Get Function-Minded: Tasks to Jumpstart Relationship Thinking

Session 450

Liem Tran
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bit.do/function-minded

Please work on the “Do Now”

Room Norms

- Thanks for choosing our talk, please start working on the Do Now
- Talk with your neighbor, but resist the urge to ‘teach’
- Please provide explanation for your thinking on your paper

Who we are...

Liem Tran (Algebra 2, Pre-Calculus, AP Calculus AB) and Nate Goza

Math for America, Los Angeles (Master Teacher Fellow: “Pathway to Calculus Curriculum”)

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We are Functional kind of guys ...

We attended the Park City Math Institute in 2013.

We think Relations and Functions are important concepts that set students up for Algebra success as well as success in Calculus.

We want to share how we introduce relations and functions to our students.

Do Now

Take 30 seconds and talk to the people near you:

- Introduce yourself to your neighbor
- Compare your answers on page 1 and 2

Relation vs. Function

Slide 6

1 Add Images of tv shows and Subway lines
Carl Oliver,

2 Other Function
Carl Oliver,

How do we introduce Relations and Functions

Sometimes things and numbers are related in a way that make sense:
we call that a **set**.

Sometimes two *sets* are related where one is the input and the other is the output:
we call that a **relation**.

Sometimes a *relation* exists such that for each input there is exactly one output:
we call that a **function**.

* Please refer to task "***1.3: Relations and Functions***" (Page 5)

Please look over this task without doing it.

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Relation vs. Function

Relation 5 (Page 6)

?	1	2		3	4	5	6	7	8	9	10	11	12
?	31	28	29	31	30	31	30	31	31	30	31	30	31

Slide 8

1 Add Images of tv shows and Subway lines
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2 Other Function
Carl Oliver,

Exploring Tasks vs. Practicing with Problem

What separates a Task Approach from a Practice Approach:

- May have more than one solution, one approach, one way of thinking
- Opportunities for discussion and justification
- Students collaborate with each other instead of in a teacher-guided

Tasks can be copied, adapted, altered, etc. to fit the needs of YOUR particular student!

Typical lesson approach

1) Launch

    Could be a story, video, picture, scenario that promotes engagement

2) Investigate

    Could be a task, a prompt, a set of questions, or comibination that students explore

3) Debrief

    Sharing of student thinking, approaches, struggles, and connection

1.4 Mini-Mart Madness

Presentation Questions are done in groups on vertical white boards.

Scaffolding Questions are done individually during or after the PQ's.

Follow-up Questions are done after debriefing of PQ's and SQ's.

Mini-Mart Madness (Page 9) - Launch

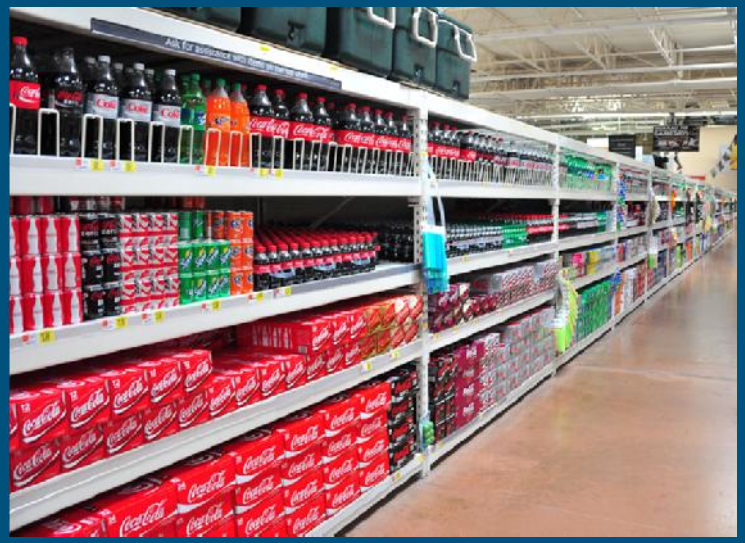
What do you wonder?

What do you notice?

Mini-Mart Madness (Launch)

A local Mini-Mart sells sodas in different ways:

Individual Sodas	**$1**
Six-Packs	**$4**
Twelve-Packs	**$7**



What do you notice? What do you wonder?

