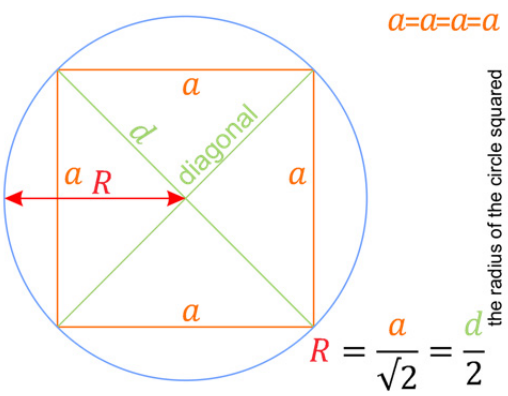
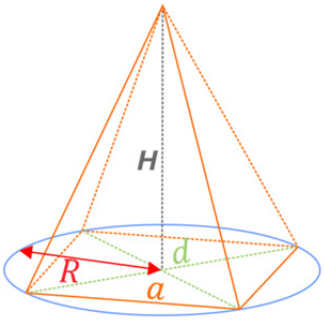
Regular quadrangular pyramid

Sides are equal and equilateral triangles





Pythagoras' theorem $a^2 + a^2 = d^2$

Sample need length of the edge 100 mm

$$H = \frac{1}{\sqrt{2}} \times a = \frac{1}{1{,}41421356237} \times 100 = 0{,}70710678118 \times 100 = 70{,}710678118 \text{ mm}$$

$$R = \frac{a}{\sqrt{2}} = \frac{d}{2} = \frac{\sqrt{(100^2 + 100^{2)}}}{2} = \frac{141{,}421356237}{2} = 70{,}7106781185\text{mm}$$

$H \approx R$? Have the mathematical case, no solution is-$H = \frac{R}{2} = 35{,}355339059$ mm.

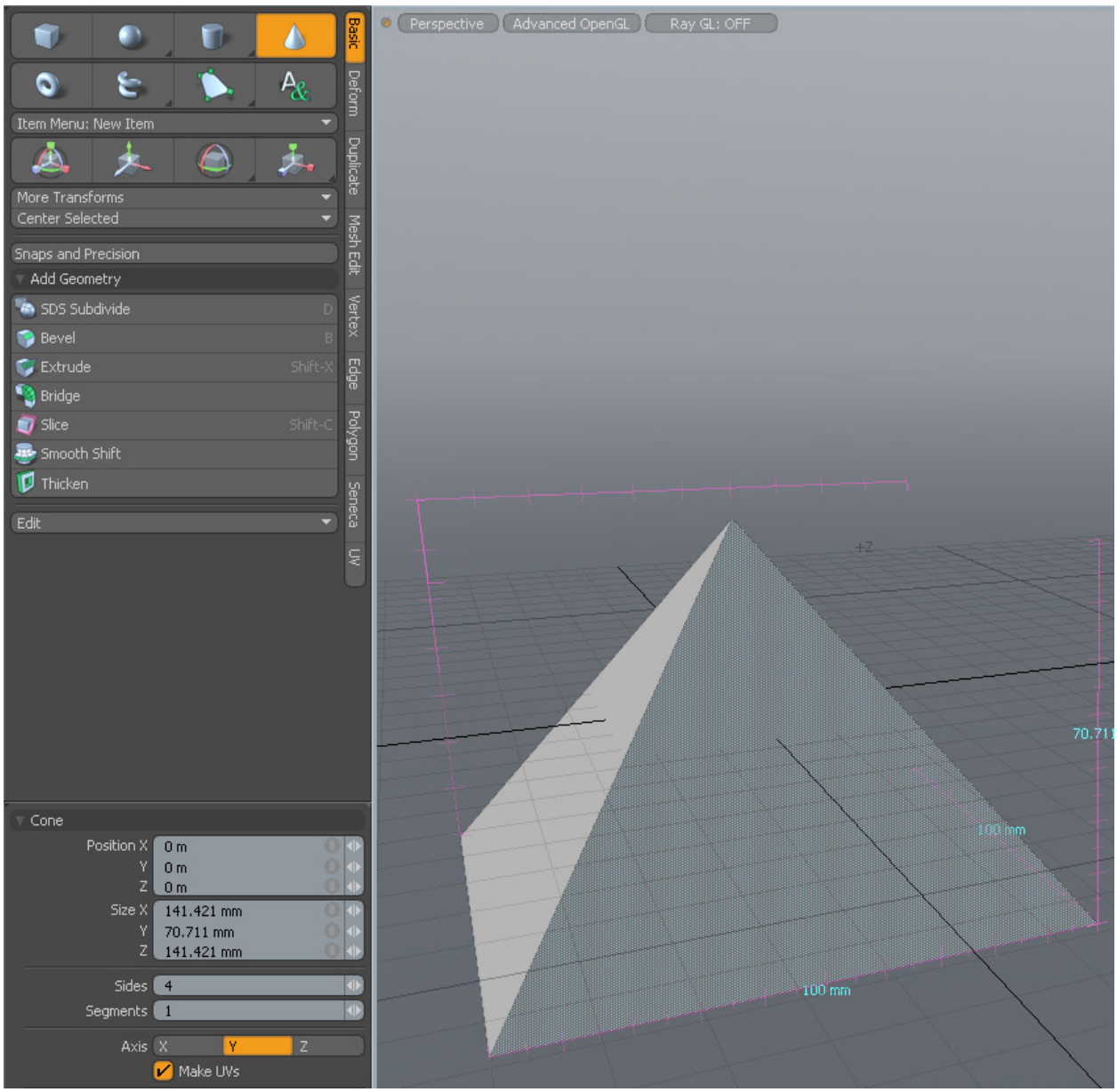
In this case, we see a clear problem with the estimated values, so I advise you to use the doubled value, and then perform the necessary scaling.

