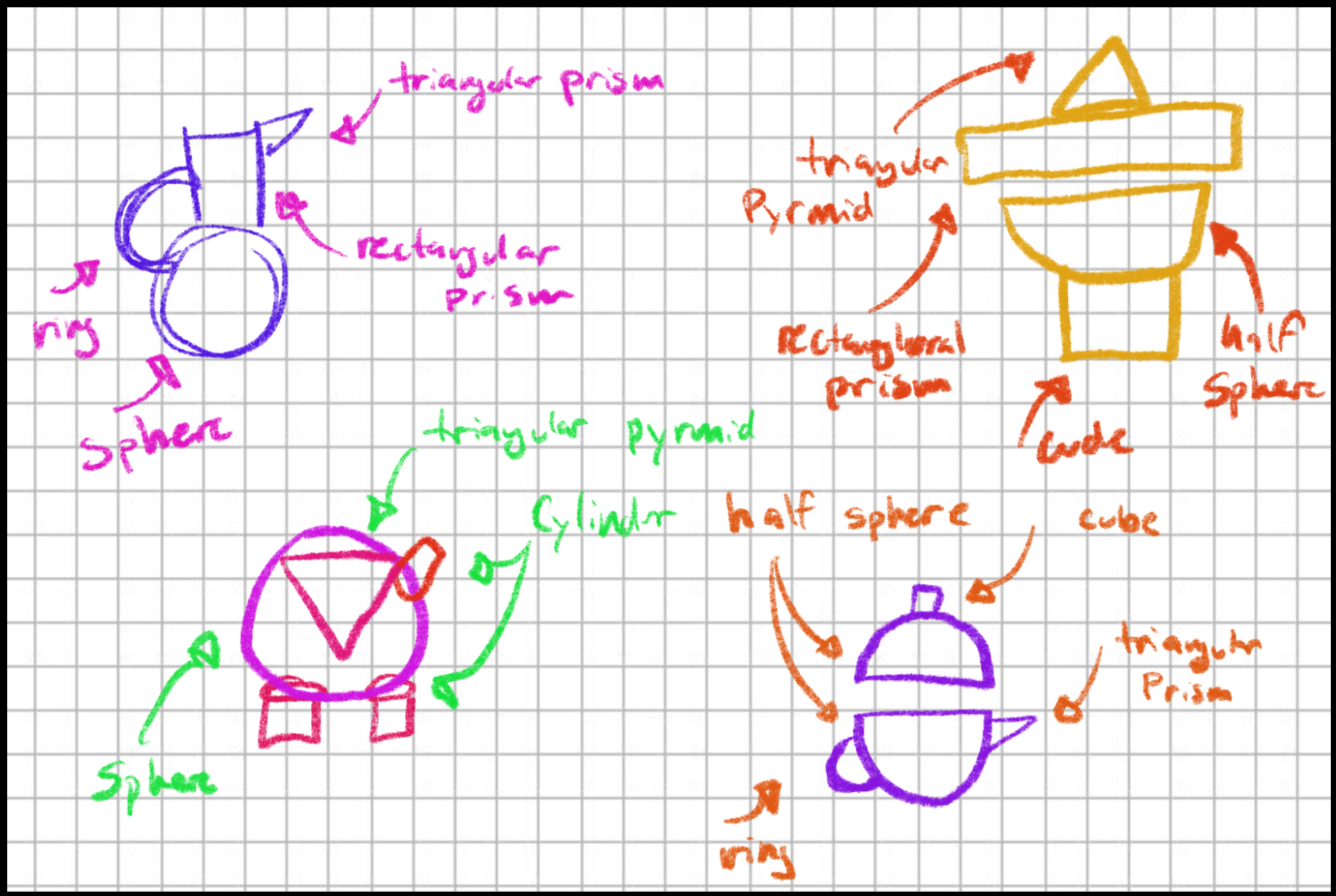
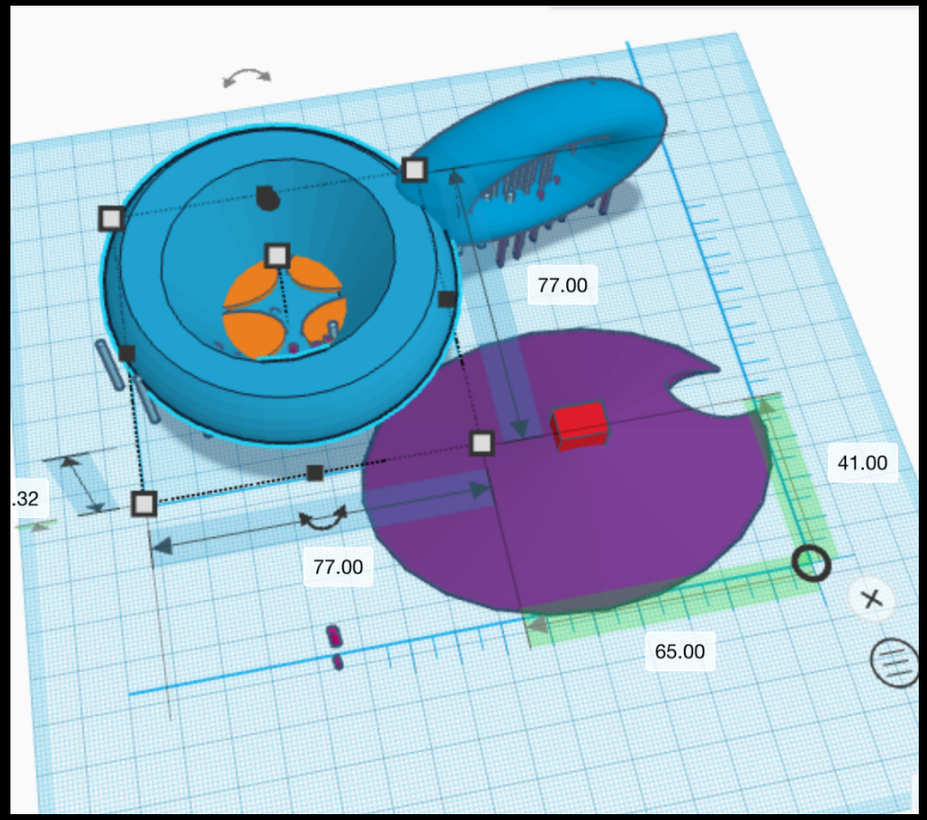
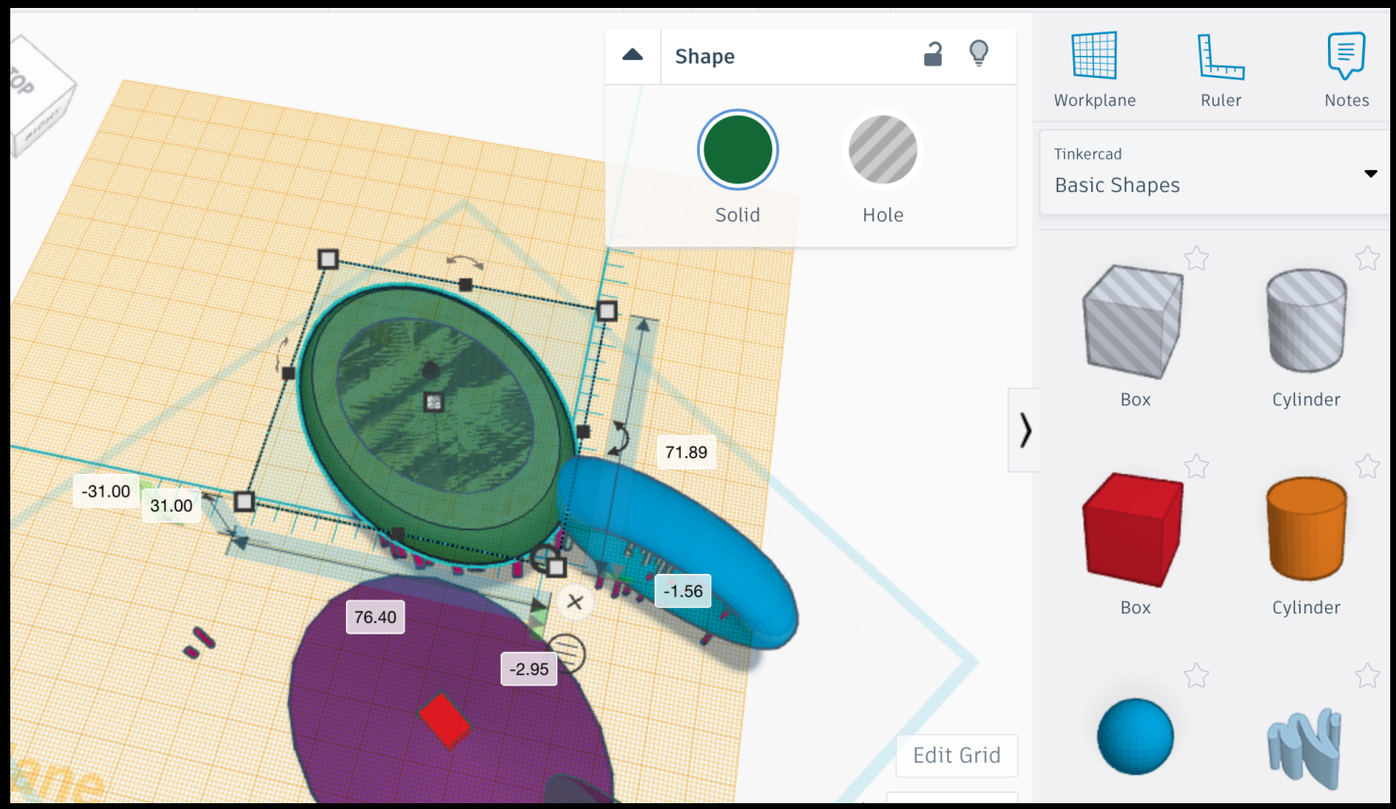
My “ultimate design project”

