7.2 Ms. Fye Launching the Introduction to Sine Graphs Desmos Task Transcript

Ms. Fye is using the Introduction to Sine Desmos Activity in a remote synchronous class session.

Watch Ms. Fye Launching the Introduction to Sine Graphs Desmos Task

Transcript:

[Video starts with teacher going from page one to page two of the Introduction to Sine Graphs Desmos task.]
Ms. Fye: So on this page, you have a graph of the sine function, and if you wanna look at, have a better view, it might be easy to close that down and have kind of like a sense of what it looks like and some of the more specifics of it.

[When the teacher says "close that down", she clicks the double arrows near the equation bar to hide the equations pane and expand the view of the graph.]
Ms. Fye: But kind of like look at it, drag it around, see what you notice, and then on slide three, I want you to talk to me about what features or characteristics you notice about it.
[When the teacher says "on slide 3", she clicks into the next slide of the activity.]
Ms. Fye: So some of the things maybe to focus in on are think about the shape of the function. Think about important points of the function, critical things that we've normally talked about in the past, like maybe intercepts or maxes and mins. Are there restrictions on the function? Maybe thinking about domain and range, increasing, decreasing, positive, negative, something along those lines. So think about some of those features that we've discussed in the past in discussing functions, and let me know some of the things you notice about the sine function.

[There is a transition screen to a different section of footage where students are interacting with and making observations about the graph on page 2 and recording findings on page 3. The teacher begins scrolling down the page and reading through students' responses to page 3.]
Ms. Fye: All right. Let's see what kind of things you guys came up with here. All right. So I see this idea of, that the graph repeats forever. There is the same average height from the *x*-axis, from the maximum, the *x*-axis for each of the maximums, which is one, called the amplitude. So some people are engaging in some terms that maybe they've heard before. Below the *x*-axis, the maximum height is also negative one. Function seems to be comprised of waves, and each waves share the same characteristics. Height and how frequently it occurs. The size of each wave is also in the name. The domain seems to be all real numbers. The range seems to be in between one and negative one. And

the function passes through the origin. Shaped like a wave. Goes through the point (0,0). Reaches one and negative one. It has infinitely many *x*-intercepts. Goes through even *x* points and they're all spaced 180 units from each other. The range is restricted to negative one and one. The graph starts at the origin. Each curve is like a parabola. The domain is negative infinity to positive infinity. There's a relative minimum at negative one, or the relative minimum is negative one, and the relative maximum is one. All right, we've got a wave with a constant vertex on either side of *x*. Lots of *x*-intercepts, with a domain of all real numbers, ranges, let's see, from negative one to one. Crests and troughs are equal in distance from each other. The range is from negative one to one. Domain is negative infinity to positive infinity. Each *x*-intercept is a multiple of 180. *y*-intercept's at (0,0). Increases and decreases at equivalent rates to make a symmetrical image. Shape of the sine is like a curly line. There is an *x*-intercept every 180 points, starting at zero, at both in positive and negative directions. The range is restricted from one to negative one. The domain is from, and I see we're in the middle of typing. Each vertex of each loop shares the same numbers as another loop, but the loop it shares with would be positive if it was negative, or vice versa. Has a constant vertex. The *y*-intercept of (0,0) has multiple *x*-intercepts. The domain is all real numbers. The range is from positive one to negative one.

[Teacher finishes reading through student responses and then begins recapping and using slide 2 with the graph of sine as a reference.]
Ms. Fye: Okay, cool. So I see a lot of common things there. I see domain and range is considered almost in all of 'em. We have that *y*-intercept. I think there's a common thread that the *x*-intercepts, and I'll go to the graph here **[Teacher goes to the graph on page 2]**, the *x*-intercepts continue in every direction, and some people pointed out that it's 180, every 180, we're getting that.

[Teacher selects points on the graph at (180,0) and (360,0) as she talks about the *x*-intercepts repeating every 180 units.]
Ms. Fye: Some people talked about the maximum and the minimum values, as well as the *y*-intercept.

