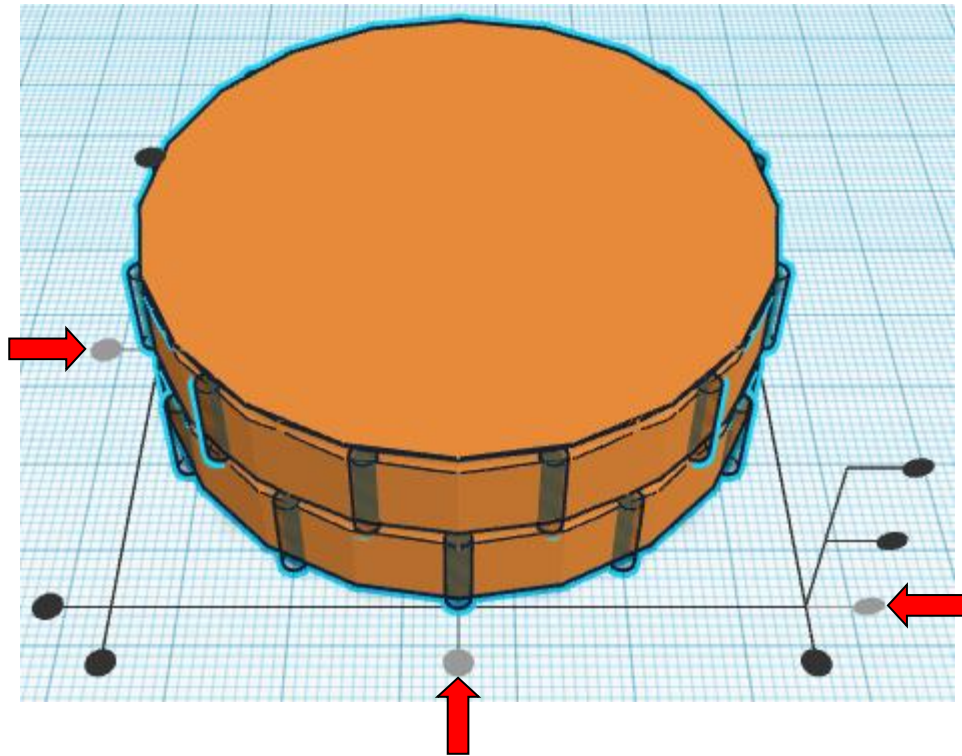
Group both Full Cylinder Cutout Sets

From now on this will be called the **Double Full Cylinder Cutout Set**.

Change Double Full Cylinder Cutout Set to **Hole** by selecting Double Full Cylinder Cutout Set and typing "h".

Align Bricks and Double Full Cylinder Cutout Set

centered in X direction,
centered of Y direction, and
bottom of Z direction.



Group Double Full Cylinder Cutout Set and Bricks

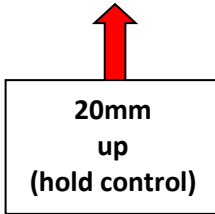
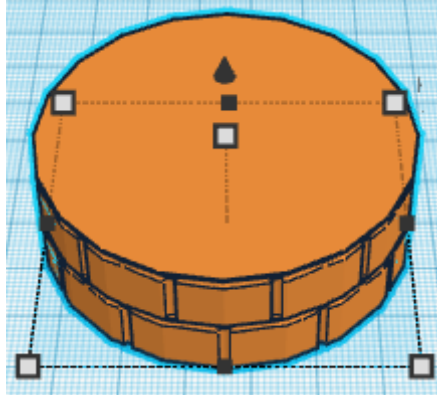
From now on this will be called the **Bricks**

Duplicate Bricks 1 time

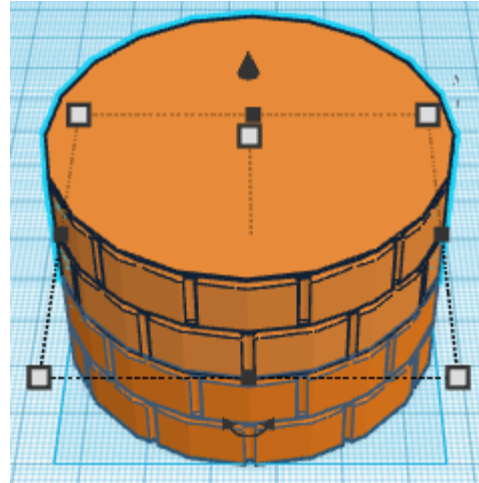
Move Bricks (Must be in home view for this to work!)
move up in positive Z direction 20mm

Hint: Select Bricks and hold down control and push up arrow key 20 times.
or
Select Bricks and hold down shift and push right arrow key 2 times.

Before



After

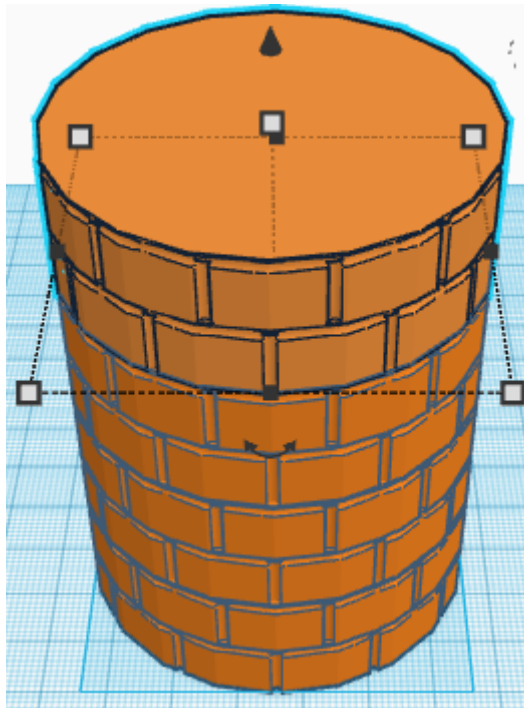


Cool Trick Time:

With the top set of bricks still selected *immediately*

Duplicate Bricks 2 more times

This will duplicate and move the bricks all at the same time.