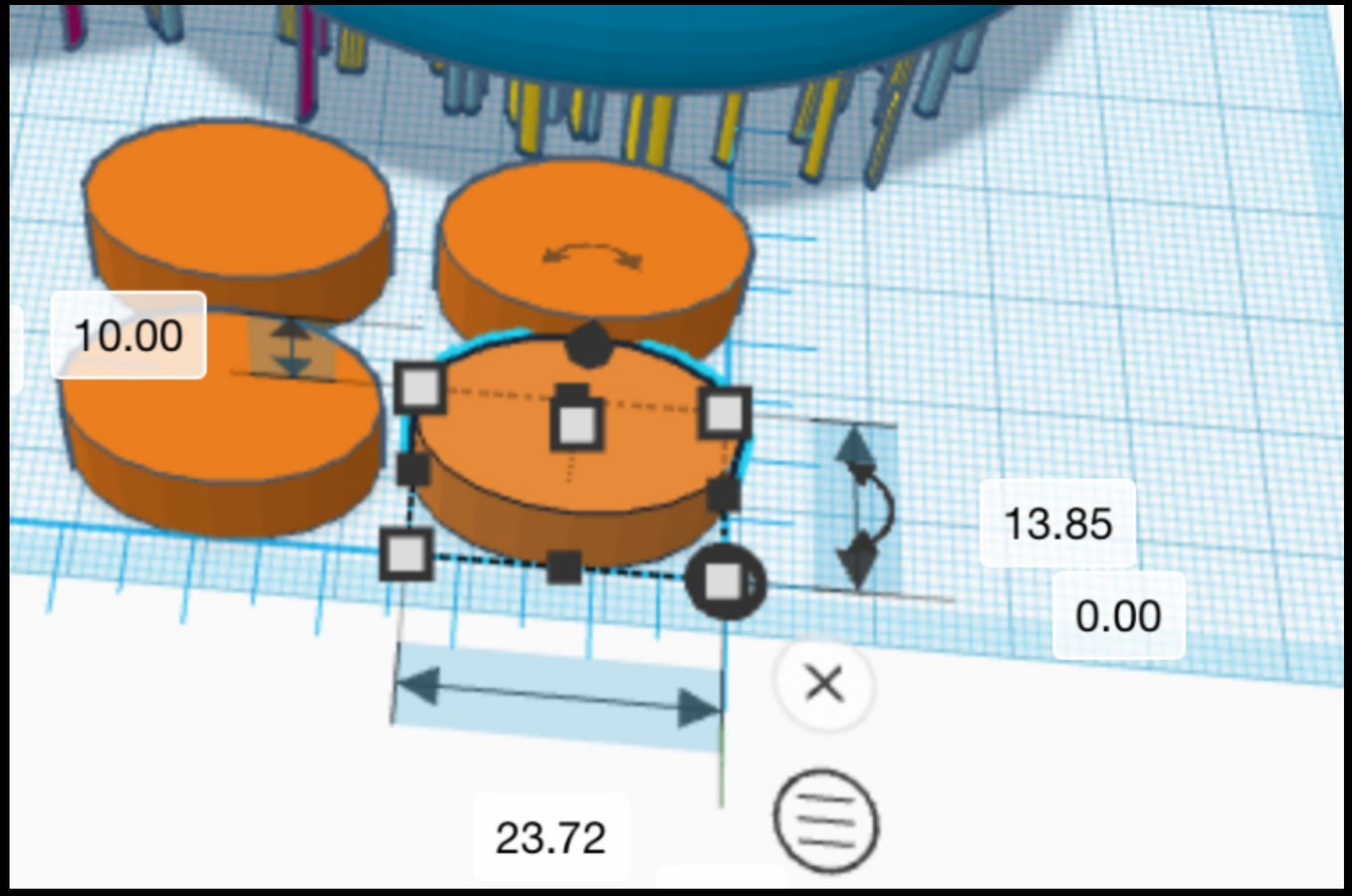
Nothing special



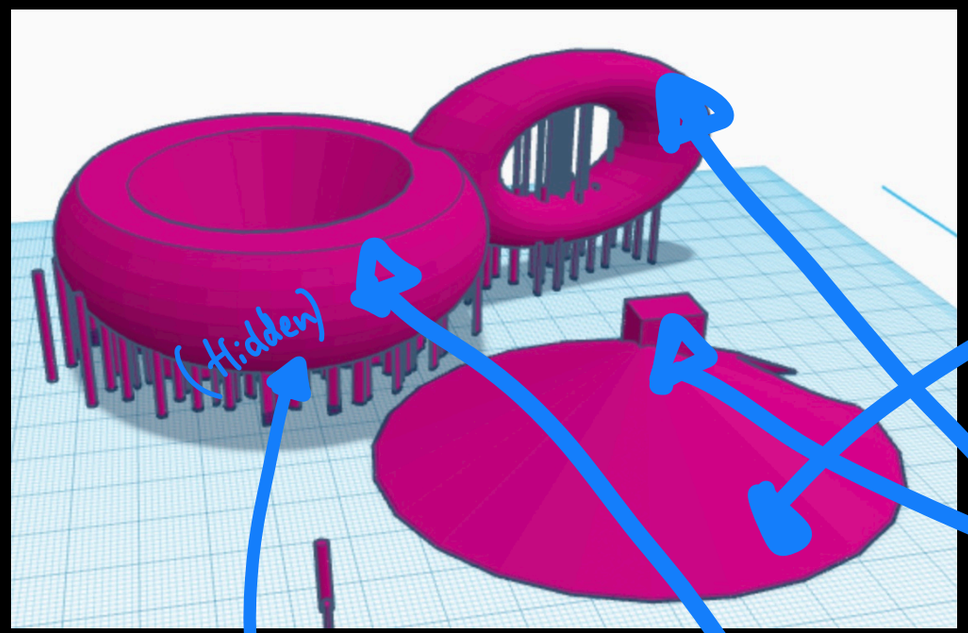
The first drafts for the design of “the teapot”

