



## 7.6 Rhian and Shakira Exploring Period of the Sine Function (Clip 2) Transcript



Ms. Fye is using the [Introduction to the Sine Graph](#) Desmos Task in an in-person class.



[Rhian and Shakira Exploring Period of the Sine Function \(Clip 2\)](#)

Transcript:

**[Students start on slide 14 of the task which has a blue dotted sine function and a graph of  $y=\sin(x)-2$ .]**

Rhian:  $b$  has to be farther away from zero

Rhian: because I know it's wider.

**[Student selects two maximums on the blue sine function, one at  $(-180,1)$  and one at  $(540,1)$ .]**

Rhian: 180, 540,

Rhian: which is 360.

Rhian: 360 divided by 6

Rhian: It's 60

**[Student types in 60 for parameter  $b$ , the graphed equation is now  $y=\sin(60x)-2$ .]**

Rhian: Oh no.

Ms. Fye: Whoa I like that!

Rhian: It's 6.

**[Student types in 6 for parameter  $b$ , the graphed equation is now  $y=\sin(6x)-2$ .]**

Rhian: Wait, never mind.

Shakira: You said, you said what?

Shakira: Alright.

Shakira: 40 div- subtracted by what?

Rhian: 540 subtracted by 180.

**[Student reselects maximum at  $(-180,1)$ .]**

Shakira: 180....

Rhian: It's on 360.

Rhian: And then, the midline is negative 2, I know that.

Rhian: 360

Shakira: oh

Rhian: oh, so that means  $x$  is only....

Rhian: I'm kinda lost, I don't know.

**[Student begins to type for parameter  $b$  and stops before they type a number.]**

Shakira: 60

Rhian: Let me go back to what we said.

**[Student goes back through the task slides to page 11, which has a question about identifying amplitude, period, and midline from a graph of a sine function.]**

Rhian: Oh, we didn't write it down.



Ms. Fye: So talk me through how you're getting the period right now?

**[Students go back to slide 14 with the blue sine graph and red graph of  $y = \sin(x) - 2$ .]**

Shakira: Oh, we just subtracted.

Ms. Fye: What did you subtract?

Rhian: 540....

Shakira: And 180.

**[Student selects maximums on the blue graph at  $(-180, 1)$  and  $(540, 1)$ .]**

Ms. Fye: okay, how, um...

Rhian: oh, you have to add because this is negative.

Ms. Fye: Explain that to me, Rhian.

Rhian: Because this is negative, so it's 540,

**[Student gestures with the cursor, from the y axis ( $x=0$ ) to the maximum at  $x=540$ . Then they use a similar gesture from the maximum at  $x=-180$  to the y axis ( $x=0$ ).]**

Rhian: and then there's another 180 right here.

Rhian: So it's 540 plus 180.

Ms. Fye: Do you see that Shakira?

Shakira: Yeah, but why?

Ms. Fye: But you're squinting your eyes, so we're not quite convinced.

Ms. Fye: Can you show us on there, Rhian?

**[Student repeats similar gesture with the cursor, from the y axis ( $x=0$ ) to the maximum at  $x=540$ .]**

Rhian: So this to the y-axis is 540,

**[Student gestures from the maximum at  $x=-180$  to the y axis ( $x=0$ ).]**

Rhian: and then this is another 180,

Rhian: so the distance between these would be 540

Rhian: plus 180.

Shakira: So that's the absolute value?

Rhian: Mmhmm

Shakira: Okay, so you add that.

Rhian: Okay, so 720 divided by 60 is....

Rhian: 12

**[Student types in 12 for parameter  $b$ , the equation is  $y = \sin(12x) - 2$ .]**

Rhian: I want to say it's-

Shakira: Why are we dividing it by 60?

**[Student removes the 12 from the equation.]**

Rhian: Well divide by-

Rhian: I'm lost, I forg-

Ms. Fye: Remind me how you were finding the period before?

Rhian: It was 360.

**[Student goes back through the slides to page 12 which has a graph of  $y = 2\sin(3x) - 5$ . Student gestures with the cursor to the 3 (the value of parameter  $b$ ).]**

Rhian: That divided... That divided by 360.

Rhian: Well, I don't know how to explain it.

Rhian: 360 divided by something would get 3.

Rhian: So for that it would be-



**[Student returns to slide 14 and then goes back to slide 12.]**

Ms. Fye: So remind me on the previous one-

Ms. Fye: Show me how you got there,

Ms. Fye: because I think that might help you remember how you did it.

Ms. Fye: one more back.

Ms. Fye: So tell me how you got your  $b$  there.

Rhian: 360 divided by a number would give you 3.

Rhian: So, three-six ....

Rhian: In that case it was 360 divided by 120.

Shakira: 120? Was it both of these?

Ms. Fye: So let's find that 120 again and confirm that.

Ms. Fye: If we can find that 120, then I think

Ms. Fye: we'll be...we'll prove it to ourselves, right?

**[Student selects the maximums for the graph on slide 12 with coordinates (150,-3) and (30,-3).]**

Rhian: 150 and 30 is 120.

Ms. Fye: Okay, so there's that where that 120 came from?

Rhian and Shakira: Mhmm

Ms. Fye: Okay, so how can we do that with that 720 now?

Rhian: It would be a negative.

Rhian: So three-sixt...

Rhian: Can see it?

Shakira: Mhmm

Ms. Fye: I can also get another whiteboard.

Shakira: Okay.