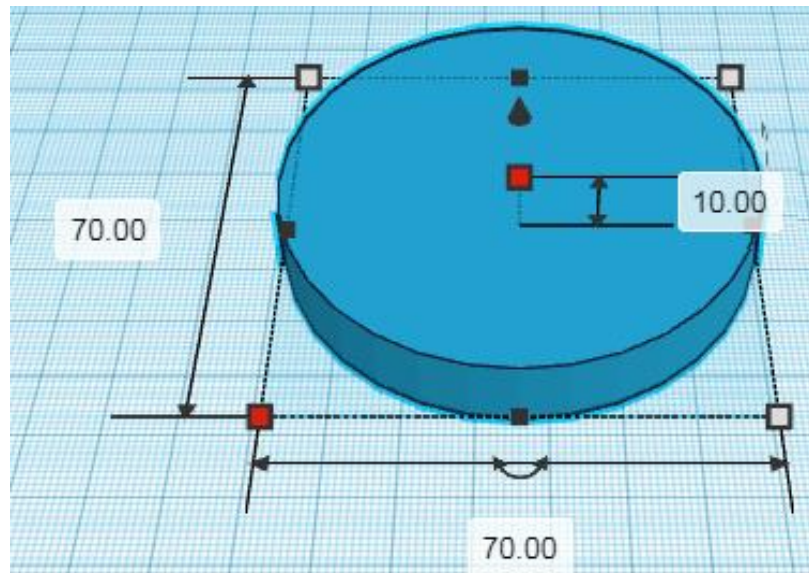
Group all Bricks
From now on this will be called the **Bricks**

Congratulations, the base of the Castle Turret is Done!

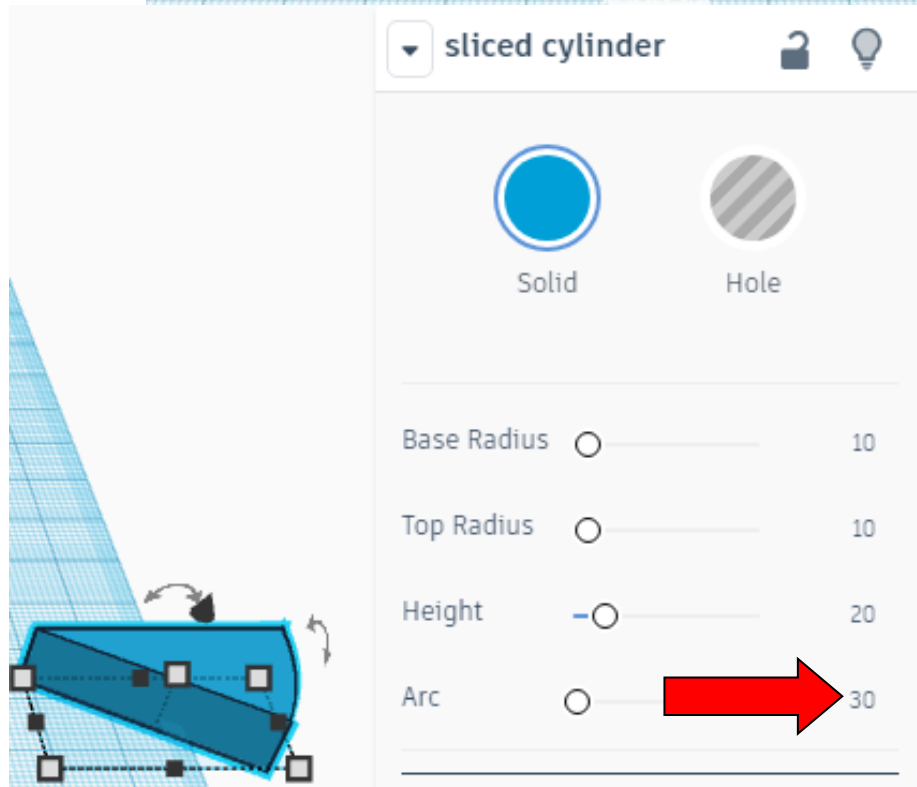
Now we need to put the bricks along the top.

Bring in a Sliced Cylinder, located in All, (things in All move each time that TinkerCad adds items to All), this was last seen on page 5, on the bottom right.
From now on this will be called the **Top Brick**

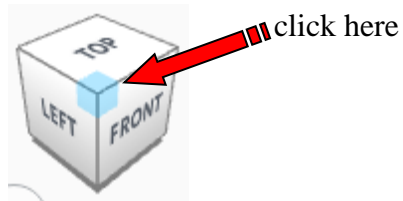
Change the dimensions to
70mm X direction,
70mm Y direction, and
10mm Z direction.



Change:
Arc to 30



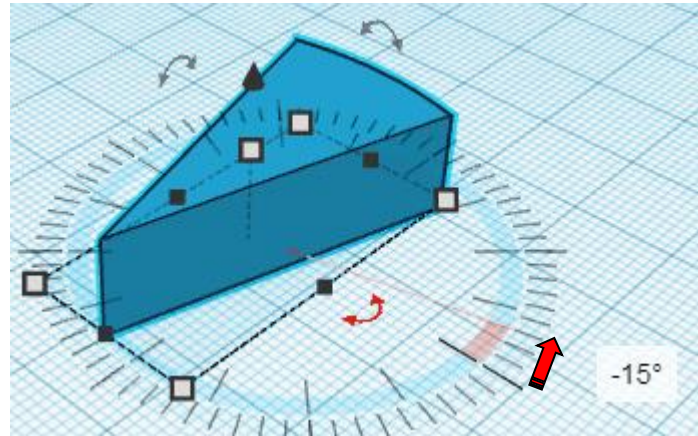
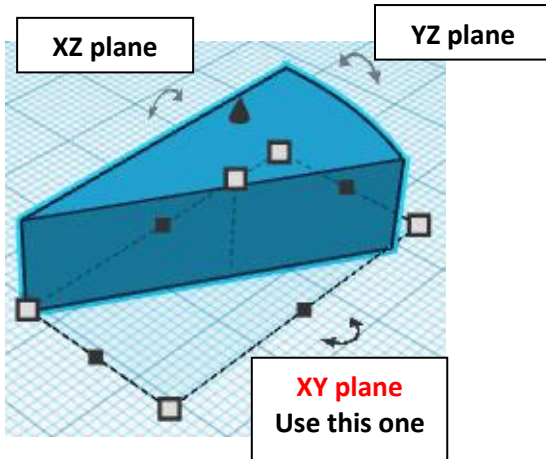
Go to TOP LEFT FRONT view for rotations



Rotate the Top Brick counter-clockwise 15 degrees in XY plane.

Before

After

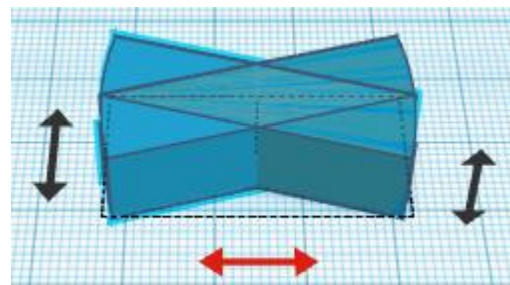
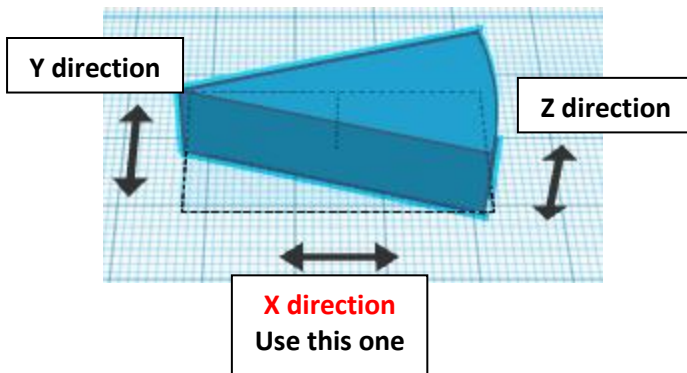


Duplicate Top Brick 1 time

Flip Top Brick in X direction.

