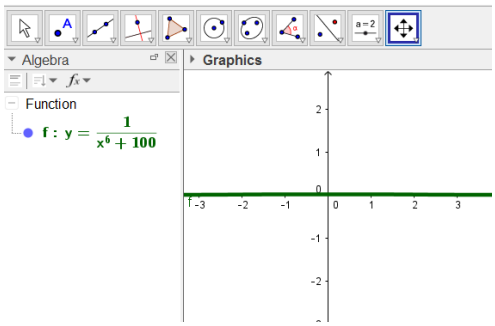
Function Graph II*

In a class revising for their A Level exam, the teacher invites the students to use GeoGebra to solve the following problem:

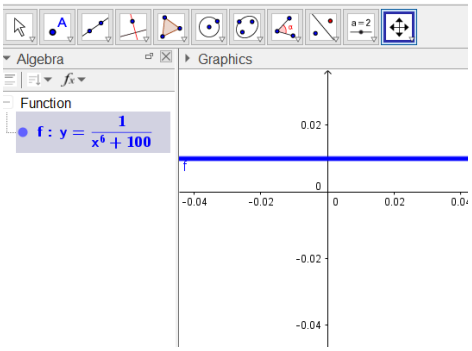
"Make the graph of the function $f(x)=\frac{1}{x^6+100}$ and use the graph to find out whether the function has a minimum and/or a maximum"

The students work on the problem and this dialogue between Students A, B and C follows:

Student A: I think, it does not have a maximum or a minimum. I made the graph and it is a straight line lying on the x-axis. Look at the image on my screen:



Student B: You are right, it is a straight line but I zoomed in and it is parallel to the *x*-axis, not on it. Look at my graph:



Student A: Whatever … in both cases it is a straight line with no maximum … no minimum, it is flat.

Student C: This cannot be true, you say that it is flat but $f(-1)=\frac{1}{101}$ and $f(0)=\frac{1}{100}$, they are not the same. Hmmm, I cannot find where the problem is.

You are the teacher and you just heard this dialogue.

Questions:

a. What does the graph of this function look like – and does it have a maximum and/or a minimum?
b. What are the aims of using this problem in class?
c. What do you think are the issues in the three students' responses?
d. How would you respond to each of the three students and to the whole class?

* Inspired by Giraldo, V., Caetano, P., & Mattos, F. (2013). *Recursos Computacionais no Ensino de Matemática [Computational Resources in the Teaching of Mathematics]*. Rio de Janeiro, Brazil: SBM.

This is a Task developed by the MathTASK 2016-17 team. Let us know whether it is useful and how we can improve it at @mathtask or email Irene Biza at i.biza@uea.ac.uk. For more tasks, visit MathTASK.