$R = 141{,}421356237\ mm$ (for XZ axis – if length edge100 mm)

$H = \frac{141{,}421356237}{2} = 70{,}7106781185\ mm$ (for Y axis - height of the pyramid)

Now you need to go back to the original settings, apply scaling to 50 percent (or at any convenient value to you).

Sample: Activate action center, set all value as 0-0-0, and scale to 50 percent, and rotate geometry 45 degrees on the Y axis. Regular pyramid with the required length edges ready.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Y 70.711 mm
Z 141.421 mm
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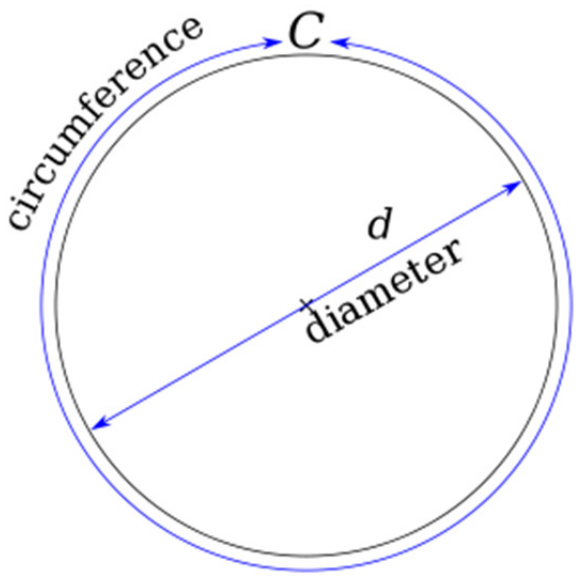
100 mm

The Cheops pyramid ratio

Sum of the four edges the base of the pyramid is the length of a circle whose radius is equal to its height.



to calculate the height

Sample need bottom based edges 100 mm

$C = a + a + a + a = 100 \times 4 = 400\ mm$

$d = \frac{C}{\pi} = \frac{400}{3{,}14159265358979323846264338327 95} = 127{,}32395447351626861510701069801\ mm$

$R_H = \frac{d}{2} = 63{,}661977236758134307553505349006\ mm$ this H (height of the pyramid Y axis)

$R_{Base} = 141{,}421356237\ mm$ (for XZ axis – if length edge100 mm) - formula for calculating the circumference of the described see above

Do not forget - this is twice the value of modeling primitives cone!

