

Molly Huggins' 7th-grade class on March 21, 2019

In 6th grade and earlier this year, these students focused on multiple representations of proportional relationships. They are in the second day of a unit that introduces linear relationships.

At In-N-Out Burgers, a 20 x 20 burger has 20 cheese slices and 20 beef patties.



Number of Cheese Burgers (x)	Price (y)			Number of Patties on Burger (x)	Price (y)
0	0	LT: I CAN REASON AND MAKE SENSE ABOUT COMPLEX PROBLEMS.		0	0.85
1	1.75			1	1.75
2	3.50			2	2.65
3	5.25			3	3.55
10	17.50			10	?

Molly: We are going to get started today working with what we were working with yesterday. We are going to get started by getting into Desmos. I am going to unpause it and as I unpause it, I want you take a moment to consider what is the same and what is different in the two tables that are on the screen in front of you. Give me a thumbs-up when you are ready to share with a partner something that you see that is the same and something that you see is different on the screen in front of you. I'm going to wait until I see all thumbs. I want to respect your time. Okay, turn and talk to a partner. **Students talking in pairs.**

Molly: I'm going to call on you and love to hear from you. Lily, I want to hear what you see is the same or different.

Lily: For the cheeseburger it's (0, 0), but for the patties it's different, (0, \$0.85). [Molly circles the entry in each table that Lily is talking about.]

Hayden: There are more values than in yesterday's table.

Molly: Say more about what you mean.

Hayden: Yesterday's table just had only a few values. This table has more.

Molly: Oh, so you are connecting to what we did yesterday when we only had a couple, we only had two entries. Now we have more prices available. I like that connection.

Molly: Josh, what would you like to talk about?

Josh: We talked about that this side, the left side, is they are cheaper than on the right side which is just the patty.

Molly: What does that mean? What do you think that means?

Tyler: The number of patties, like how many slabs of beef there are. Um, cause the \$0.85 would be the grilled cheese with no patty on it.

Molly: So, I'm hearing you connecting this that this with nothing on it and this is the price per patty. [Molly points to the two points she circled when Lily talked about (0, 0) and (0, \$0.85).] So, what is different about this table, here, in connection to what Tyler is saying?

Jeffrey: So, well the first one says the number of cheeseburgers which means the whole burger itself. Which, since there are no burgers, it doesn't cost anything.

Daniel: I noticed that on both of them, $1 = 1.75$ in price. Right? So, I was thinking that the number of cheeseburgers is 1 and the number of patties is 1 so that's just a normal burger. And I'm wondering also since you can keep on adding patties, can you just buy only a patty?

Molly: Great wondering. What do you think? Do you think you can go and buy only a patty? I think you can do that. That is the low carb option, a no carb option, right? This is the vegan option, no beef. I bet you could buy just a patty. I wonder how much just a patty would cost. **Call out \$0.85.**

Molly: Talk in your teams. **Lots of talking.**

Molly: All right. Who can tell me why it makes sense that one patty just costs \$0.90? Where do we see evidence that in this table?

A female student: On the number of patties for 2 and then 3, one extra patty is added. The price goes up by \$0.90. [Molly marks the differences for each column of the second table.]

Molly: All right. Awesome. So, the last thing I want you to talk about on the screen, is to refresh your memory on this. I want you to think back to a couple of units ago. Why is this relationship here [pointing to the first table] a proportional relationship? Where do we see evidence of this being a proportional relationship? And why is this a non-proportional relationship? Can you do me a favor and think about that. Where do you see evidence of this being a proportional and that this one is not proportional? Okay go ahead and talk to your partner. **Talking in pairs and groups.**

Molly: I'd love to hear from you. Who can give me evidence that this one is proportional or that this one is not?

Josh: The cheeseburgers is proportional because 0 equals 0.

Molly: So that point goes through the origin. So, we know on a graph, that proportional relationships have to go through that (0, 0) point. That is super important. What's another key feature that either tells us that is proportional or that this is not proportional?

Eden: I think that the second one is not proportional because just like Josh just said, it doesn't start at 0.

Molly: So, it doesn't start at 0. So, if we were going add the graph for this one, right, it wouldn't go through the origin. It might be up a bit. So, thinking about what that might look like on the graph.

Daniel: Well I see on the left-hand side that if you double 1 which is 2, you double the price with it. It also doubles. But on the other side, Table 2, when you double 1, go from 1 to 2, the price doesn't double with it. [Molly indicates the doubling on each side of the graph.]

Molly: So, we can't just double in this column. Right? That is not true. Right? We are not just doubling the price is what I'm hearing you say. Awesome. Does anyone else have another reason for why this one might be?

Male student: Um, I'm pretty sure that it's adding \$1.75 every time while this is adding \$0.90.

Molly: So, this one is adding \$1.75 every time, and this one is adding \$0.90 every time, but they have different starting points. That is a huge relationship, really important relationship. Right? In this one, we can just take the number of cheeseburgers and we can just multiply by \$1.75 every time. That's our constant of proportionality, remember, that relationship about what we can multiply by every time?

You guys are now going to do a task that refreshes your memory of these ideas.