Mini-Mart Madness (Launch)

Launch: Too Rich To Care

With an elbow-partner (or two), please read and work through the PROMPT of the soda tasks (page 10)

Be prepared to present your work

Scaffolding questions (page 11) should be answered after you have worked thoroughly on the task, but answering the questions first could be help you complete the task

Mini-Mart Madness (Investigate)

With your neighbor explore each of the following relations as thoroughly as possible for ***up to*** 15 sodas.

1) The relationship between the number of sodas you want to buy *"S"* and the cost of buying those sodas *"C"*

2) The relationship between the number of sodas you want to buy *"S"* *and* the least expensive way to by those sodas *"L"*

Discuss and justify whether or not these two ***relations*** are ***functions***.

(From page 10)

Individual Sodas	$1
Six-Packs	$4
Twelve-Packs	$7

Mini-Mart Madness (Debrief)

What makes this situation a relation?

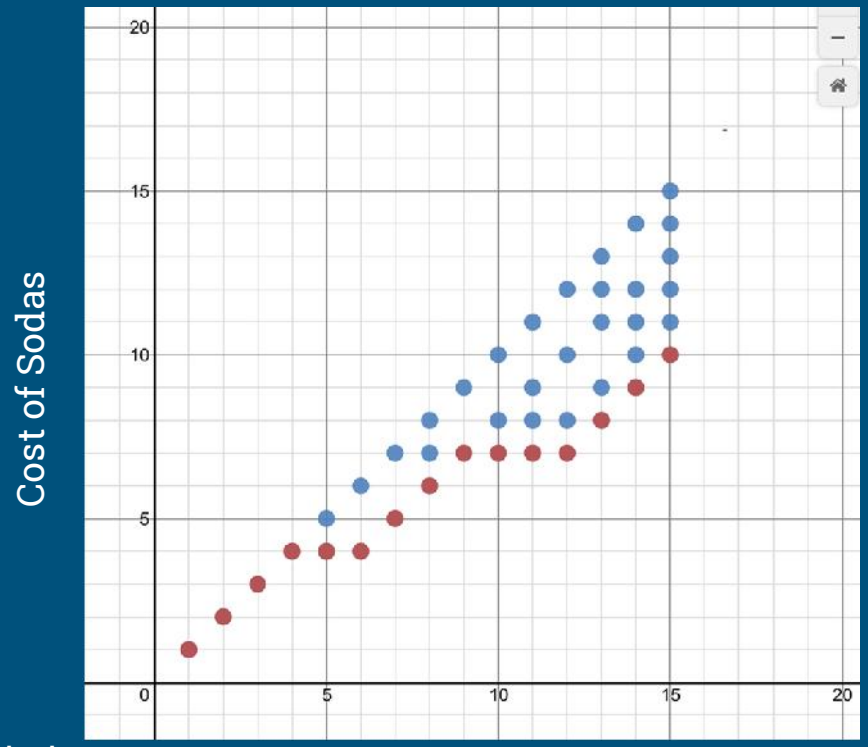
Which of the relations represent a function? Why?

1) Between the number of sodas you buy *"S"* and the cost of buying those sodas *"C"*.
2) Between the number of sodas you buy *"S"* *and* the least expensive way to by those sodas *"L"*.

What did you like about this task?

How would you use this in your class? What would you do anything differently?

One possible representation...



It’s all about ...

Relationships before x and y’s

Have students see and understand functions in a **contextual** kind-of-way before introducing the more abstract concepts such as notations and equations

Use these context to make the abstract more tangible

Additional Resources

There are many rich tasks available online that can be copied, adapted, and modified to encourage inquiry and discussion around relations and functions.

- LiemnNate's Unit 1 link
- Carl's Function Unit link
- Illustrative Math link
- NRICH link
- Math Assessment Resource Service (MARS) link
- MTBoS -The Global Math Department Projects link

Where do we go from here ...

Unit 1: Relations and Functions (ONLINE at **www.coast2coast.me/liem**)

Sets and set notation...relations ...functions …multiple representations ...intervals and interval notation ...domain/range ...continuous/discrete ... extremas ...roots … increasing/decreasing ...rates of change … graphing stories ...interpreting graphs of functions …

Unit 2: Linear Functions and Piecewise Linear Functions

Unit 3: Arithmetic Sequences and Series as a Bridge to Quadratics

Unit 4: Quadratic Functions

Final Thoughts

Understanding of Relations and Functions is important for success in Calculus.

There are many resources out there beyond traditional approaches to present this topic to help students build deep understanding using rich-task

Questions, comments, and suggestions:

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