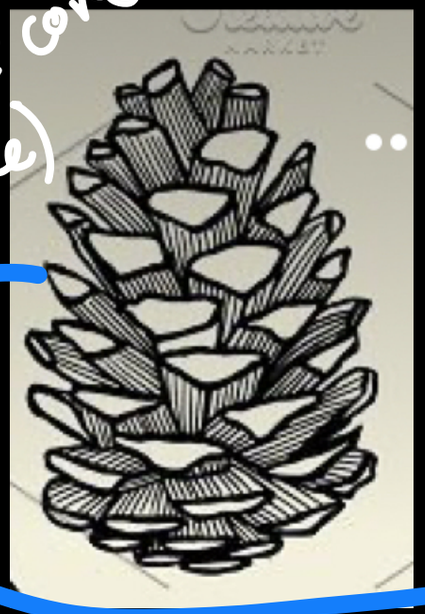

77.00
41.00
.32
77.00
65.00

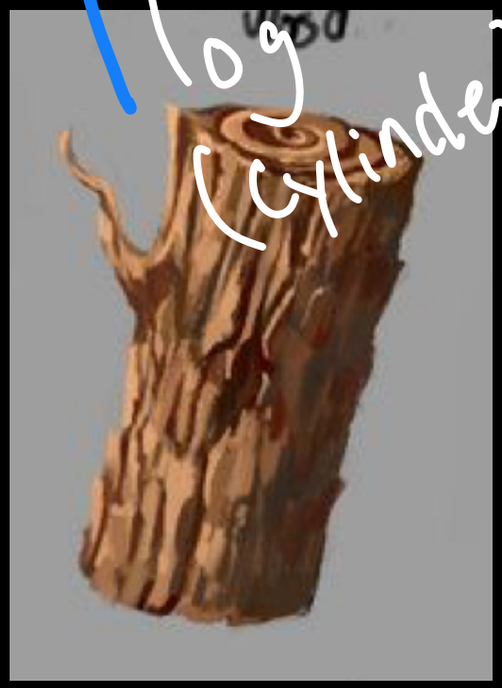

Shape
Solid
Hole
Workplane
Ruler
Notes
Tinkercad
Basic Shapes
Box
Cylinder
Box
Cylinder
71.89
-31.00
31.00
-1.56
76.40
-2.95
Edit Grid

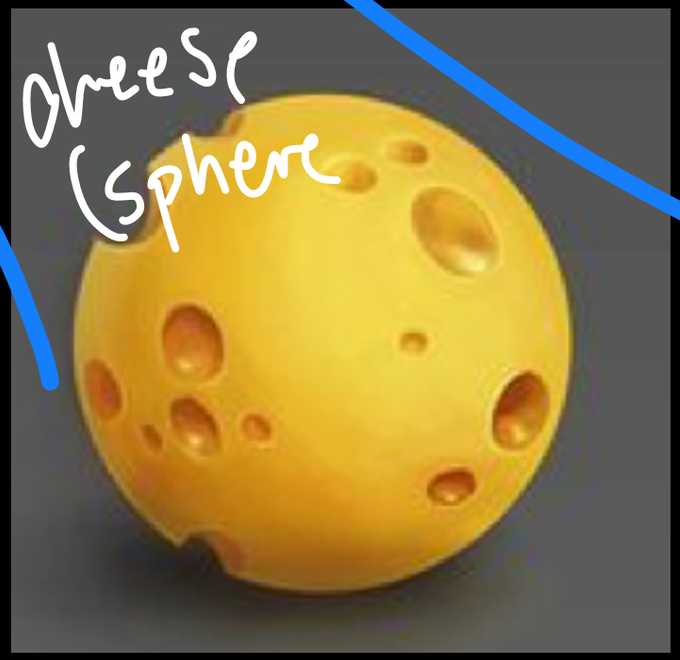

10.00
13.85
0.00
23.72

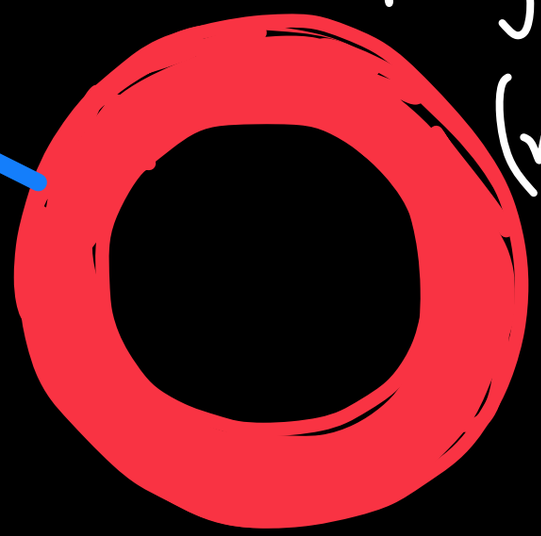
Basic 3D shapes











Yay! The formulas!

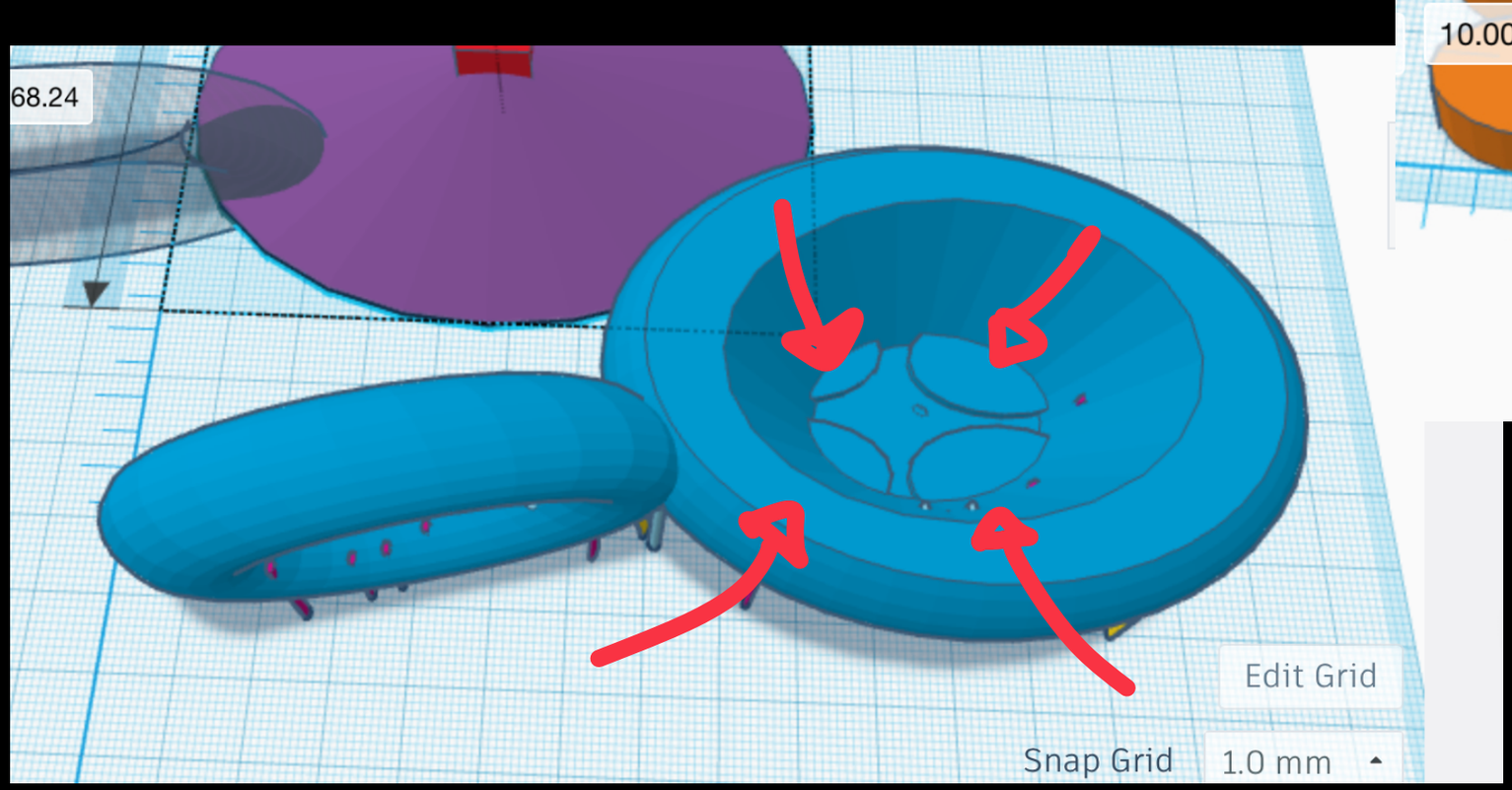
Shape	Forum SA	Formula V
Cylinder	$sa = 2\pi r^2 + 2\pi rh$	$v = \pi \times 2 \times h$
Sphere	$sa = 4 \times \pi \times r^2$	$v = \frac{4}{3}\pi r^3$
Cone	$sa = \pi \times r^2 + \pi \times r \times l = \pi \times r(l + r)^2$	$v = \frac{1}{3} \times \pi \times r^2$
[illegible]		
Cube	$sa = 6xa^2 = 2 \times l \times w + 2 \times l \times h + 2 \times h \times w$	$v = a^3 = l \times w \times h$

