



4.2 Noticing Student Thinking: Avi & Benita's Repair Shop

In this task you will examine students' work on Desmos' Avi & Benita's Repair Shop Task. The task was used as an introduction to exponential functions. Specifically, it uses multiple representations (e.g., written descriptions, graphs, and tables) of linear and exponential situations to compare and contrast within the context of two different ways of being paid. The task provides a real context for the meaning of a and b ($f(x) = ax^b$), and after this task (not during), formal language regarding exponential functions will be introduced.

Thus, the overarching learning goal for this task is for students to understand the difference between linear and exponential growth in context (though they have not yet been introduced to the term "exponential"). The performance goals include that students will identify if a situation is changing constantly (i.e., common difference) or exponentially (i.e., common ratio) given a graph or table, and justify their responses using the rate of change.



[Desmos' Avi and Benita's Repair Shop Task](#)

Q1. On Page 5 of Avi and Benita's Repair Shop, many students say that Benita's rule will make more money on Day 20. The prompt directs the students to use math to support their answer and points to the sketch tool as one possible way to illustrate their thinking. Anticipate three different arguments that students may make to justify their answer that Benita's rule makes more money. At least one of your anticipations should include how students may use the sketch tool.



Q2. Elise and Fin say Benita's rule will make more money. Watch the video as they continue to work on page 5 of the task. Attend to (describe in detail) how the students used math and/or the technology to analyze the payment options and support their answer.



[Video 1: Elise and Fin Engaging with Desmos' Avi and Benita's Repair Shop Task](#)

Q3. Continue watching as Elise and Fin work on pages 6 and 7 of the task. What prompts them to realize that Benita's rule does not pay the most on day 20? Explain in detail.



[Video 2: Elise and Fin Engaging with Desmos' Avi and Benita's Repair Shop Task](#)



Q4. Based on your responses to Q2 and Q3, interpret Elise and Fin's current understanding of linear and exponential rates of change?

Q5. Alex and Carly also say Benita's rule will make more money. Watch the video as they work on page 5 of the task. Attend to (describe in detail) how the students used math and/or the technology to analyze the payment options and support their answer.



[Video 3: Alex and Carly Engaging with Desmos' Avi and Benita's Repair Shop Task](#)



Q6. Continue watching Alex and Carly as they work on pages 6 and 7 of the task. What prompts them to realize that Benita's rule does not pay the most on day 20? Explain in detail.



[Video 4: Alex and Carly Engaging with Desmos' Avi and Benita's Repair Shop Task](#)

Q7. Based on your responses to Q5 and Q6, interpret Alex and Carly's current understanding of linear and exponential rates of change?



Q8. Both pairs of students attempt to use the technology in a way that the task did not allow.

a. What did Elise and Fin want to be able to do? How might their understanding have been affected if they had been able to do it?

b. What did Alex and Carly want to be able to do? How might their understanding have been affected if they had been able to do it?