Before

After



From now on this new flipped part will be called the **Left Top Brick**

Move Left Top Brick (Must be in home view for this to work!)
move left in negative X direction 35mm

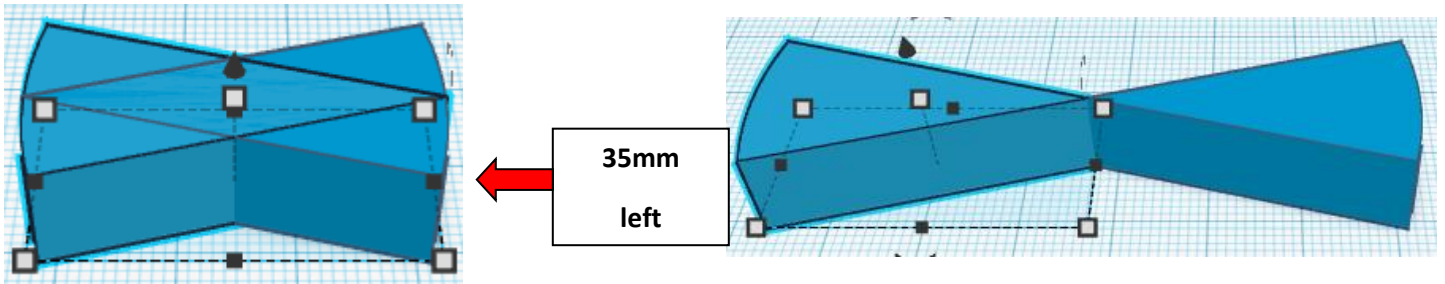
Hint: Select Left Top Brick and push left arrow key 35 times.

or

Select Left Top Brick and hold down shift and push left arrow key 3 times. Then release shift and push left arrow key 5 more times.

Before

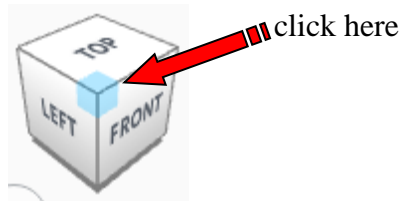
After



Group Left Top Brick and Right Top Brick
From now on this will be called the **Top Brick Set**

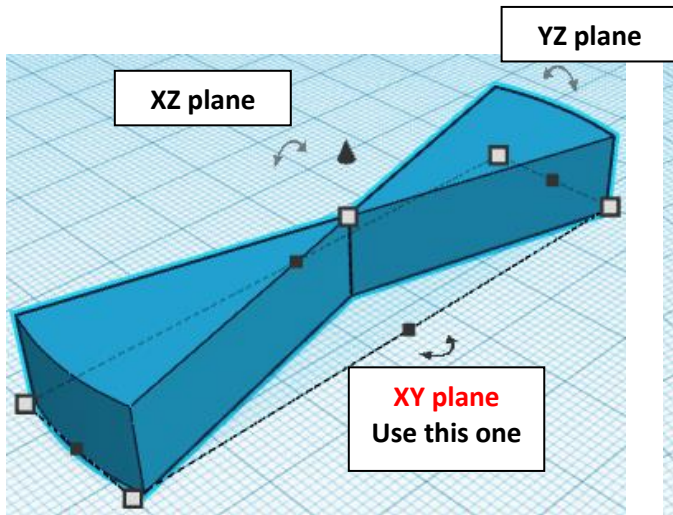
Duplicate Top Brick Set 1 time

Go to TOP LEFT FRONT view for rotations

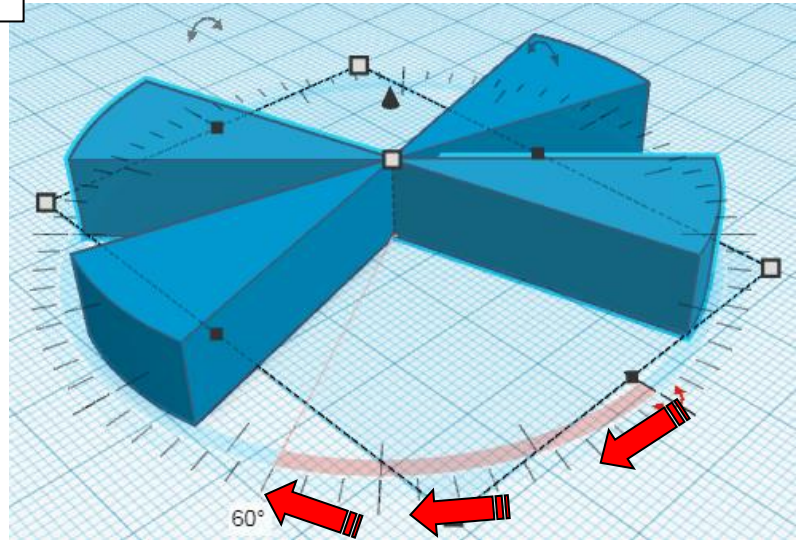


Rotate the Top Brick Set clockwise 60 degrees in XY plane.

Before



After



Remember the Cool Trick Time:

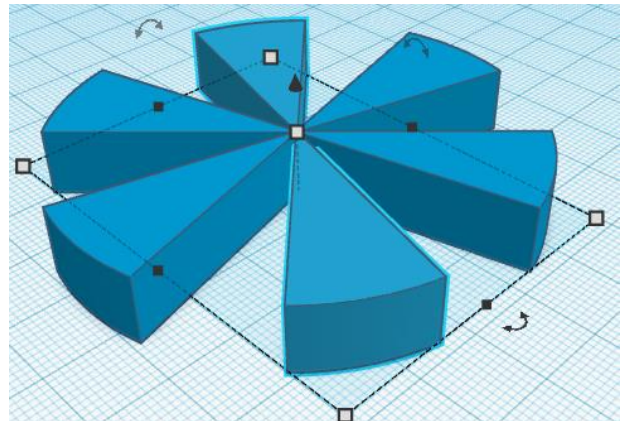
immediately

Duplicate Top Brick Set 1 more time

This will duplicate and rotate the bricks all at the same time.