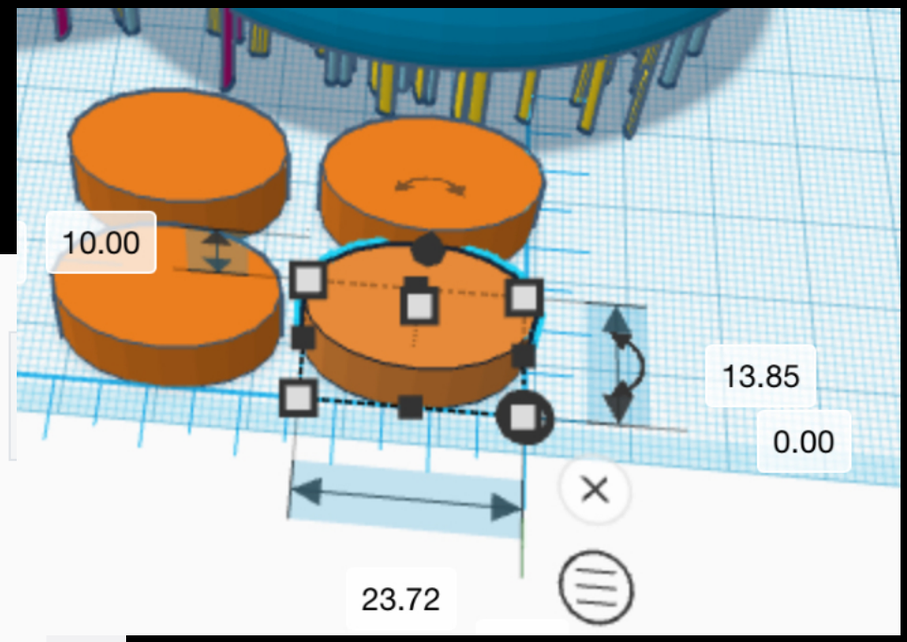
And with the actual math…

Shape	Surface area Equation	Volume equation	Ratio
Cylinder	$sa = 2 \times \pi \times 11.86^2 + 2 \times \pi \times 11.86 \times 10$ $sa = 2{,}512.8mm^2$	$v = \pi \times 2 \times 10$ $v = 62.8mm^3$	$R = 2512 : 62.8$ $R = 2{,}512 \div 62.8$ $R = 40 : 1$
Sphere	$sa = 4 \times \pi \times 37.5^2$ $sa = 17671.5mm^2$	$v = \frac{4}{3} \times \pi \times 37.5^3$ $v = 220887.7mm^3$	$R = 17{,}671.5 : 220{,}887.7$ $R = 17{,}671.5 \div 220887.7$ $R = 0.1 : 1$
Cone	$sa = \pi \times 35(40.31 + 35)^2$ $sa = 17{,}817.8mm^2$	$v = \frac{1}{3} \times \pi \times 35^2$ $v = 1{,}269.9mm^3$	$R = 17817.8 : 1269$ $R = 17{,}817.8 \div 1269$ $R = 14.0{:}1$
[illegible]			
Cube	$sa = 6 \times 8^2 = 2 \times 8 \times 8 + 2 \times 8 \times 8 + 2 \times 8 \times 8$ $sa = 64mm^2$	$v = 8^3 = 8 \times 8 \times 8$ $v = 512mm^3$	$R = 64 : 512$ $R = 64 \div 512$ $R = 0.125$

Cylinder

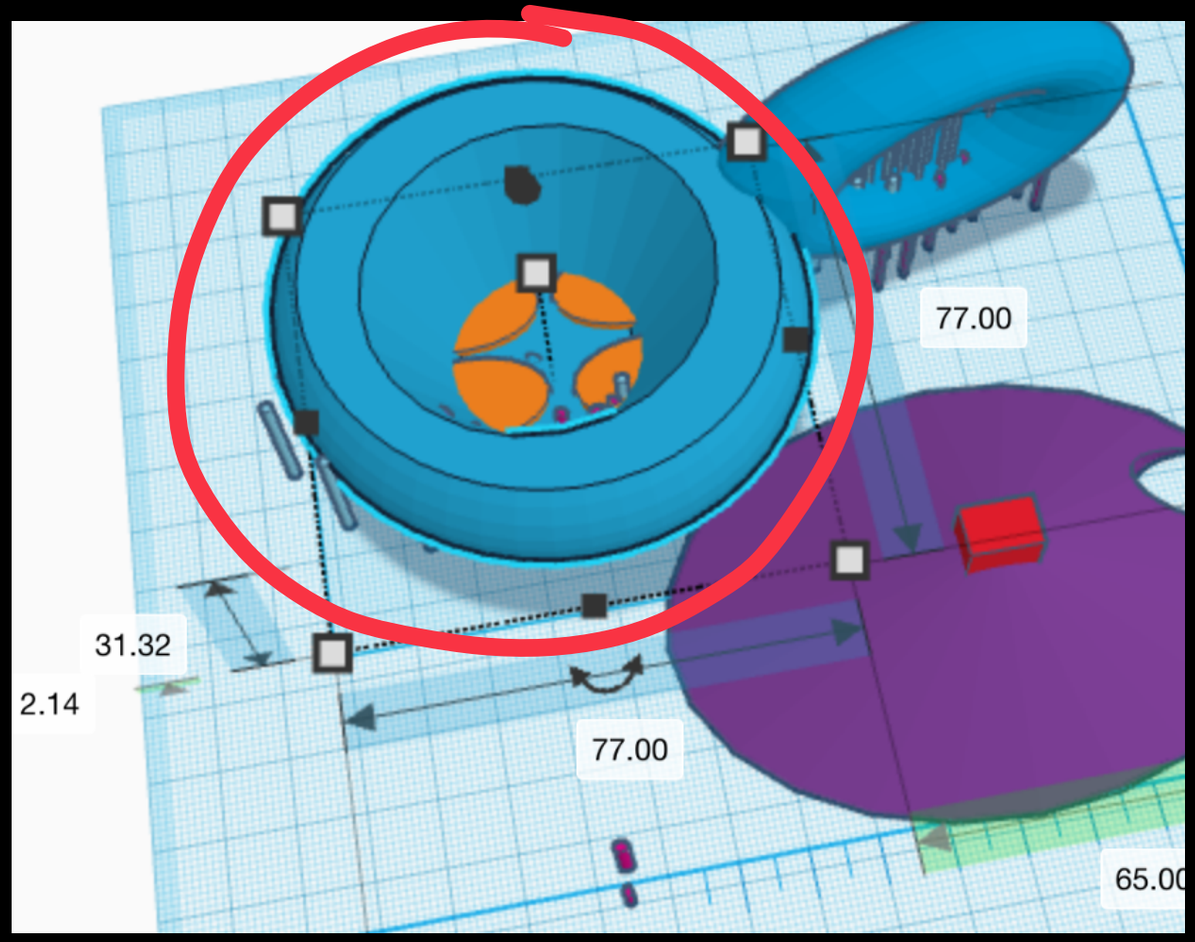
Shape	Surface area Equation	Volume equation	Ratio
Cylinder	$sa = 2 \times \pi \times 11.86^2 + 2 \times \pi \times 11.86 \times 10$ $sa = 2{,}512.8mm^2$	$v = \pi \times 2 \times 10$ $v = 62.8mm^3$	$R = 2512 : 62.8$ $R = 2{,}512 \div 62.8$ $R = 40 : 1$





