"Two *sines* of the same *coin*"
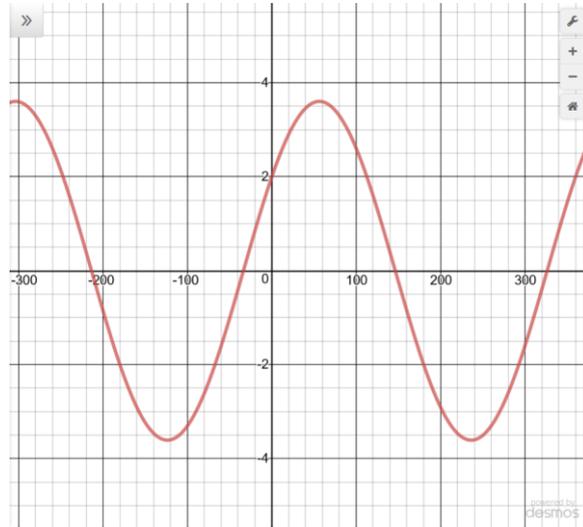
In a Year 13 class, the teacher, who has access to the software Desmos, asks students to:

"Give an approximate formula for the function presented in the graph"

The students look at the screen and write down their approximations, while asking the teacher to navigate the software for more information. The teacher does so when requested and stops when she believes she has given enough information to her students.

Student A: **(to himself)** Hmm… It looks like a sine function. But it is way over 1 and lower than -1 on the y-axis. So it is multiplied by a number. It also crosses the x-axis before 0. So, it looks like $y = a\sin(x + b)$. Now, to find a and b…
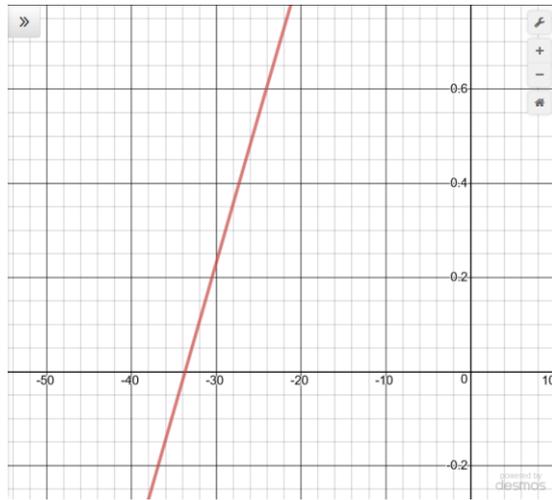
Student B: **(addresses the teacher)** Excuse me Miss? Could you zoom in closer please?

Teacher: **(zooms in, then stops at this point)**
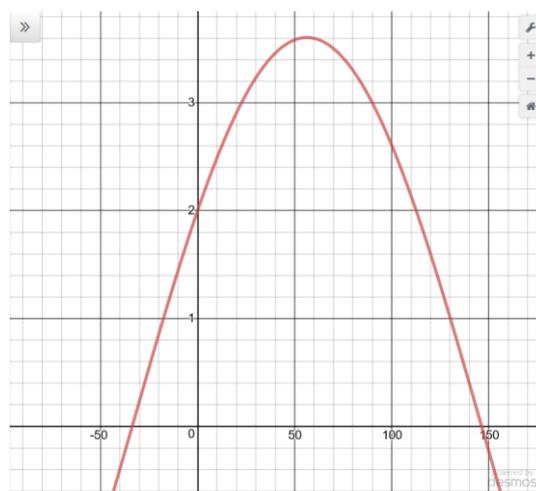
Student A: **(addresses the teacher)** Could you zoom in closer to the x-axis, near -30 for example?
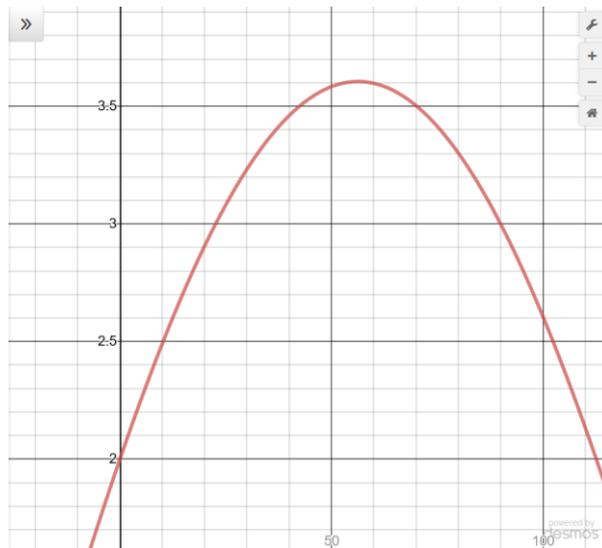
Teacher: **(zooms in, then stops)**

Student A: Ha! So, that looks between -40 and -30… oh wait… yeah, about -35, I'm gonna say -34.

Student B: **(addresses the teacher)** Could you now zoom out a bit, up to the right… near the point with coordinates (50,3)?

Teacher: **(moves out to the right, then up, following the function's graph)**

Student B: Hehe, so that is clearly 3.6, right, Student A?

Student A: Yep! And that gives me all the info I wanted! The equation is
$$y = 3.6\sin(x+34)$$

Questions:

a. What are the aims of using an activity like this in class?

b. How would you help the students to approximate the equation of the function?

…to be continued to Trigonometry 2 (of 3) Task

*Inspired by the doctoral research of Lina Kayali

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.