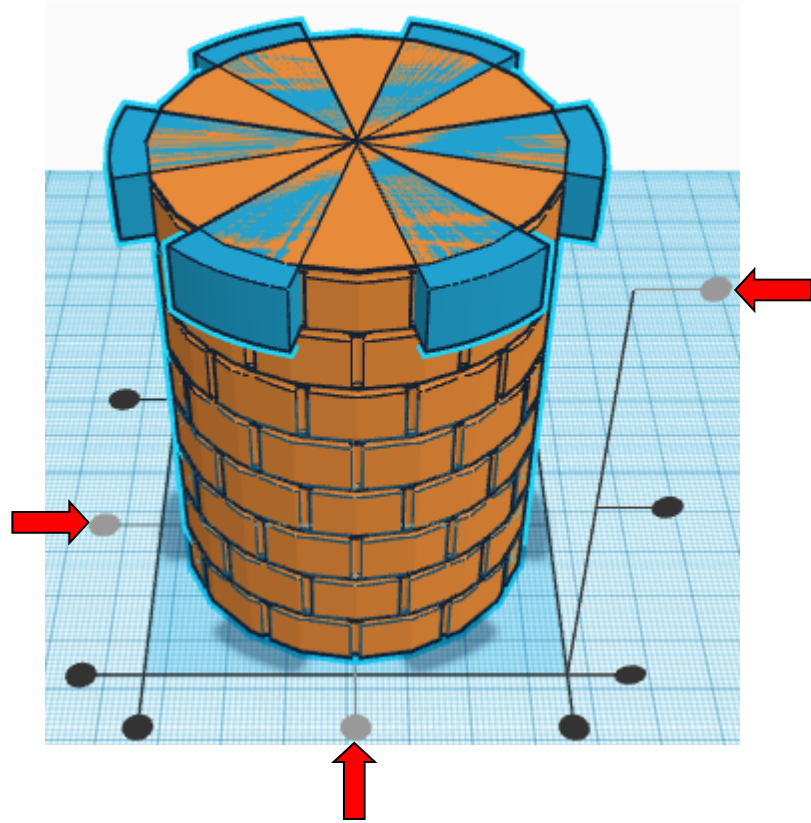
Group all Top Brick Sets

From now on this will be called the **Full Top Brick Set**



Align Bricks and Top Brick Sets

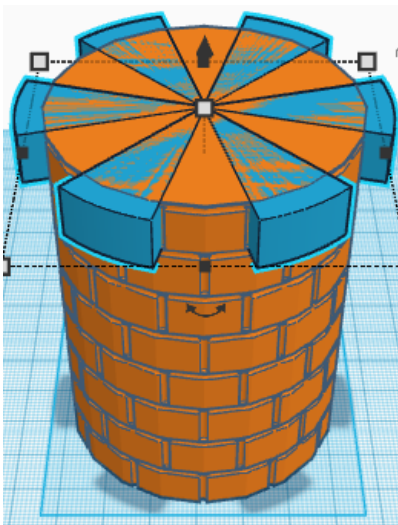
centered in X direction,
centered of Y direction, and
top of Z direction.



Move Top Brick Sets (Must be in home view for this to work!)
move up in positive Z direction 10mm

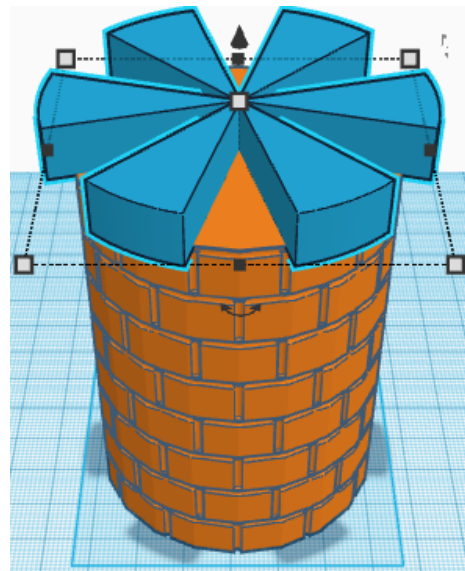
Hint: Select Top Brick Sets and hold control and push up arrow key 10 times.
or
Select Top Brick Sets and hold control and hold shift and push up arrow key 1 time

Before



10mm
up
(hold control)

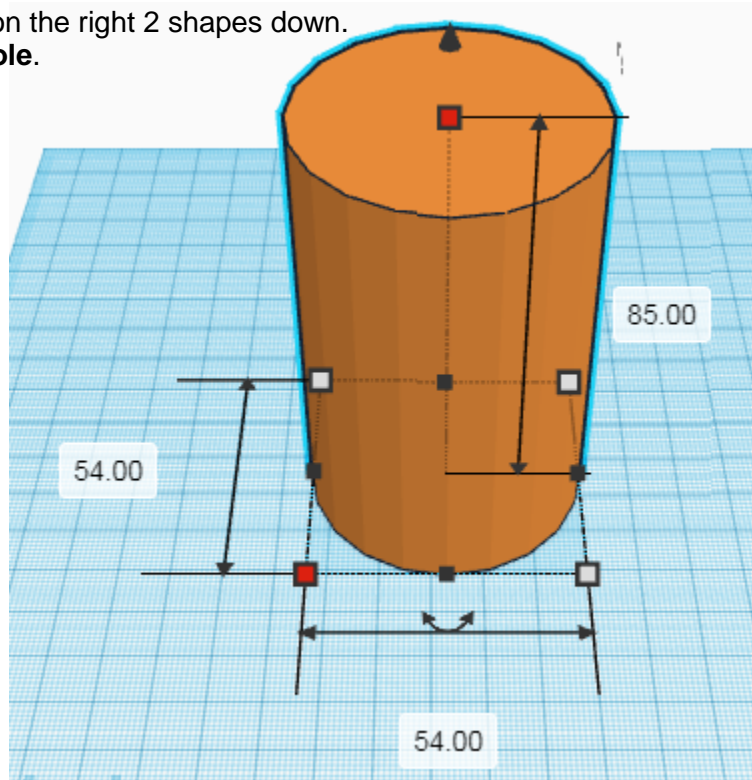
After



Group Bricks and Top Brick Sets
From now on this will be called the **Turret**

Bring in a Cylinder, located in Basic Shapes on the right 2 shapes down.
From now on this will be called the **Center Hole**.