Sphere

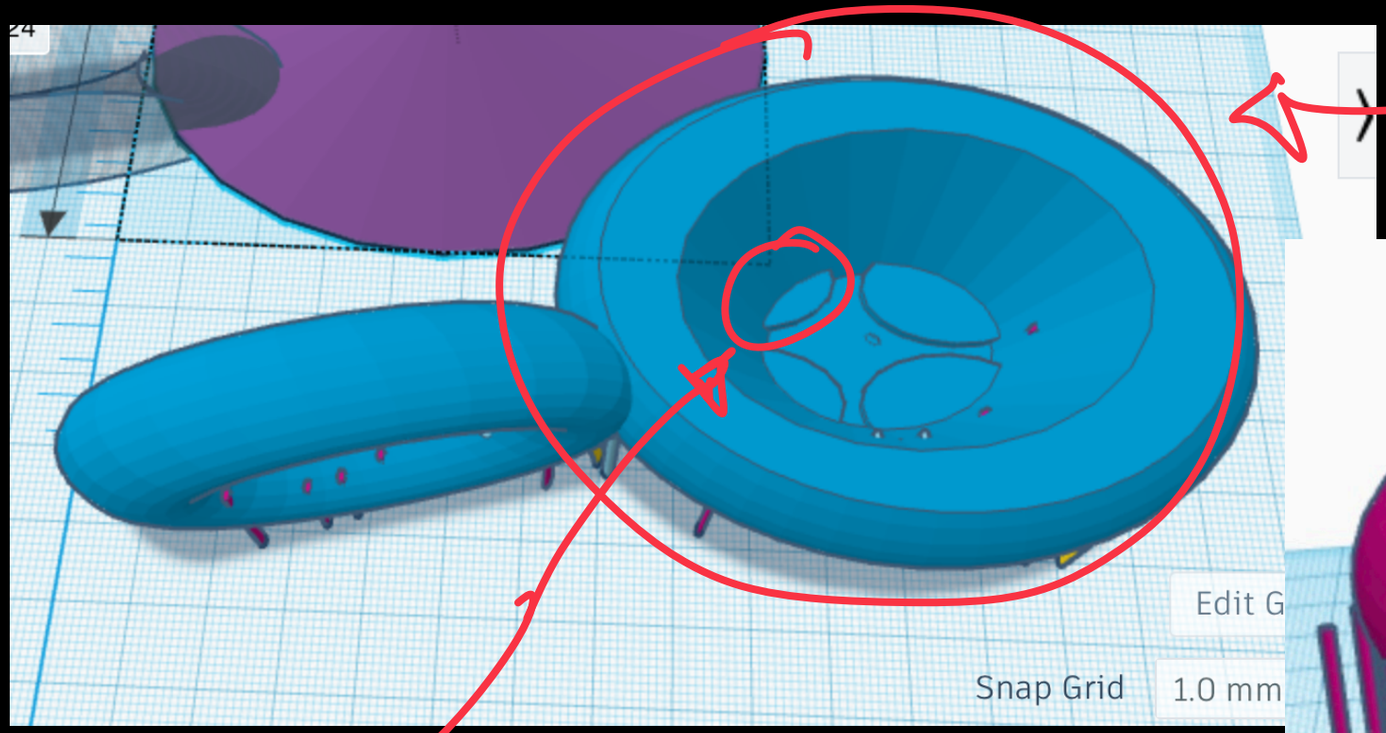
Shape	Surface area Equation	Volume equation	Ratio
Sphere	$sa = 4 \times \pi \times 37.5^2$ $sa = 17671.5mm^2$	$v = \frac{4}{3} \times \pi \times 37.5^3$ $v = 220887.7mm^3$	$R = 17{,}671.5 : 220{,}887.7$ $R = 17{,}671.5 \div 220887.7$ $R = 0.1 : 1$
Cone	$sa = \pi \times 37.5(40.31 + 37.5)$	$v = \frac{1}{3} \times \pi \times 37.5^2 \times 80$	$R = 17817.8 : 117{,}809.7$



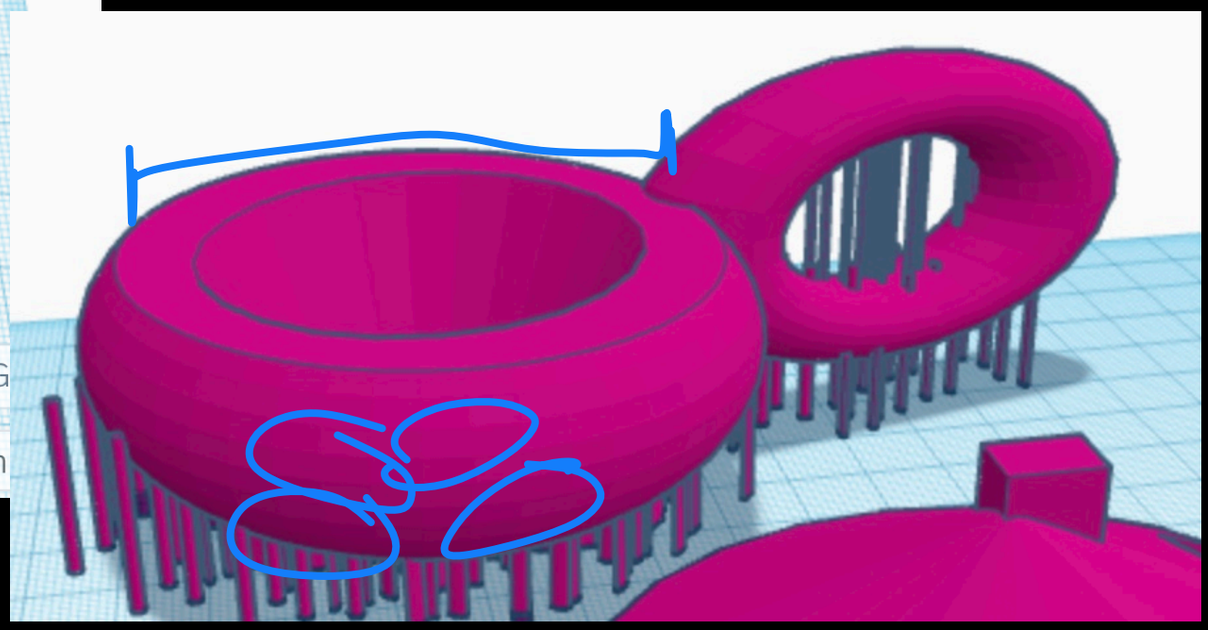
Those 2 shapes together make “the cup”

Not subtracting non-showing faces

TOTAL FOR CUP: **(cylinder +sphere)**	Surface area: $20{,}184.3mm^2$	Volume: $220{,}950.5mm^3$	Ratio: $20{,}184.3 : 220{,}950.5$ $0.1 : 1$