If we look we see Wikipedia:

Height – 146,5 meters (481 ft.), ancient

138,8 meters (455 Ft.), contemporary

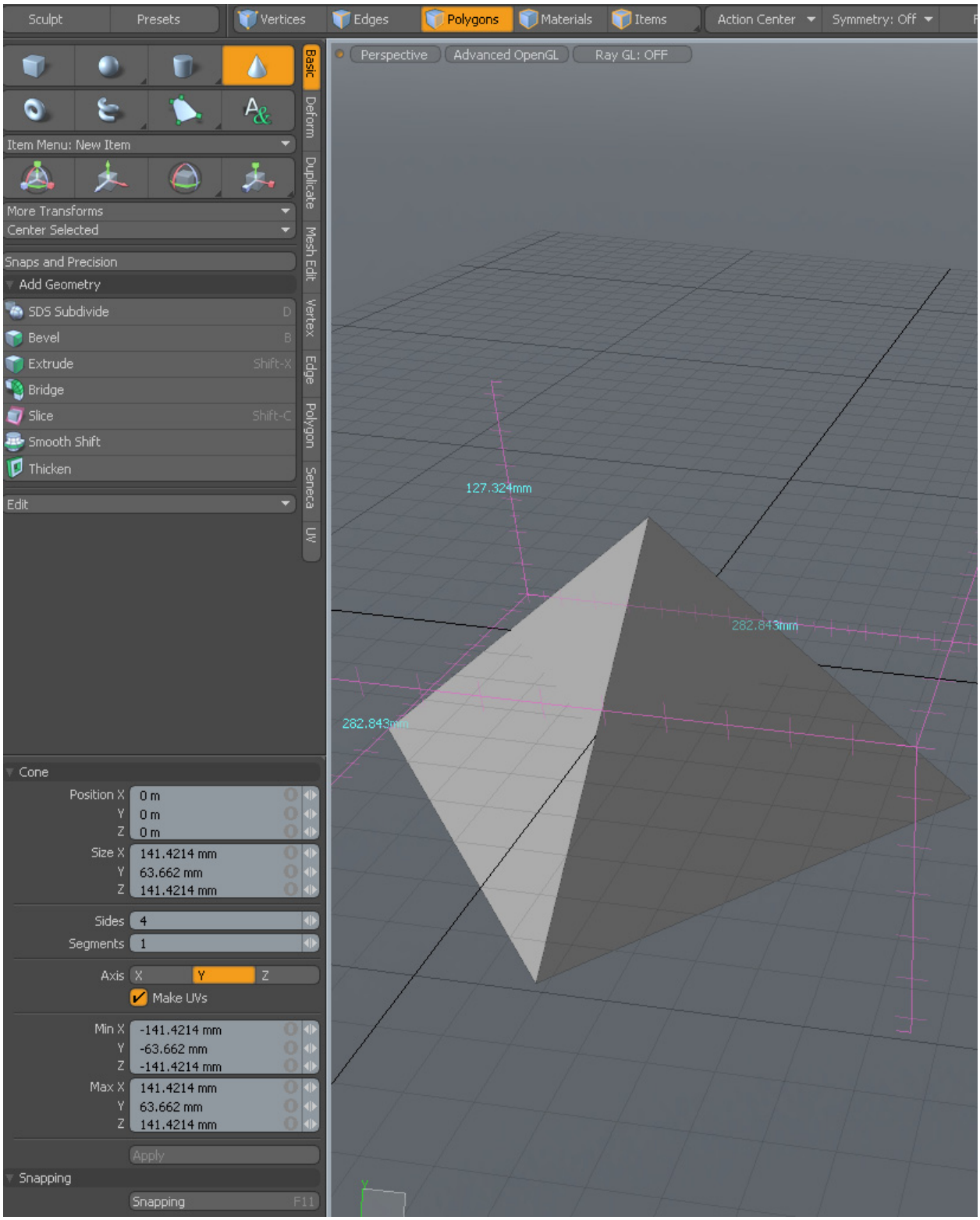
Base – 230,4 meters (756 ft.)