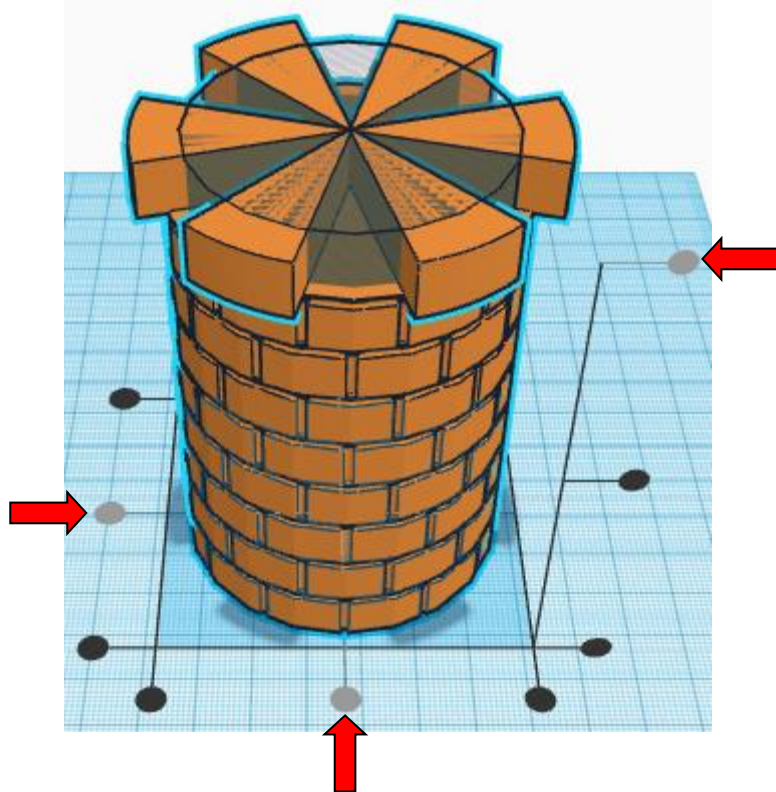
Change the dimensions to
54mm X direction,
54mm Y direction, and
85mm Z direction.



Change Center Hole to **Hole** by selecting Center Hole and typing “h”.

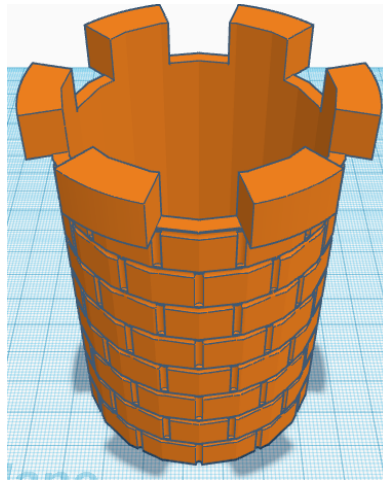
Align Turret and Center Hole

centered in X direction,
centered of Y direction, and
top of Z direction.

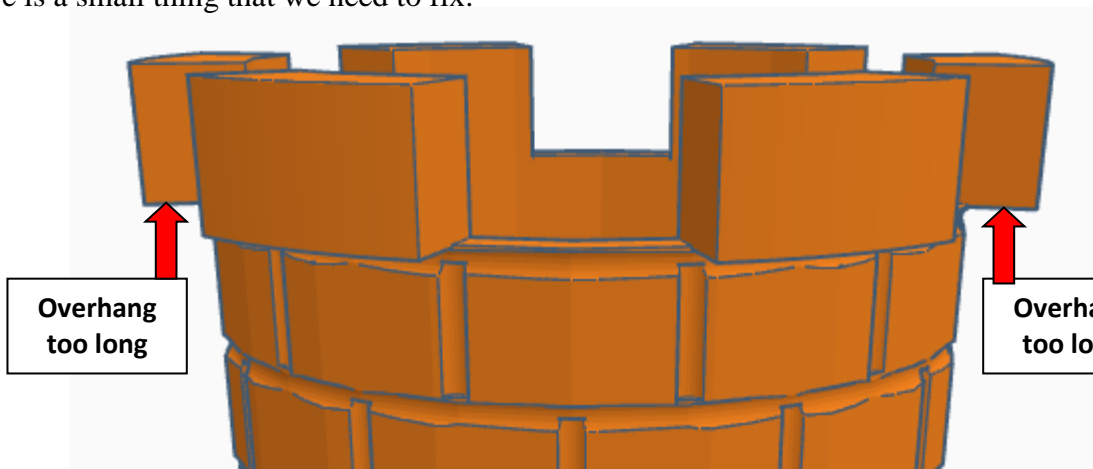


Group Turret and Center Hole
From now on this will be called the **Turret**

Wow, this is really looking like a castle turret!



There is a small thing that we need to fix.



See that overhanging brick? A 3D printer can print some overhang, about 2mm - 3mm, without messing up.

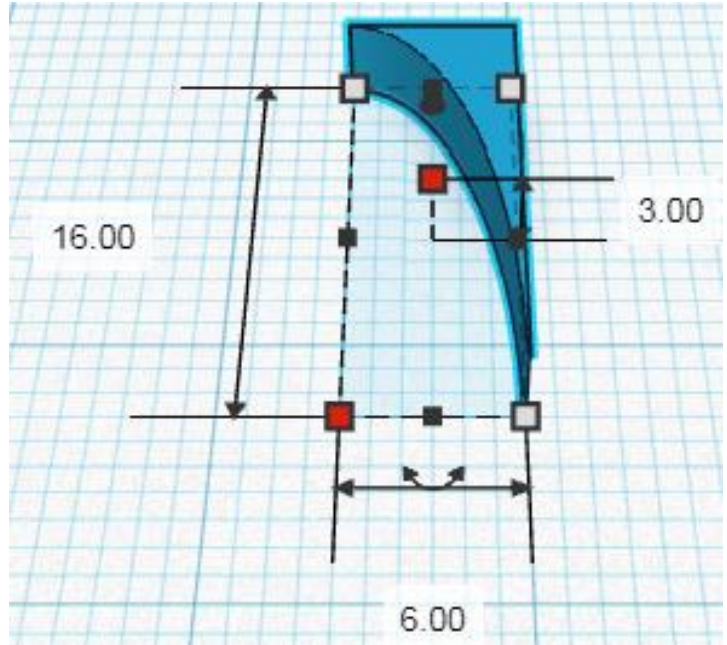
But this is more like 5mm of overhang. The 3D printing software can add supports that break-away and then you would have to use sandpaper to smooth out the area where the support was. I try to avoid this as much as possible.

Let's add our own supports and in the process add more decor to our Castle Turret.

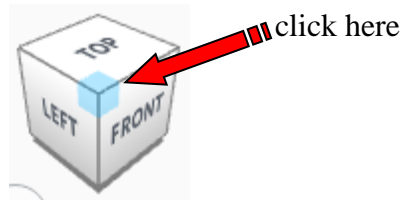
Bring in a MetaFillet, located in All, (things in All move each time that TinkerCad adds items to All), this was last seen on page 11, on the bottom left.

From now on this will be called the **Brick Support**

Change the dimensions to
6mm X direction,
16mm Y direction, and
3mm Z direction.