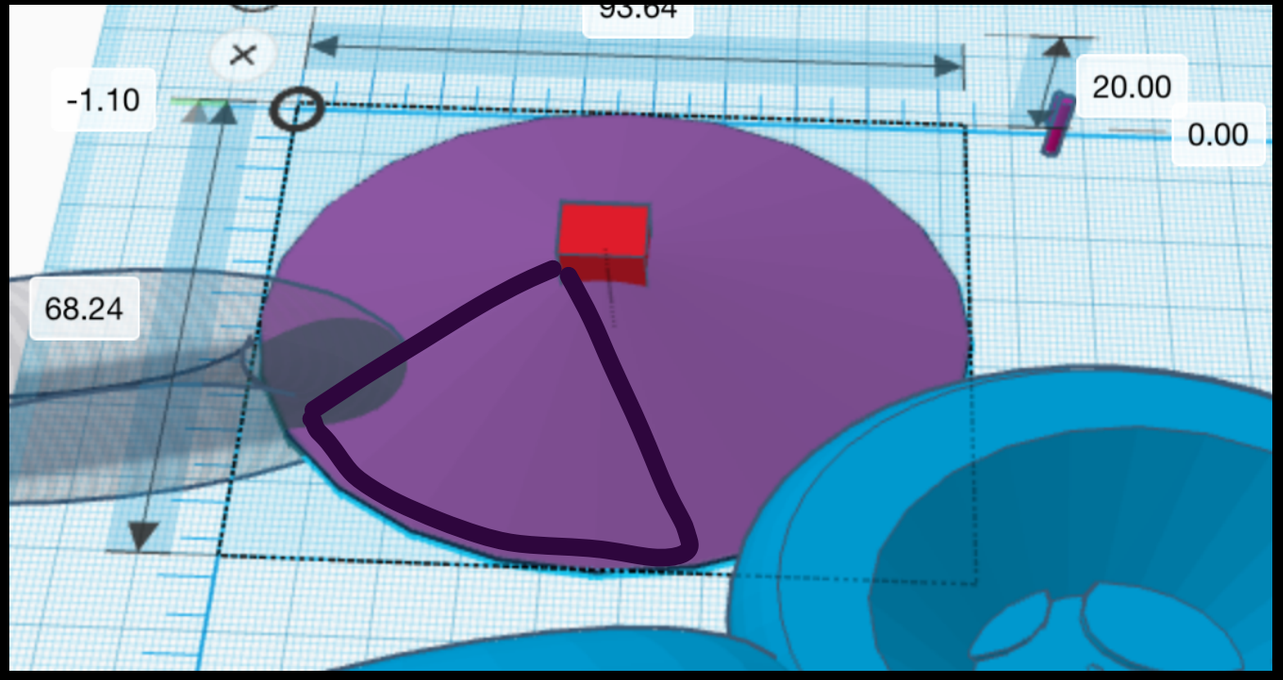
Spher

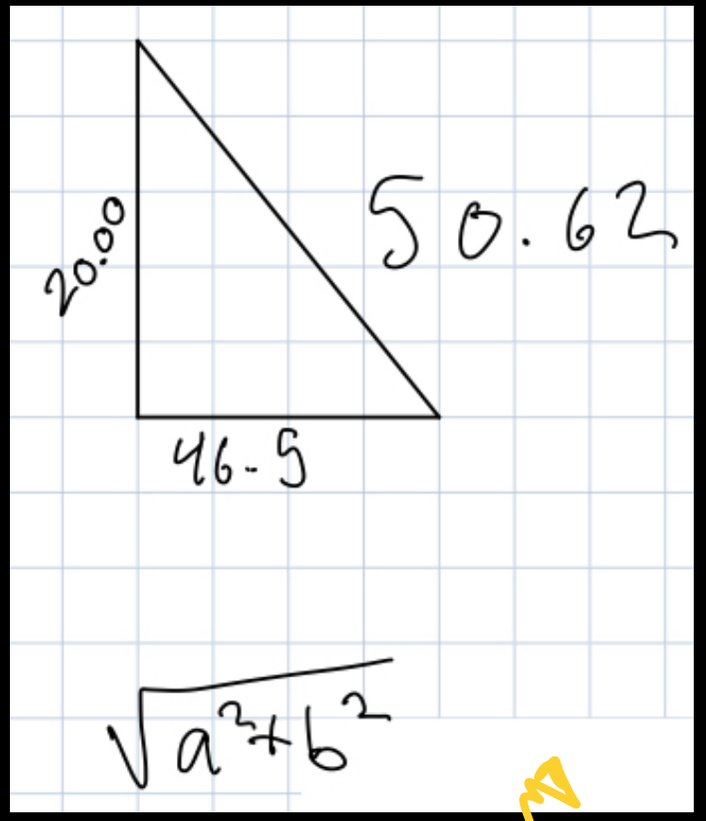


ice cream

Cone

Shape	Surface area Equation	Volume equation	Ratio
Cone	$sa = \pi \times 35(40.31 + 35)^2$ $sa = 17{,}817.8mm^2$	$v = \frac{1}{3} \times \pi \times 35^2$ $v = 1{,}269.9mm^3$	$R = 17817.8 : 1269$ $R = 17{,}817.8 \div 1269$ $R = 14.0{:}1$