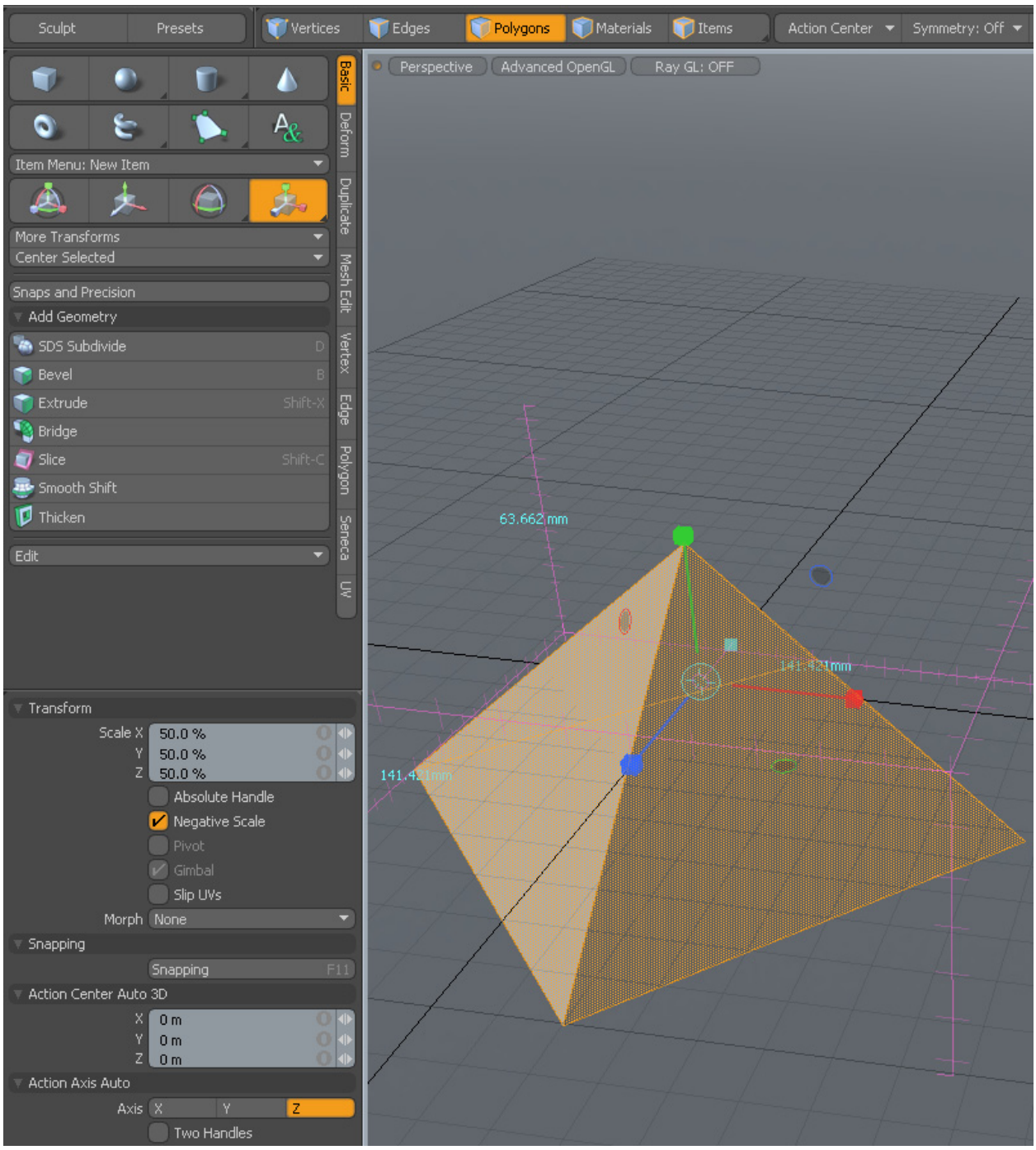
$\text{Ratio} = \frac{Base}{H} = \frac{230{,}4}{146{,}5} = 1{,}572696245733788395904436860068 3$ - imprecision associated with the measurements.

$$\text{Our ratio} = \frac{Base}{H} = \frac{Base\ (\text{length edge}100)}{R_H} = \frac{100}{63{,}661977236758134307553505349006} =$$

$$= 1{,}570796326794896619231321691639 9$$

Enter these values and apply scaling and rotation, as done for the previous pyramid.