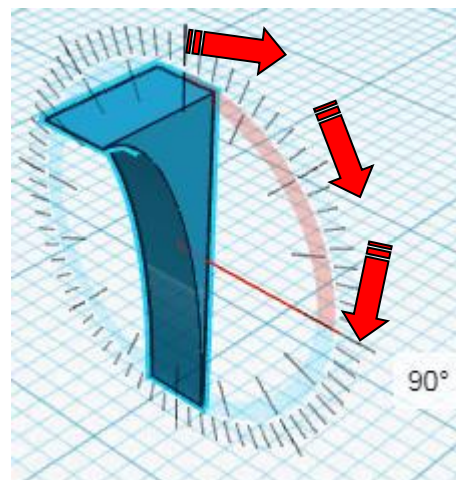
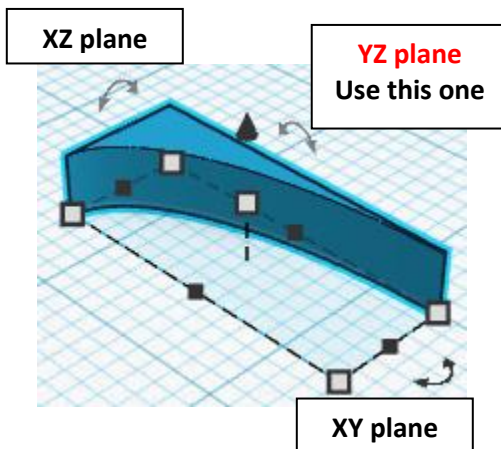
Go to TOP LEFT FRONT view for rotations



Rotate the Brick Support clockwise 90 degrees in YZ plane.

Before

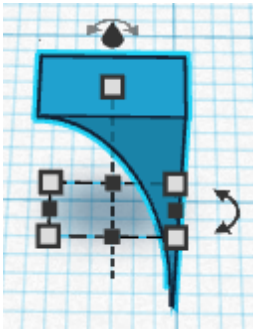
After



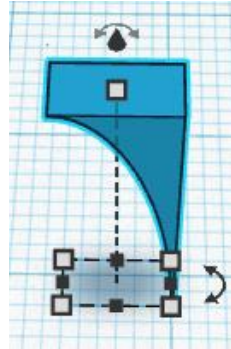
Set on Workplane:

Select the Brick Support and type "d" to set the body on the work plane.

Before



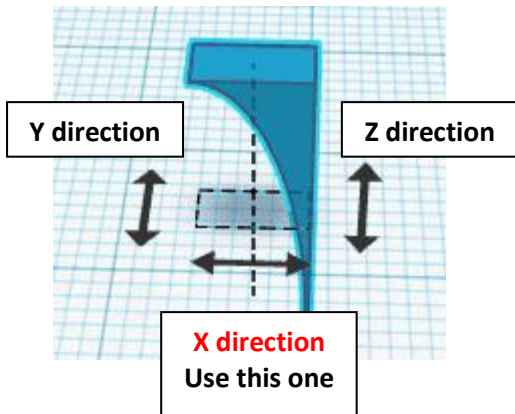
After



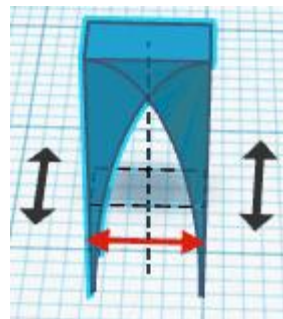
Duplicate Brick Support 1 time

Flip Brick Support in X direction.

Before



After

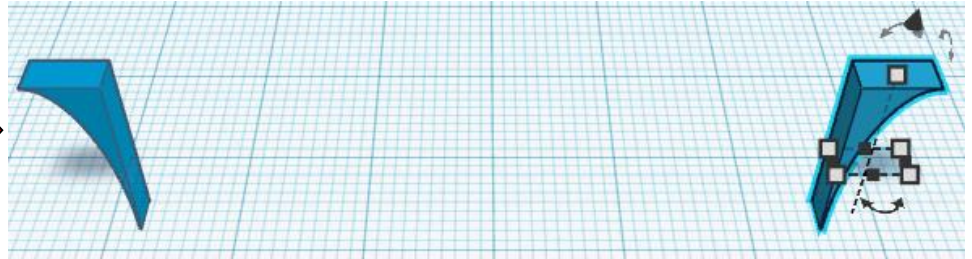
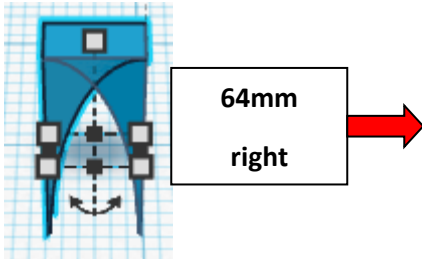


From now on this new flipped part will be called the **Right Brick Support**

Move Right Brick Support (Must be in home view for this to work!)
move right in positive X direction 64mm

Hint: Select Right Brick Support and push right arrow key 64 times.
or
Select Right Brick Support and hold down shift and push right arrow key 6 times. Then release shift and push right arrow key 4 more times.

Before

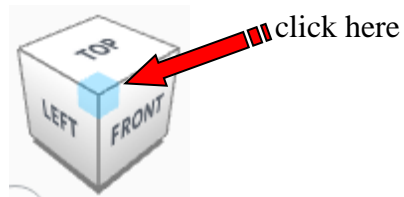


After

Group Left Brick Support and Right Brick Support
From now on this will be called the **Brick Support Set**