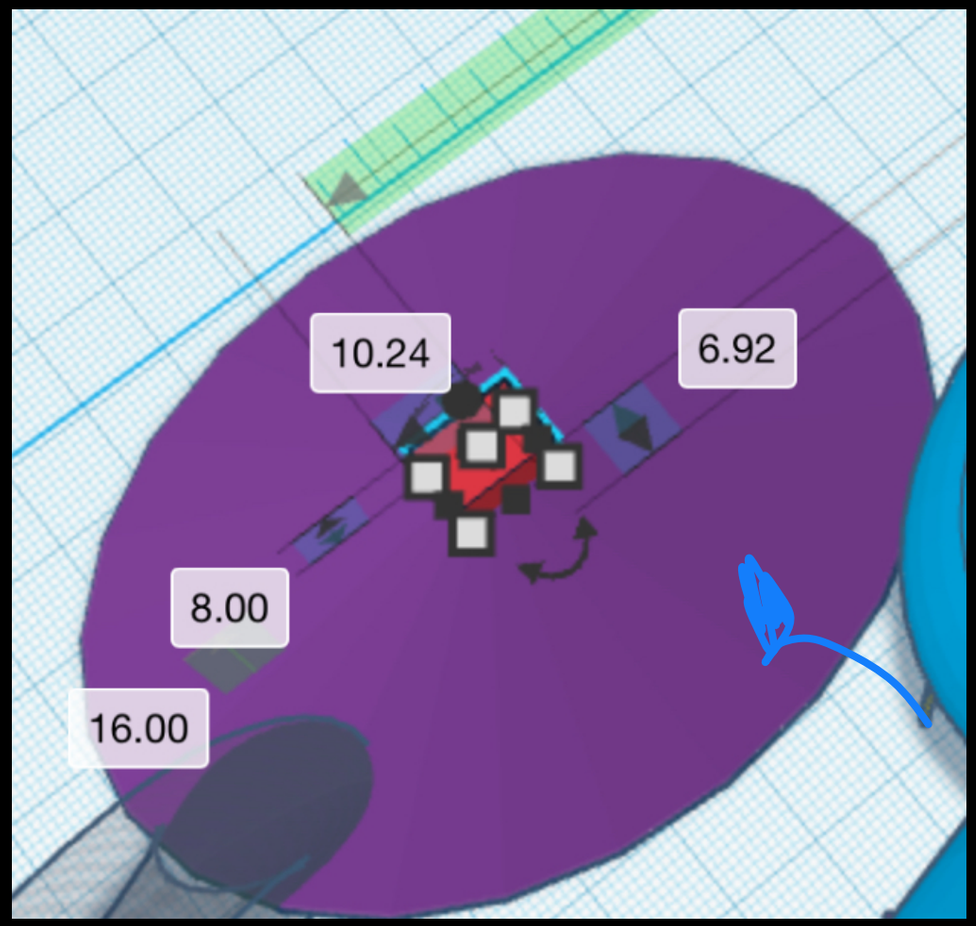




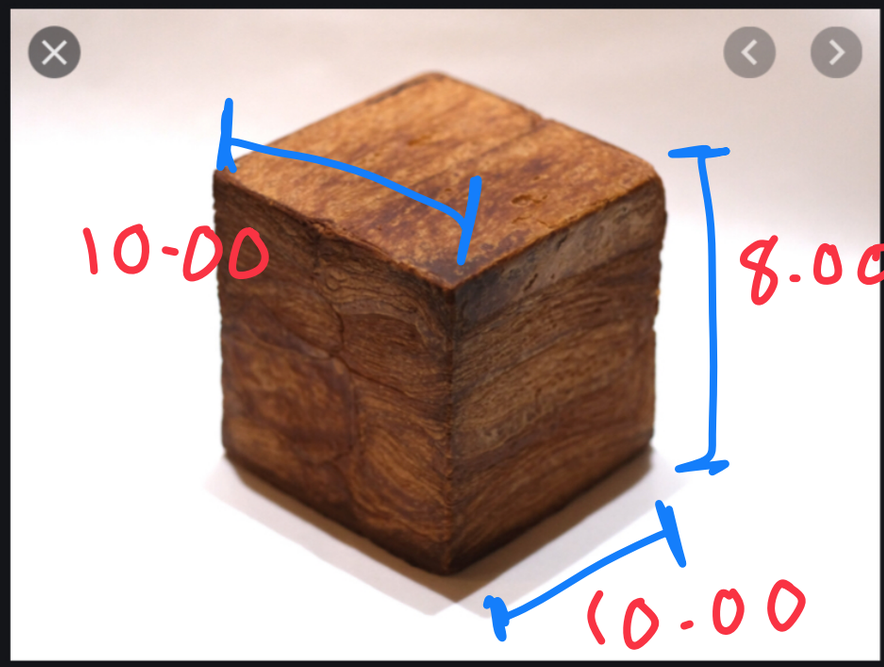
quick math

Cube

Shape	Surface area Equation	Volume equation	Ratio
Cube	$sa = 6 \times 8^2 = 2 \times 8 \times 8 + 2 \times 8 \times 8 + 2 \times 8 \times 8$ $sa = 64mm^2$	$v = 8^3 = 8 \times 8 \times 8$ $v = 512mm^3$	$R = 64 : 512$ $R = 64 \div 512$ $R = 0.125 : 1$



Number change



LITTLE PEBBLES

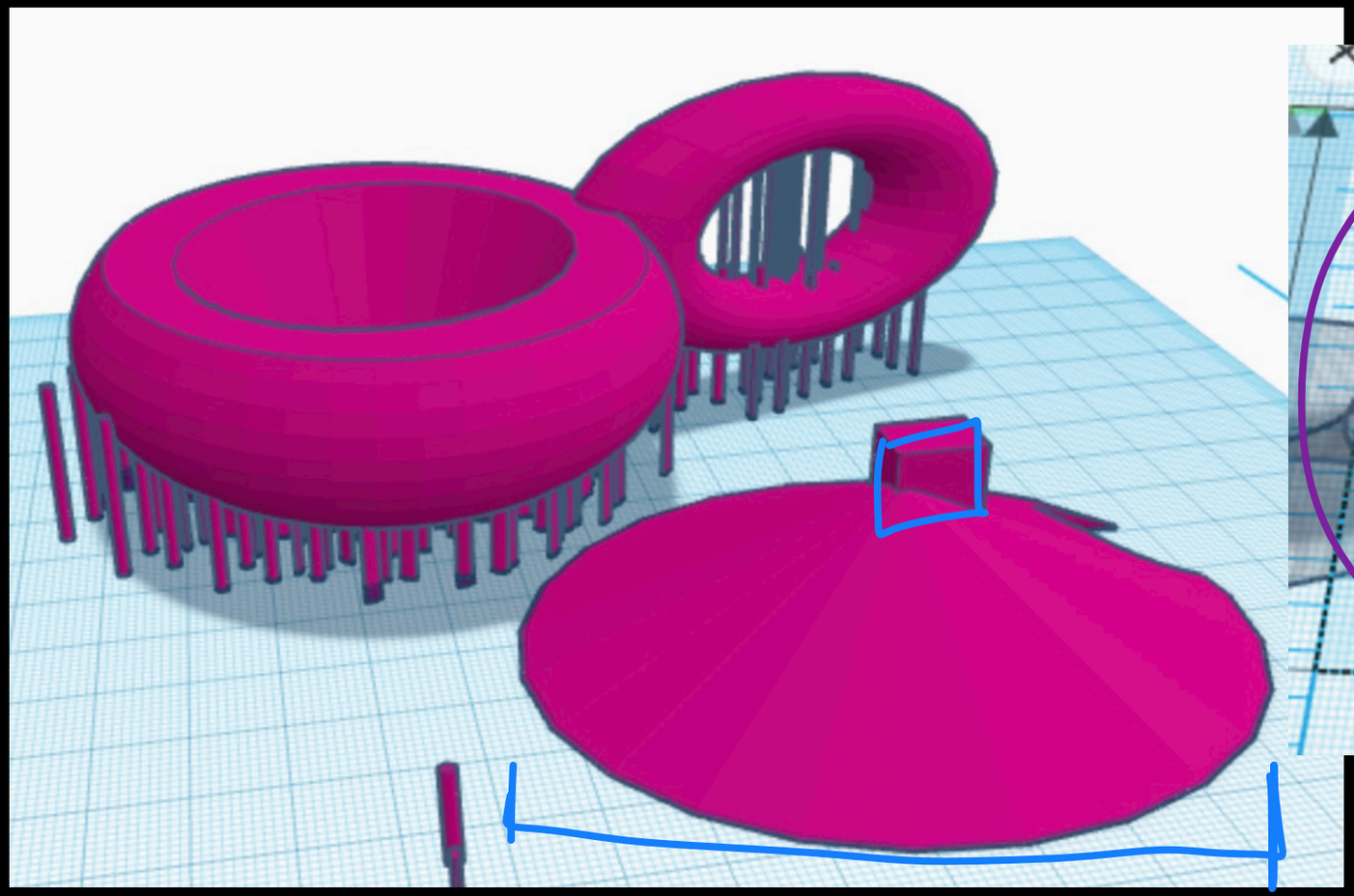
Croissant Cube – LITTLE PEBBLES

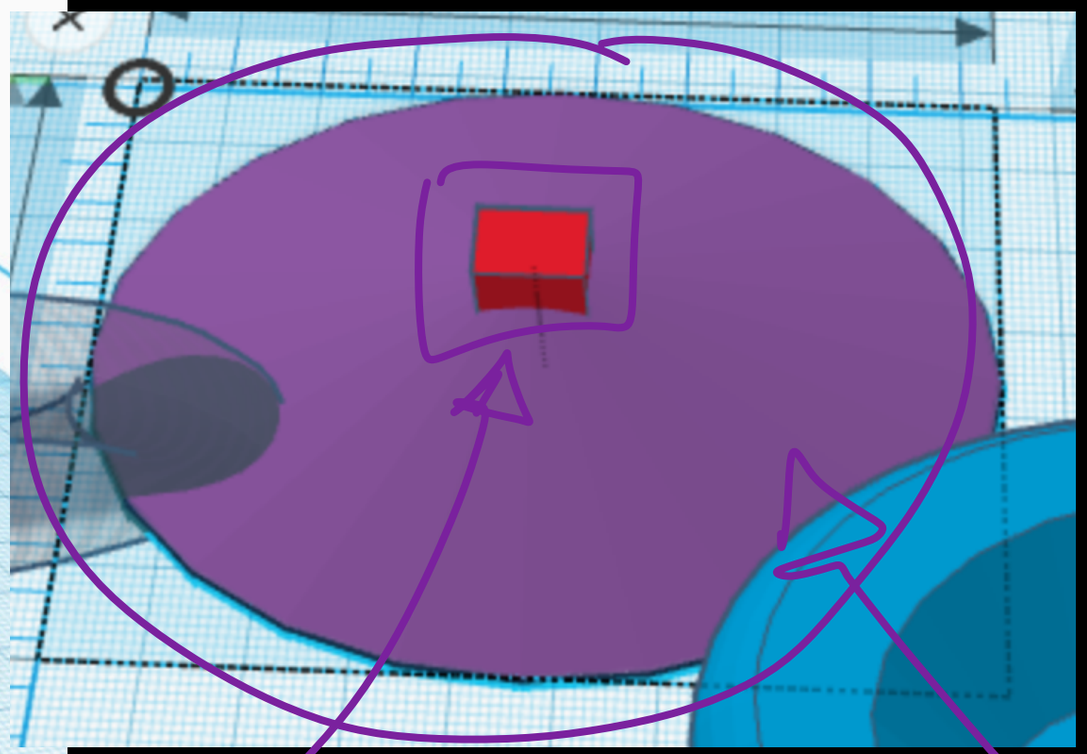
In stock · Brand: LITTLE PEBBLES

These 2 shapes together make "the lid"

