7.5 Kei and Xarielle Exploring Amplitude of the Sine Function Transcript

Ms. Fye is using the Introduction to the Sine Graph Desmos Task in an in-person class.

Kei and Xarielle Exploring Amplitude of the Sine Function

Transcript:

[Students start working on slide 6 of the task with questions about amplitude and then go back to slide 5 which has sliders for the parameters *a*, *b*, and *k* for a sine function $y = a\sin(bx) + c$.]
Kei: Alright. Whoa. Whoa. Whoa.
Kei: *k* affects the amplitude because look,
[Student starts dragging the slider for *k* greater than zero and then less than zero. The graph translates up and down depending on the movement and position of the slider.]
Kei: it's changing up and down and like
Kei: it's going to have different amplitude.
Kei: I don't know *a*. *a* does not change it at all.
[Student moves the cursor to the point on slider *a* but does not move the slider.]
Teacher: So before we move on to the next argument
Teacher: I agree with moving up and down.
Xarielle: Okay, I see what I got wrong.
Xarielle: Okay. I can see that it's *k*.
Teacher: Hold on. I didn't say anything yet.
Teacher: I agree that our graph is going up and down.
Teacher: What's the amplitude right now?
Kei: Uh.
[Student moves cursor to a maximum of the graph with coordinates (-150, 0.1)]
Teacher: It's easier to move it to *a*….
Kei: She said no decimals.
Teacher: Not decimals (unclear words)
Kei: Go to one. There you go.
[Student moves sliders to make parameter *a* into a whole number, negative 1 is where they stop.]
Kei: You know you could just click it, right?
[Student is moving parameter *b* to try to land on a whole number, they stop at positive 2.]
Xarielle: And I can just do this too.
Kei: But it's easier if you just click-
Xarielle: Mines (unclear words)
Teacher: Alright, so what's the amplitude?

Xarielle: It is…
Kei: No, let me see.
[Student selects a max and min on the graph and then goes to the parameter *k* slider to change it from a decimal.]
Xarielle: Oh, I gotta put this to one.
Xarielle: Why'd you write negative one?
[Student types in negative 1 as the parameter for *k* and then changes it to positive 1.]
Kei: Because you just said one (unclear words)
Xarielle: But leave it to two!
Kei: Alright.
[Student selects the maximum of the new function with coordinates (-45,2) and the minimum at (-135,0).]
Xarielle: Okay, the amplitude right now is one.
Teacher: Okay, now move slider *k* to somewhere else.
[Student moves slider *k* first to a larger positive number and then to negative 1.1.]
Kei: Go down.
Xarielle: Let's see.
Teacher: What's the amplitude?
Xarielle: Uh, do just negative one
[Student backspaces the .1 in the *k* parameter to leave negative 1 as the value.]
Kei: One, negative one?
Xarielle: Wait, we are supposed to do negative two plus
Kei: So it's the same,
Xarielle: No it's no-....yeah, it's the same.
Teacher: Okay, alright
[Student starts moving the parameter slider for *a*.]
Xarielle: And I say *a*
Teacher: Why do you say *a*?
Xarielle: Because, okay watch this, watch this,
Xarielle: watch this, watch this
[Student drags slider *a* value back to negative 1.]
Teacher: What's the amplitude right now?
Xarielle: Zero…..
Kei: Okay, zero….
Kei: It's the same.
Xarielle: It's the same.
Teacher: Okay, now move it.
Xarielle: It seems to be.
Xarielle: Is it still the same? It's still the same.
[Student drags slider *b* to be positive and then negative.]
Kei: Look let me see that
[Student starts sliding the parameter slider for *a* but the switches to typing in values.]
Xarielle: Try two.
Kei: Three

Xarielle: Try two!
Xarielle: Let me see.
[Student types -2 for the value of parameter *a*. They select a maximum at (-30,1) and a minimum at (-90,-3).]
Kei: Got it. It's one and three.
Kei: So three….
Xarielle: Negative three, No it's three.
Xarielle: No, three plus one's….
Xarielle: No, negative three plus one, negative two,
Xarielle: divided by two,
Xarielle: Yeah it's absolute value so it's one.
Xarielle: Cause it's um
Kei: So it's *a* and *k*. Can it be two? Or one, just one.
Teacher: Is it one or two?
Kei: Uh I think it's one
Kei: I would say *a* though
[Student starts dragging the slider for parameter *k*, the graph translates up and down accordingly. They stop at k=0. Parameter *a* stays at negative 2 and parameter *b* stays at 3. They select a maximum at (-150,2) and a minimum at (-210,-2).]
Xarielle: I say *a*, because
Kei: Not because you said it just because…
Teacher: But what's the amplitude of this one before we change it?
Kei: That's zero, no
Xarielle: Four
Kei: The distance….
Xarielle: It's two. It's two.
Xarielle: I don't know, this is hard.
Kei: I choose *a*, I choose *a*
Teacher: Why do you choose *a*?
Kei: Cause like, if you slide *a*,
Kei: it depends on where
Kei: See look, you gotta slide it.
[Student moves slider for parameter *a* from negative 2 to negative 5.]
Kei: see, it stretches
Kei: and it has different…. Then if you stop, stop it real quick.
Kei: And then now, is it different?
[Student drags the slider *a* to 0.6 and stops. Then the selected a maximum at (30,0.6) and a minimum at (-30,-0.6).]
Kei: So that's 0.6, and -0.6
Kei: So it had different
Kei: it changes the *y*-axis, the *y*-value
Kei: So it's different. So I think it's *a*.
Teacher: Okay. But I thought you said it didn't change
Kei: Wait because

[Student drags slider for parameter *k* from 0 to 1.7. Then they select a maximum on the graph at (-90, 2.3) and a minimum at (-150,1.1).]
Xarielle: Okay. The reason I say *k*, I mean *a*
Xarielle: is because it moved the sine wave.
Xarielle: It moved the point. Even though *k* do, too.
Xarielle: But it doesn't matter
Xarielle: for every one you got a y-axis if you do
Xarielle: you start to do the *y* values
Xarielle: and *a* actually changes the amplitude of the
Teacher: How do you know it changes the amplitude?
Kei: *k* changes the amplitude
Xarielle: No. It's *a*
[Student moves the slider for parameter *k* to negative 1.6.]
Xarielle: Because no, no *k* doesn't
Xarielle: Just because it just moves it.
Xarielle: *a* makes the sine either larger or smaller.
Xarielle: So it does end up changing.
Xarielle: *k* doesn't do
Kei: *k* just changes the position
Xarielle: *k* just, yeah
Xarielle: It just changes the position
Teacher: Ah, I like that.