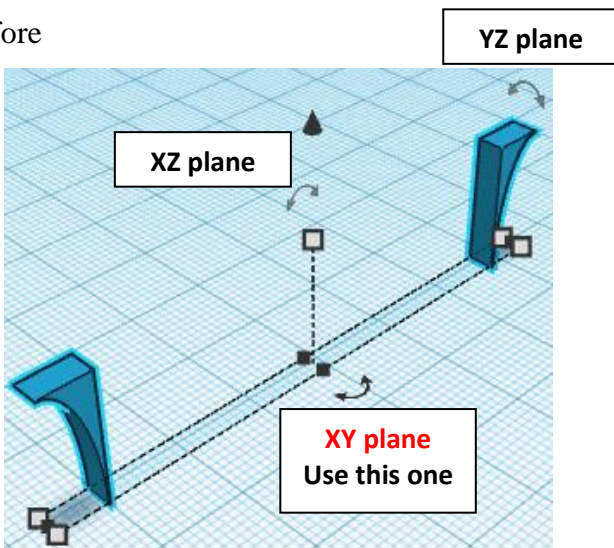
Duplicate Brick Support Set 2 time

Go to TOP LEFT FRONT view for rotations

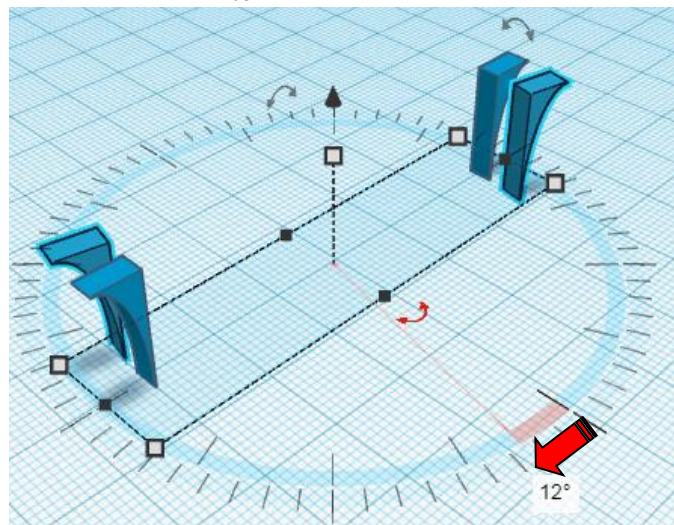


Rotate the Brick Support Set clockwise 12 degrees in XY plane.

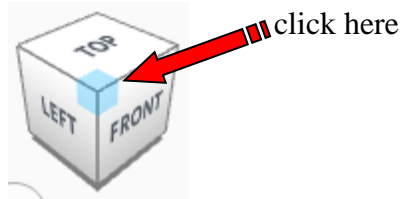
Before



After

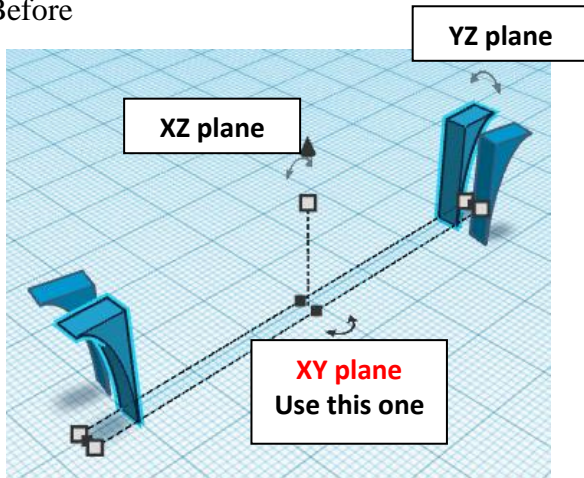


Go to TOP LEFT FRONT view for rotations



Rotate the Brick Support Set counter-clockwise 12 degrees in XY plane.

Before



After

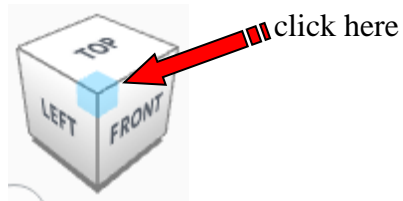


Group all Brick Support Sets

From now on this will be called the **Full Brick Support Set**

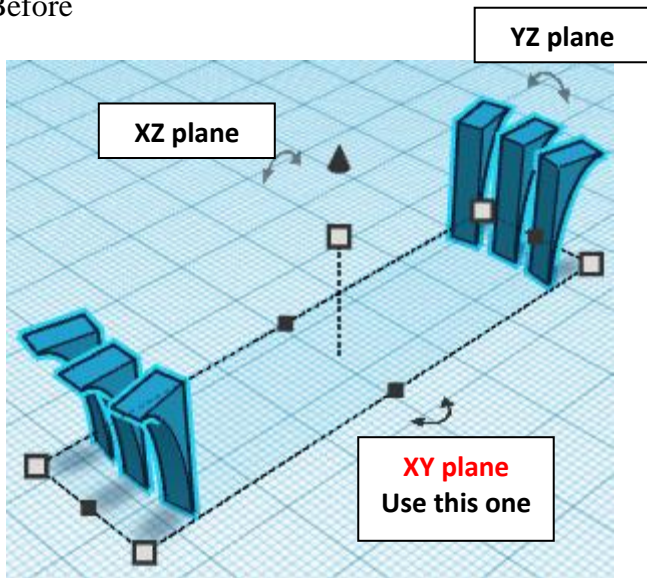
Duplicate Full Brick Support Set 1 time

Go to TOP LEFT FRONT view for rotations

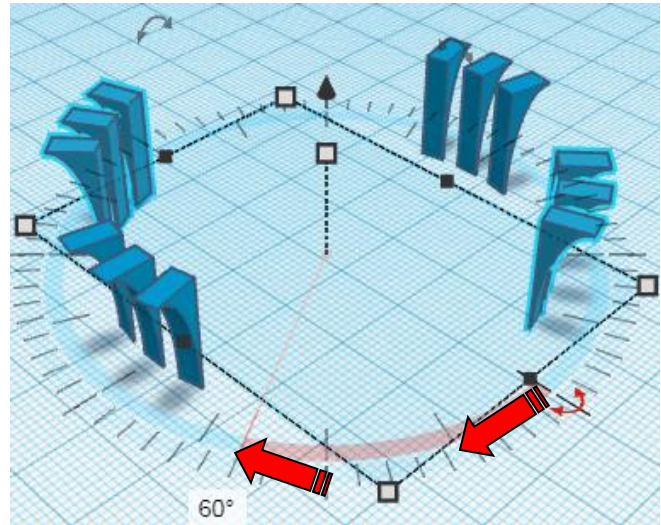


Rotate the Full Brick Support Set clockwise 60 degrees in XY plane.

Before



After



Remember the Cool Trick Time:

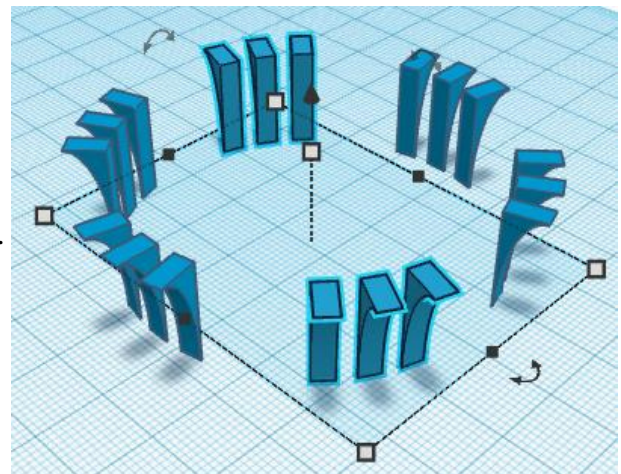
immediately

Duplicate Full Brick Support Set 1 more time

This will duplicate and rotate the bricks all at the same time.