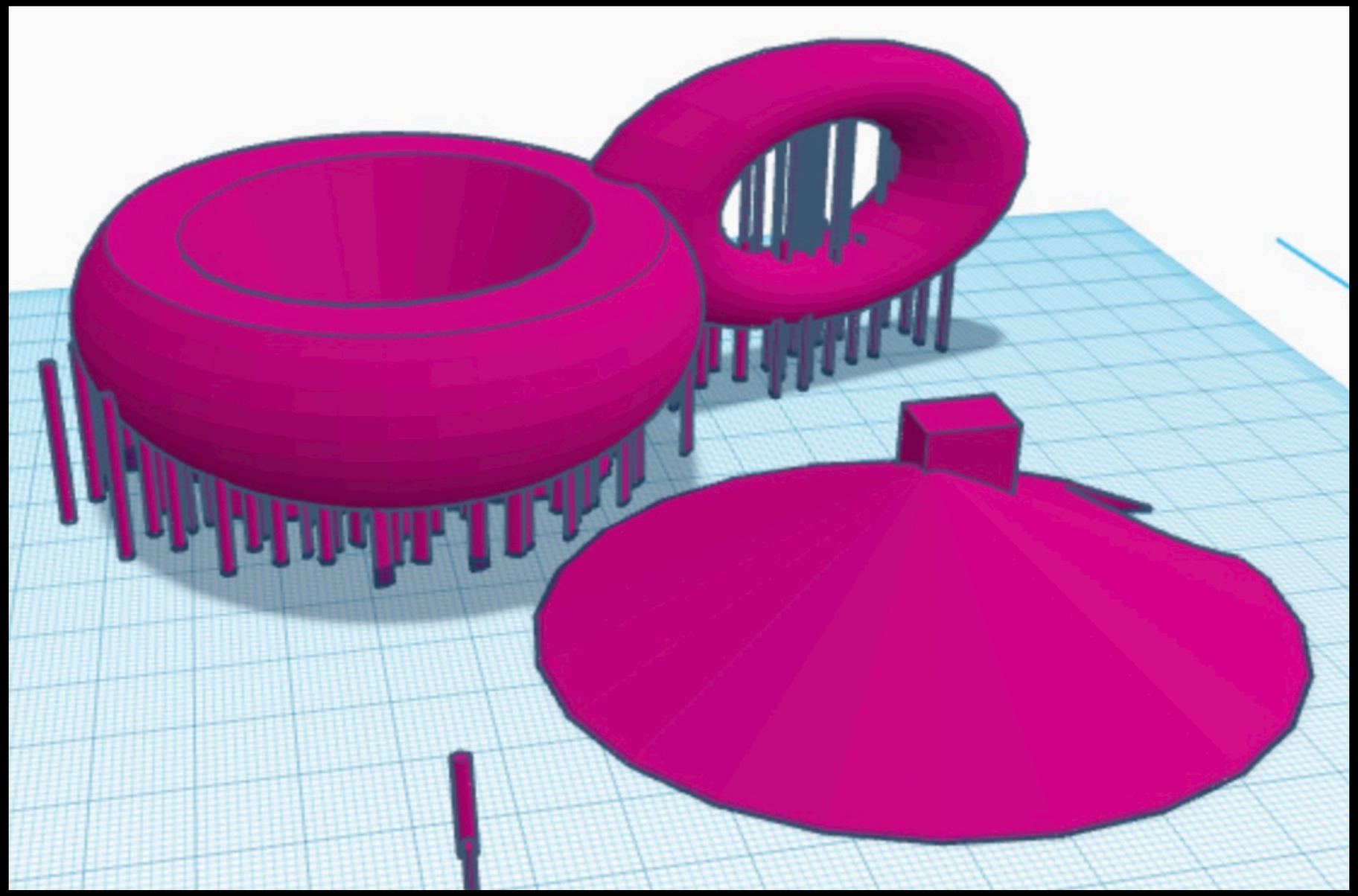
Did not subtract non-showing sides

Shape	Surface area Equation	Volume equation	Ratio
TOTALS FOR LID: (cone+cube)	Surface area: $17{,}881.8 mm^2$	Volume: $1{,}781.9 mm^3$	Ratio: $17881.8 : 1781{,}9$ $10 : 1$



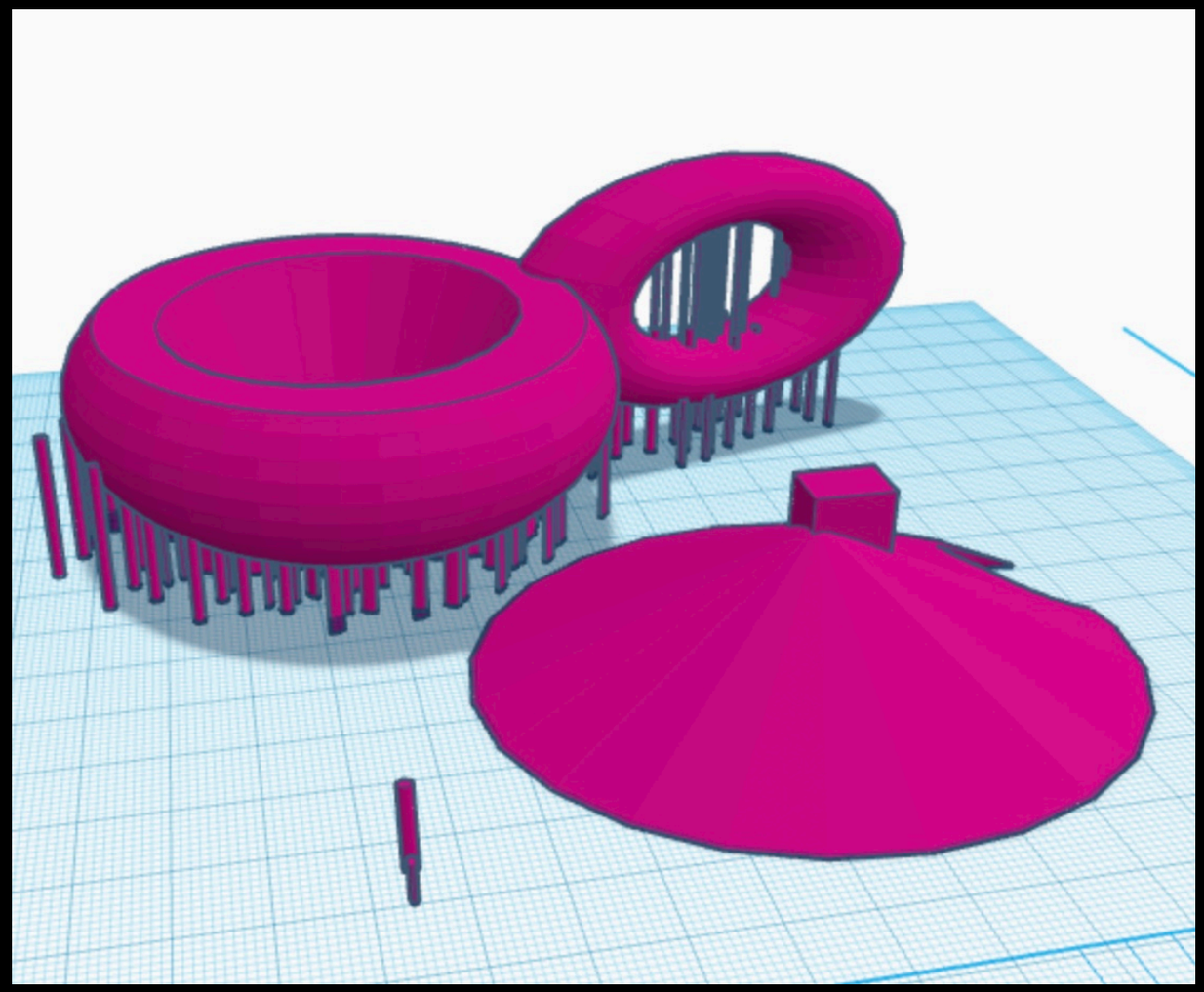


And when looking at it all together!



In conclusion…

- Goal: optimize volume= ended up having more surface area
- Was never 3D printed



The end