[Teacher selects a maximum at (90,1), a minimum at (270,-1), and the *y*-intercept at (0,0).]
Ms. Fye: Some people talked about how it continues on forever in both directions right? If I continue to drag either way, I continue to see a graph.

[Teacher drags the graph to the right so the *y*-axis is barely visible and then back to the left.]
Ms. Fye: As well as... Gimme a second.

[Teacher goes back to the teacher view of page 3 and looks at student responses for the description of the sine graph.]

Ms. Fye: We kind of have, talked about it looking like a wave. Yeah, so those are some good features to point out, and then some of that stuff is interesting to just specific sine and some of it's just features that, ways that we use to describe all functions.

[Teacher opens pages 4 and 5 in teacher view and shows the question on page 4].
Ms. Fye: So what I wanna do next is, on slide four and five, four's just kind of some, four is where you're gonna answer the question, five is where you're gonna play. So on slide four, on the next question, you'll see a sine function with sliders *a*, *b*, *h*, and *k*. Actually, there's no h.

[Teacher goes from page 4 briefly to page 5 with the graph.]
Ms. Fye: I removed the h. I forgot about that. And I want you to play with the sliders on slide five, and what do those sliders do? So hopefully this isn't too much of a stretch from, we're trying to connect to the things we do know to potentially this new function. So what do those sliders do to that function?

[Footage has a break to looking at students' answers to the question on page 4 based on the graph on page 5.]
Ms. Fye: All right. Let's take a look at what you guys came up with. I'm hitting, I wanna be on the slide before that slide. All right, so let's take a look. I'm gonna go bottom to top this time, just to switch it up.

[Teacher scrolls to the bottom of the list and begins reading student responses.]
Ms. Fye: So we've got, *a* is a vertical stretch and compression. *b* is a horizontal stretch or compression. *k* moves it up and down. Okay. Let's see. I see something different. I see, and the next one is that, *k* would change the *y* value and the *y*-intercept. Let's see. Yes, yes. I'm reading to see if there's anything different, because you guys are saying a lot of the same thing. *k* elevates and lowers the equation. Vertical stretching and compressing, changes the *y*-intercept. Love it, love it. Raises and lowers the function. The *b* slider is responsible for changing the distance between each wave, okay which may be called the wavelength. All right. That's something new.

[Teacher finishes reading student responses.]
Ms. Fye: All right, that looks good. So we're kinda trying in our transformations, and we start seeing that we're starting to talk about maybe some new features that exist within the function itself. So what I wanna do next is I'm gonna open the activity up and put you into partners, and I want you to see if you can reason through the new slides. So real quick, before I do that, I want to kind of explain a little bit about what's going on on these slides, and then I'll open it up.

[Teacher shows slide 6 with information on amplitude on the screen.]
Ms. Fye: On the next three slides, I've asked I've given you a definition and an image to support that definition, and I want you to first answer, what is the amp-, like so the first

one is amplitude. So you'll use that definition to tell me what the amplitude of the sine function was, which it might be helpful to go back to slide two on that question.

[Teacher uses the cursor to gesture to the different questions on page 6 and then gestures to slide 2 on the slide banner above the page view.]
Ms. Fye: And then, also think about which of those sliders controls the amplitude, based on the definition, and slide five would help you with that.

[Teacher gestures to slide 5 on the slide banner above the page view.]
Ms. Fye: So I want you to work together with your partner to discuss what you think the answers to these are and talk through them. And then see if you can use that information to start looking at expressions, looking at the equations, looking at the graphs, and can you find those features and can you write equations using those things? Yes, the original sine function with no transformations applied is on slide two, and the one with the sliders is on slide five.

[Teacher shows slide 5 that has a sine graph with the equation y=*a*sin(*b*x)+*k* where *a*, *b* and *k* are sliders. Teacher gestures to sliders *a*, *b* and, *k* when they talk about resetting the graph.]
Ms. Fye: On slide five, if you want to reset it, *a*-one, *b*-one, *k*-zero will produce your original sine function, okay. So just a couple helpful hints there, as you go through that next part of the exploration with your partner.