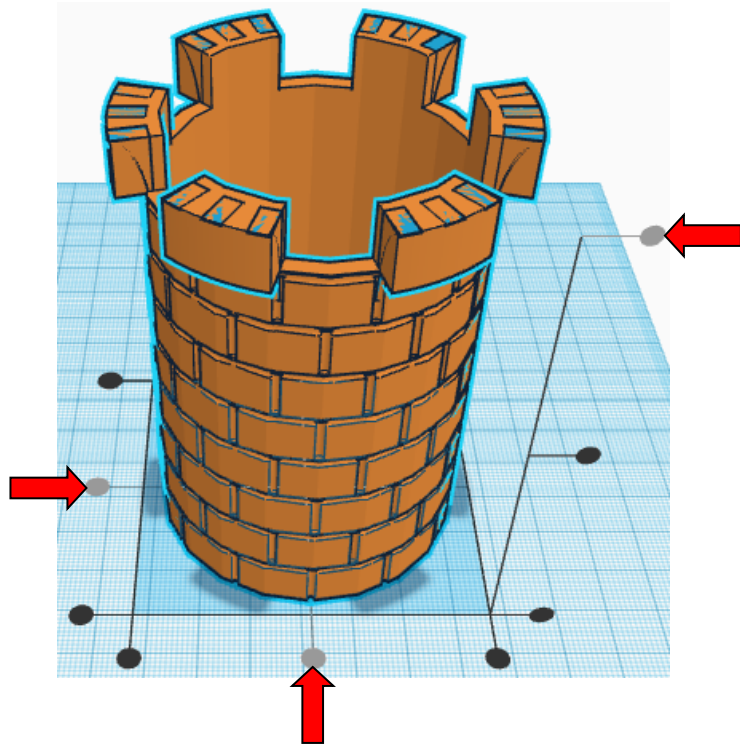
Group all Full Brick Support Sets

From now on this will be called the **Full Brick Support Set**



Align Turret and Full Brick Support Set

centered in X direction,
centered of Y direction, and
top of Z direction.

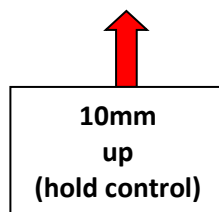
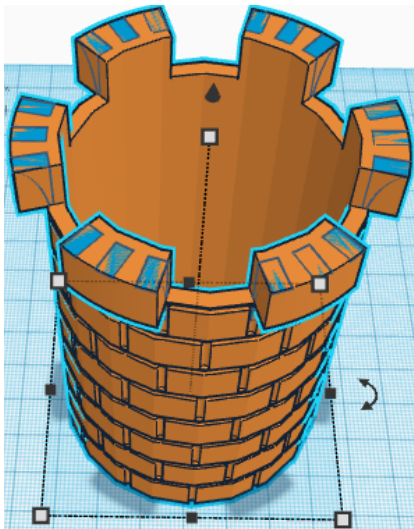


Because the Full Brick Support Set will be hard to select for movement, let's move the Turret instead and then we will set it back onto the workplane.

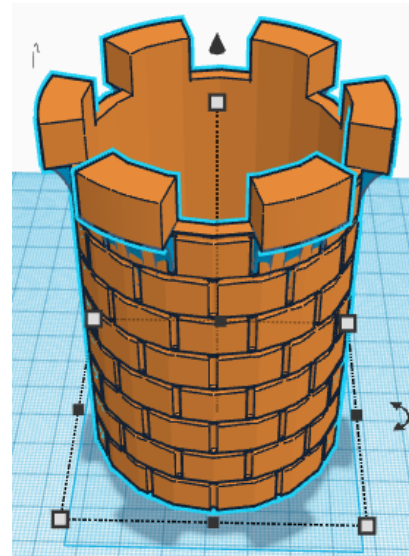
Move Turret (Must be in home view for this to work!)
move up in positive Z direction 10mm

Hint: Select Turret and hold control and push up arrow key 10 times.
or
Select Turret and hold control and hold shift and push up arrow key 1 time

Before



After

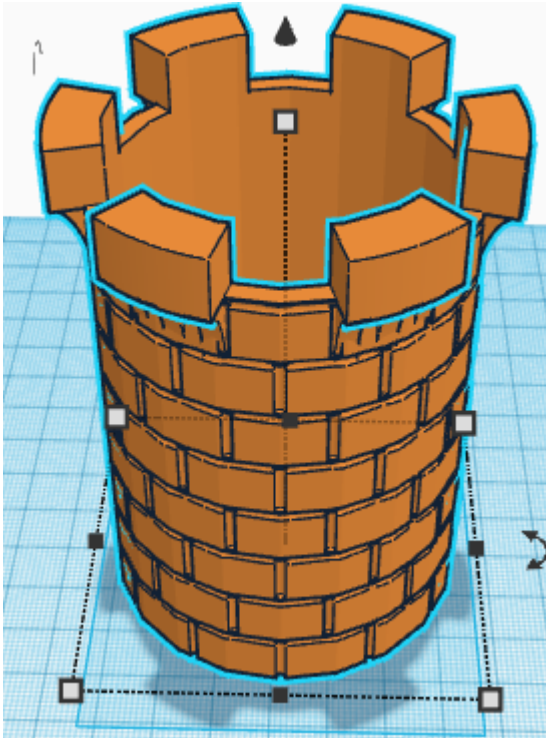


Group Turret and Full Brick Support Set
From now on this will be called the **Turret**

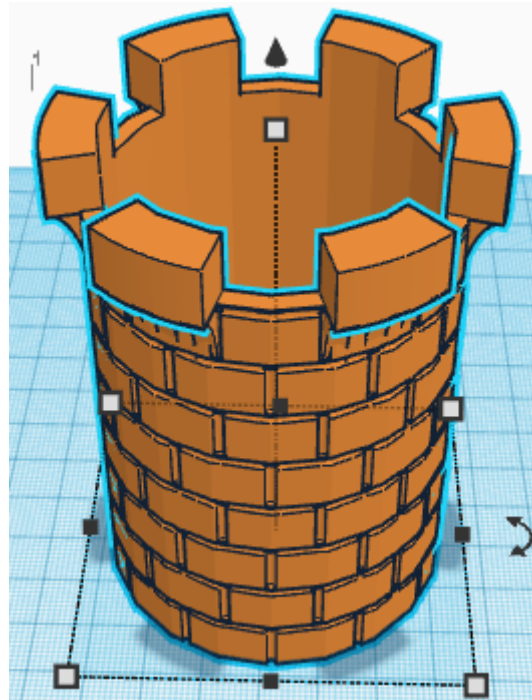
Set on Workplane:

Select the Turret and type "d" to set the body on the work plane.

Before



After



You are done!

It looks great, and those support let us print with no added supports.

Print and use as a vase or pencil holder.

Hope you enjoy it!