Shakira: 120.

Rhian: The only way could think of is simplifying until we get it.

Shakira: Could we multiply?

Shakira: or would that work? Multiplying?

Ms. Fye: What are you thinking about multiplying?

Rhian: Oh now. This is 720, is two times 360,

Rhian: but I don't feel like that would be it.

Rhian: I could try it.

**[Student types 2 in for parameter  $b$  on slide 14, then they backspace the 2.]**

Rhian: 720 is two times 360.

Shakira: So 360 is the max volume of the period?

Ms. Fye: It's our period in standard position.

Shakira: All right.

Ms. Fye: That's how we did the last one, right?

Ms. Fye: Okay, so Rhian just reminded us what we did last time.

Ms. Fye: We took 360 and we divided by the period we found,

Ms. Fye: which was 120,

Rhian and Shakira: Mhmm

Ms. Fye: and that's what gave us 3?

Rhian and Shakira: Mhmm

Ms. Fye: Okay, how can we do something with that 720?



Rhian: 720 divided by 360 is 2.

Ms. Fye: Did that give us what we wanted when you tried it in there

Rhian: No.

Rhian: But it makes sense.

Rhian: I think we have to, set the amplitude to maybe-

Shakira: How about.....

Shakira: I'm still thinking about multiplying

Shakira: that last number.

Ms. Fye: Okay.

Rhian: I know the amplitude is 3.

**[Student types in 3 for parameter  $a$ , in the equation on slide 14.]**

Shakira: It should be 3.

**[Student types in 2 for parameter  $b$  and then deletes the 2.]**

Rhian: Nope.

Rhian: It's probably negative two.

Rhian: Negative two because-

Rhian: I don't know how to explain it, but negative two

Rhian: because 360 divided by 720.

Shakira: It might be.

Ms. Fye: And what'd you write down, Shakira?

Shakira: I just thought because 360 was the top number,

Shakira: it should be the top for this one, too.

Shakira: I didn't.....

Ms. Fye: Explain that Rhian for me.

Shakira: What?

Ms. Fye: Explain that thinking.

Shakira: Because 360 is the number that we're dividing-

Shakira: Our um....

Shakira: the number we got from the difference,

Shakira: The differences,

Shakira: and I just figured, if that was the right way,

Shakira: then this should be the right way too.

Ms. Fye: So, here you're saying 360 was located where?

Shakira: On the top.

Ms. Fye: And so you think it should stay on the top

Ms. Fye: when you divide?

Shakira: Yeah.

Ms. Fye: Okay.

Ms. Fye: Rhian, what you think?

Rhian: I agree.

Ms. Fye: You want to give it a shot?

Rhian: So it would be 0.5

Rhian: Do we put it as a decimal or a fraction?

Ms. Fye: You know what Ms. Fye's going to say.

**[Student types in  $\frac{1}{2}$  for parameter  $b$ .]**

Rhian: But it would be negative.



Ms. Fye: Interesting.

**[Student types in a minus sign in front of the  $\frac{1}{2}$ .]**

Ms. Fye: Do you like what you got for  $b$ ?

Rhian and Shakira: Yes.

Ms. Fye: Oh why'd you make it negative?

Rhian: Because it was-

Rhian: I don't know how to explain it.

Rhian: But the number that was dividing-

Rhian: you was dividing a bigger number into a smaller number,

Rhian: so it's going to be negative.

Ms. Fye: Is that why it was negative-

Ms. Fye: take the negative out for a second.

**[Student removes the negative in front of the  $\frac{1}{2}$ .]**

Ms. Fye: Is your period still the same?

Ms. Fye: Feel free to click and drag if you need to,

Ms. Fye: because I know you've got....

**[Student selects two points on the sine graph a maximum at (180,1) and a minimum at (540,-5).]**

Rhian: Yes.

Ms. Fye: Period's still the same?

Ms. Fye: Do you see that?

Rhian: oh, no.

Ms. Fye: No?

Rhian: Because the 180 is on the positive side now,

Rhian: So it's ... there's a smaller gap.

Ms. Fye: So, talk me through where the period is on the red one right now.

Rhian: Oh, it's this!

**[Student selects a minimum at (-180, -5).]**

Rhian: The period is still the same.

Shakira: Yeah.

Ms. Fye: Okay. Show me where. Where you see-

Ms. Fye: We said it was 720, right?

Ms. Fye: Show me where you see the 720 for that one.

Rhian: Right here.

**[Student gestures with the cursor to the distance between  $x=-180$  and the  $x=540$ .]**

Ms. Fye: Okay.

Ms. Fye: And how are you getting 720?

Rhian: Negative-

Rhian: 180 plus 540.

Ms. Fye: The 180 plus the 540?

Rhian: Mmhmm

Ms. Fye: Okay.

Ms. Fye: Shakira, you good with that?

Shakira: Yeah.

Ms. Fye: Okay, all right.

Ms. Fye: And then what did the negative do?



Shakira: It flipped it across the  $y$ -, the  $x$ -axis.

Ms. Fye: What do you think, Rhian?

Ms. Fye: She said it reflected it.

Rhian: Yeah.

Ms. Fye: Yeah? So what does-

Rhian: Well across the  $y=-2$ .

**[Student gestures to the midline of the graph at  $y=-2$  with the cursor.]**

Shakira: The midline

Ms. Fye: Oh, so it was kind of reflecting it over the midline?

All: Yeah.

Ms. Fye: Aah, okay.