# Using LaTeX formulas for Dynamic Text

Preparations

- Open a new GeoGebra file.
- Hide the Algebra View but show the coordinate axes (*View* menu).
- Show the Input Bar (*View* menu).
- Set the number of decimal places to 1 (menu *Options – Decimal places*).

Introduction of new tools

⊹	**Move Drawing Pad tool**

Hints: Don't forget to read the toolbar help if you don't know how to use a tool. Try out new tools before you start the construction.

Instructions

1		From Google pictures search for and download to desktop a picture of an egg. Make sure that its longest axis is either horizontal (or vertical) in orientation.
2		Use the **Insert Image** tool to select this file and to place the picture of your egg in the middle of your screen. Right-click on your egg and in the **Basic** Tab check the **Absolute Position on Screen** option. From the **Style** Tab put the **Filling** Slider to 50 (out of 100)
3	⊹	Click on View> Axes to show the axes if not visible. Use the **Move Drawing Pad** tool to then drag the axes so that the origin is such that the axes cut through the egg at its maximum height and maximum width. One axis will be a line of symmetry, the other will not. An example of an egg in "vertical" orientation is shown here.
4	*a = 2*	Use the **Slider** tool three times to create Number sliders a, b and c. Choose each of their intervals to be between 0 and 5 with an increment of 0.1.
5		From the Input Bar type in: x^2/a^2+y^2/c^2=1 and press Return.
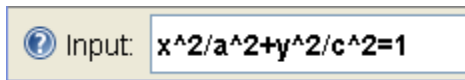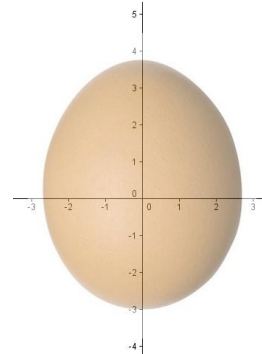
		You should now see a curve on the screen. Alter the Slider values for a and c.

Step for a "Horizontal" egg orientation

Type in the Input Box a second equation: x^2/b^2+y^2/c^2=1 to draw a second curve. Press Return.

Step for a "Vertical" egg orientation (As shown in 3. Above)

Type in the Input Box a second equation: x^2/a^2+y^2/b^2=1 to draw a second curve. Press Return.

6	ABC	Using the **Inset Text** tool write in the text as shown below and check the LaTeX formula box too. Press OK.

Text

"\frac{x^2}{" + a + "^2} + \frac{y^2}{" + b + "^2} = 1"   ²   α

☑ LaTeX formula   √

OK   Cancel

Repeat this with a new text expression, but this time enter the appropriate Slider values in the formula for *your* oriented egg!

7	Experiment with your sliders. Try to get one curve (ellipse) to fit well at one end of the egg and the second curve to fit at the other end. Given the general equation of an ellipse: $\dfrac{x^2}{p^2}+\dfrac{y^2}{q^2}=1$ it can be shown that its volume is πpq , we therefore, have a method by which the volume of this egg can be approximated.
8	Experiment with the colours of your Sliders and of the equations, and with the orientations of your Sliders so as to make them relevant and connected to the orientation of your egg and its ellipses.

Here is my attempt:

$$\frac{x^2}{2.7^2}+\frac{y^2}{3.7^2}=1 \qquad \frac{x^2}{2.7^2}+\frac{y^2}{3^2}=1$$
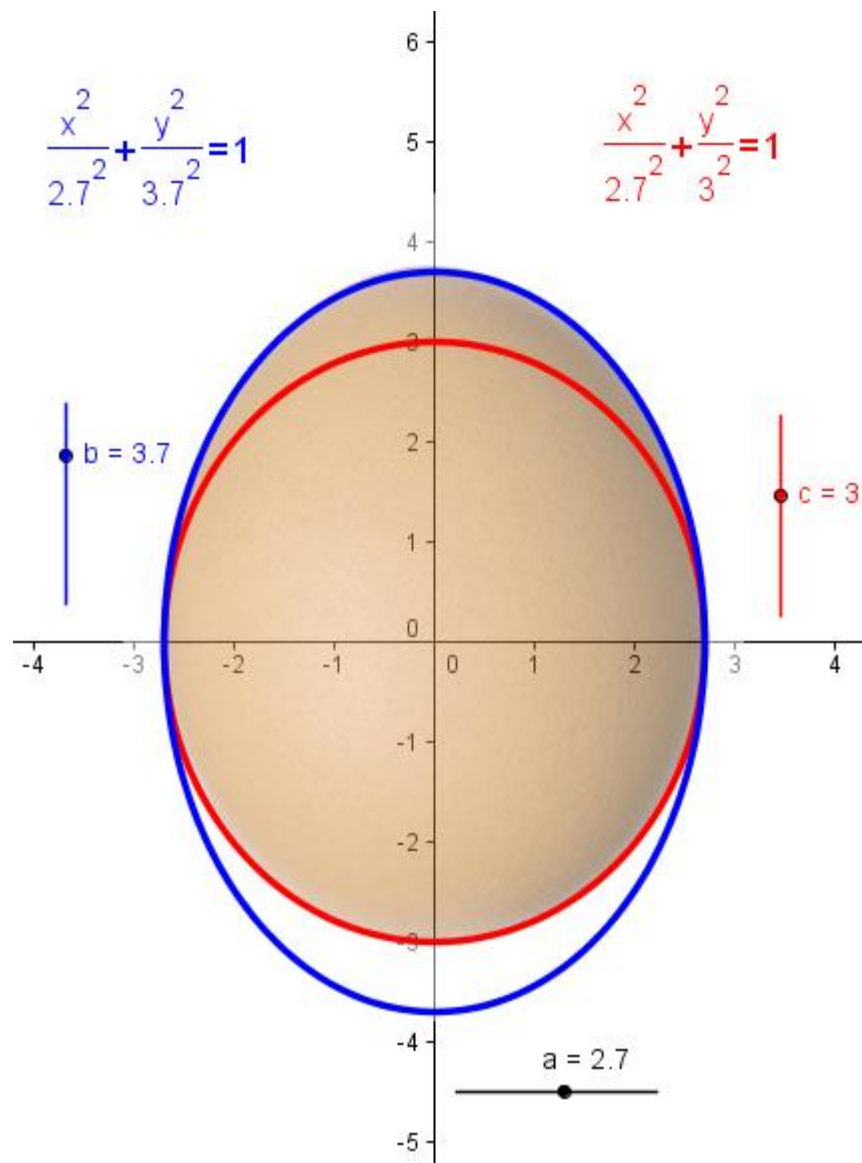
Notice that as is seen on this picture the egg volume is approximately 28cm^3. However, before you think it's all over just go back to your file, click on the screen and roll the mouse wheel…Is there a problem???

To find out more about LaTeX commands take a look at
http://garsia.math.yorku.ca/MPWP/LATEXmath/latexsym.html

Or better still search through the Geogebra Wiki