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63.662 mm
141.421 mm
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Y 50.0 %
Z 50.0 %
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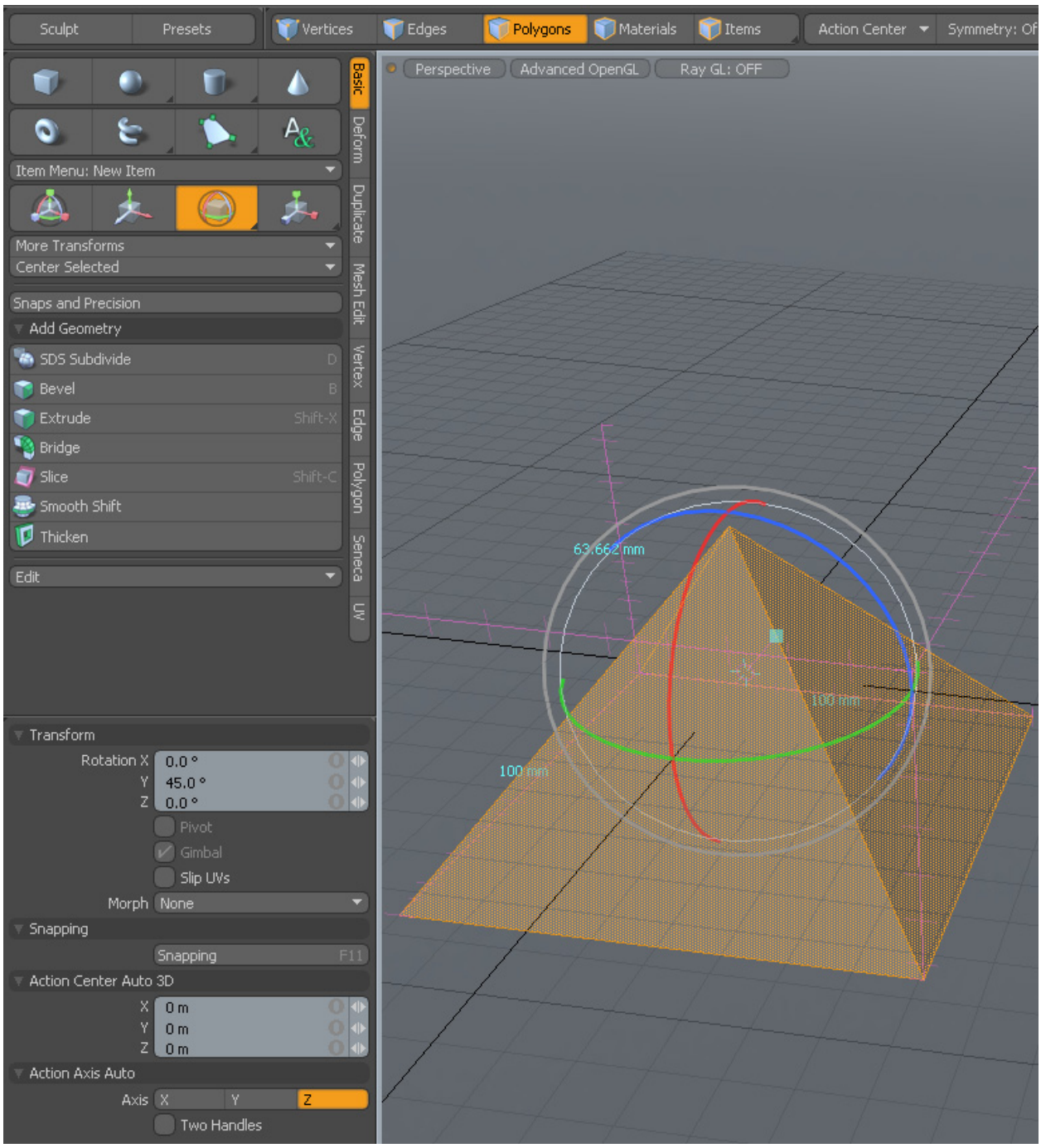
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Y 0 m
Z 0 m
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Axis X Y Z
Two Handles

Deselect all polygons and ready